A MONOGRAPH OF THE GENUS PROSOPIS (LEGUMINOSAE SUBFAM. MIMOSOIDEAE)

ARTURO BURKART *

THIS MONOGRAPH of *Prosopis* is the result of prolonged herbarium and field studies made over a period of several years with the intention of completing an exhaustive treatment of an important but difficult genus. The monograph represents the completion on a world scale and a revision of my earlier paper "Materiales para una monografía del género *Prosopis* (Leguminosae)" (Darwiniana 4: 57–128. 1940), which found wide acceptance for its more natural definition of the species. For the Mexican-Texan area of the genus, the work by M. C. Johnston (Brittonia 14: 72–90. 1962) on sect. ALGAROBIA was very helpful. Encouragement to write this paper came from those botanists interested in a broad research project on *Prosopis* (Structure of Ecosystems Program of the US/IBP).

I am conscious that this is not a final treatment and that amendments may be necessary as the results of new research become available. However, workers in nontraditional fields of phytotaxonomy and biology need up-to-date systematic accounts of the plants which they study.

My visits to the principal botanical institutions of the United States in 1973 and 1975, after I had seen most Argentine herbaria, gave me the final opportunity to finish this paper. I have to acknowledge with gratitude the interest and help received from many colleagues and friends during this task. Professor Otto Solbrig (Gray Herbarium, Harvard University, Cambridge, Massachusetts), Dr. Beryl Simpson (U. S. National Herbarium, Smithsonian Institution, Washington, D. C.), Dr. Marshall C. Johnston (University of Texas, Austin), and Dr. Peter Raven (Missouri Botanical Garden, St. Louis, Missouri) have to be mentioned in this connection. My thanks are also extended to the staff of the journal of the Arnold Arboretum for valuable editorial work.

* Professor Arturo Burkart, whose extensive treatment of *Prosopis* we are publishing here, visited the Harvard University Herbaria in the spring of 1975. I had previously reviewed the paper in some detail and was able to discuss various matters of arrangement and style with him. He seemed happy that publication would be possible within a year and gave me permission to make any changes in the English that I thought were necessary. Aside from normal editorial alterations, I have made changes only where not to have done so would have left the meaning obscure.

Professor Burkart died only a few weeks after leaving Harvard. We are glad to be able to publish this paper, which embodies some of his great knowledge of and experience with the Leguminosae, a plant family he studied all his life and which he knew better than almost anyone else in the New World.

Arturo Burkart was a helpful colleague and a good friend for many years. His passing is a great loss to American botany. We hope he would have been pleased with this publication of his study of *Prosopis*, his favorite genus. B. G. Schubert.

GENERIC DIAGNOSIS

Prosopis Linnaeus emend. Burkart.

TYPE SPECIES: *Prosopis spicigera* Linnaeus, Mantissa Pl. 68. 1767; cf. A. Burkart, Darwiniana 4: 59, 61. 1940. Now a synonym of *P. cineraria* (L.) Druce.

Flowers small, actinomorphic, pentamerous, hermaphroditic; aestivation valvate; calyx campanulate; corolla with linear petals, these fused or more or less free, glabrous or pubescent, frequently villous or pilose inside toward the tip; androecium of 5 + 5 free stamens; anthers elliptic, dorsifixed, introrse, with an apical, pedicellate, globose or ovoid connectival gland; pollen grains simple, isopolar, tricolporate, subspheroidal to prolate, the exine pertectate, baculate, the sexine bigger than the nexine, the grains large or small; ovary stipitate, villous or sometimes glabrous. Anthesis apparently protogynous, the filiform style emerging from the flower bud before the stamens appear; flowers greenish-white, yellowish with age, seldom red; insect-pollinated.

Fruit a modified indehiscent legume called a drupaceous loment, linear, straight, falcate, annular to spirally coiled; mesocarp fleshy, sugary or fibrous; endocarp divided into 1-seeded, coriaceous to bony segments, closed or sometimes opening easily, longitudinal or rarely biseriate and transverse; seeds ovoid, compressed, with fissural line on the faces (pleurogram), hard, brown, with mucilaginous endosperm (typical of Mimosoideae) surrounding the embryo; cotyledons flat, rounded, epigeous in germination.

Trees or shrubs of varying size, rarely subshrubs, predominantly xerophilous, aculeate, spiny or rarely unarmed. Leaves bipinnate, commonly with few pairs of opposite pinnae, only in a few subaphyllous species sometimes reduced, pinnate, paucifoliolate; petiole with circular, sessile, apical gland and sometimes smaller, similar ones on the rachis of the pinnae; leaflets small, numerous, mostly opposite, linear, oblong, fusiform, rarely large (*P. ruscifolia*), entire, of the same color on both sides; venation pinnate, not very prominent.

Racemes spikelike, amentiform, axillary, mostly densiflorous, sometimes with globose heads.

Shoots in most species dimorphic; megablasts long, flexuous, knotty in age; brachyblasts or short shoots emerging from multiple axillary buds (which develop the cauline spines when extant), leaf fascicles, and racemes.

CHROMOSOMES. The *Prosopis* species are mainly, if not entirely, diploid, with the somatic number of $2n = 28$. Polysomaty in root tips (cortical cells) is frequent and probably responsible for false tetraploidy interpretations, e.g., in *P. juliflora*. A supposedly tetraploid species from the Pacific Islands, *P. insularum* (Guill.) Breteler does not belong to the genus, but to *Schleinitzia* Warburg. Chromosomes in *Prosopis* are small

and uniform, without special distinctive marks. Meiosis seems to be normal even in supposedly hybrid populations.

DISTRIBUTION. About forty-four species distributed in Southwest Asia, Africa, and predominantly America, from western North America to Patagonia, mainly in warm and dry regions of the West, with the center of polymorphism in Argentina. Some species are cultivated and naturalized outside their original homes.

ECOLOGICAL AND ECONOMIC IMPORTANCE. Because of their abundance and ecological behavior, the *Prosopis* species are important vegetation elements in arid and semiarid countries, where many of them offer shade, firewood, timber, and food for man and shade and forage for wildlife and domestic herbivores. Their importance for Indian cultures has been very great in the past and is still considerable, in spite of much devastation. Not to be neglected is the value of the flowers as bee pasture. The edible fruits of some species and varieties are used as food in the form of meal or fermented beverages; however, these products have not yet gained general acceptance.

Some species, especially the mesquite (*P. glandulosa*) in Texas and the vinal (*P. ruscifolia*) in the Chaco, because of their tremendous invading power, have become nuisances to ranchers and are fought with all kinds of herbicides. Other species are planted for shade and forage in the tropics.

Ecologically, the legumes are important for the endozoic propagation of the hard seeds, which germinate freely after passing through the digestive tracts of cattle, sheep, goats, or wild animals such as the guanaco, the South American ostrich, the fox, etc. According to information given to me by O. T. Solbrig, not only are the fruits, if eaten, dispersed by the animals, but their passage through the digestive tract also benefits the seed by killing the Bruchid beetles (specialized legume predators) always present in *Prosopis* fruits. The nutritive legumes, with seeds resistant to the digestive juices of herbivores, demonstrate a superior adaptation of the species of *Prosopis* in their struggle for survival and dispersal.

There is a real need for more ecological studies on these species and for a selection program to aid forestation plans in arid and semiarid regions. Superior strains, especially of such useful species as *P. juliflora, P. chilensis, P. pallida, P. caldenia, P. alba, P. nigra, P. affinis, P. tamarugo,* etc. should be cultivated and tested at experiment stations of dry-climate countries in order to have them ready for large forestation programs.

GENERAL REFERENCES

BAILLON, H. Histoire des Plantes. Vol. 2. 512 pp. Paris. 1870. [*Prosopis*, 64, 65.]

BENSON, L. The Mesquites and screw-beans of the United States. Am. Jour. Bot. **28**: 748–754. 1941.

BENTHAM, G. [*Prosopis.*] *In*: Revision of the suborder Mimoseae. Trans. Linn. Soc. London **30**: 376–381. 1875.

BRITTON, N. L., & J. N. ROSE. Mimosaceae. [*Sopropis, Strombocarpa, Neltuma.*] North American Flora **23**: 182–187. 1928.

BURKART, A. Estudios morfológicos y etológicos en el género *Prosopis*. Darwiniana **3**: 27–47. *6 pls.* 1937.

———. Materiales para una monografía del género *Prosopis* (Leguminosae). *Ibid.* **4**: 57–128. *15 figs. 23 pls.* 1940.

———. Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. Pp. 126–143. Buenos Aires. 1952.

———. Leguminosae. [*Prosopis.*] *In*: A. L. CABRERA, ed., Flora de la Provincia de Buenos Aires. Vol. 3. Pp. 421–431. Buenos Aires. 1967. [See also ed. 1. Buenos Aires. 1943.]

CACCAVARI DE FELICE, M. A. Granos de polen de Leguminosas de la Argentina. II. Subfam. Mimosoideae; tribu Adenanthereae. Revista Mus. Arg. Ci. Nat. B. Rivadavia. Bot. **4**: 281–320. *12 figs. 15 pls.* Buenos Aires. 1972.

CANDOLLE, A. P. DE. Prodromus systematis naturalis regni vegetabilis. Vol. 2. Pp. 446–473. 1825. [*Prosopis, Lagonychium, Acacia* sp. div.]

CARMAN, N. J. Systematic and ecological investigations in the genus *Prosopis* (Mimosaceae) emphasizing the natural products chemistry. 220 pp. Diss. Fac. Univ. Texas, Austin. 1973.

COHEN, R., J. M. CEI, & V. G. ROIG. Ensayos preliminares con técnicas de precipitinas por difusión en gel de agar sobre afinidades proteínicas en el género *Prosopis*. Revista Fac. Ci. Agr. Univ. Nac. Cuyo **13**: 29–41. 1967.

GUINET, PH. Les Mimosacées. Étude de palynologie fondamentale, corrélations, évolution. Thèse, Fac. Sci. Univ. Toulouse. Pp. 52 *et passim.* 1969.

HUTCHINSON, J. Genera of flowering plants. Vol. 1. Pp. 287, 289, 290. Clarendon Press, Oxford. 1964. [*Strombocarpa, Prosopis*, and *Sopropis.*]

ISELY, D. Legumes of the United States. VI. Madroño **21**: 273–298. 1972. [*Prosopis*, 287–298.]

JOHNSTON, M. C. The North American Mesquites, *Prosopis* sect. *Algarobia* (Leguminosae). Brittonia **14**: 72–90. 1962.

LINNAEUS, C. Mantissa plantarum. Vol. 1. 144 pp. 1767. [Original description of the genus, 10, 11, 68.]

PFEIFFER, L. Nomenclator botanicus. Vol. 2. 1698 pp. Cassellis. 1874. [Older references to the genus, 842.]

SCHUSTER, J. L., ed. Literature on the Mesquite (*Prosopis* L.) of North America. An annotated bibliography. 84 pp. Special Report no. 26. International Center for Arid and Semi-Arid Studies, Texas Tech. University. 1969.

TAUBERT, P. [*Prosopis.*] *In*: A. ENGLER and K. PRANTL, Die natürlichen Pflanzenfamilien. Vol. 3. Pp. 118, 119, 385. Leipzig. 1891.

GENERIC LIMITS AND SUBDIVISIONS

Because of the uniformity of leaf, floral, and fruiting characters, there seems to be no reason for a subdivision of the genus such as was proposed by Britton and Rose (North American Flora **23**: 180, 182–187. 1928) and followed in part by Hutchinson (1964).

The paribipinnate leaf, characteristic of the whole subfamily Mimosoideae, presents in most species of *Prosopis* only one or a few pairs of pinnae and never a solitary apical pinna, found, for instance, in the leaves

of *Caesalpinia* and *Hoffmanseggia* and other caesalpinioid genera, but entirely absent in the Mimosoideae.

Flowers in *Prosopis* are of the common actinomorphic, pentamerous, decandrous, hermaphroditic type, with gland-tipped anthers, apparently the primitive model of a mimosoid floret.

The fruit, a modified, indehiscent, more or less fleshy legume with the endocarp commonly hardened and segmented into one-seeded joints, is of a type which I have called "*lomento drupáceo*" (*lomentum drupaceum*; Burkart, Las Leguminosas Argentinas, sylvestres y cultivadas 21. 1943; *Ibid.* ed. 2. 17. 1952). In spite of the diversity of forms and curling, the fruit is fundamentally uniform, another sound reason for maintaining *Prosopis* sensu lato, essentially as it was established by G. Bentham. Too much weight has been given to the curvature and curling of the *Prosopis* fruit and its bearing on systematics. There is a parallel development in both main sections (STROMBOCARPA and ALGAROBIA), with variation from nearly straight to curved and spirally coiled loments. Only one difference exists; the closed corkscrew type is reached by only some members of sect. STROMBOCARPA, while in sect. ALGAROBIA the spirals are always fewer, larger, and open. This difference is of importance at the specific level.

In contrast with this uniformity of the fruit, there is a marked vegetative diversification in the armature, whether it consists of spines or prickles or is absent. These differences provide the best foundations for a sectional subdivision of the genus. Most authors of local treatments of *Prosopis* fail to recognize the importance of these differences of subgeneric rank, although I devoted a special paper to them (Burkart, 1937). Britton and Rose, for example (*loc. cit.*), made no distinction between "stipular spines" or "spinescent stipules" in their "genera" *Sopropis*, *Strombocarpa*, and *Neltuma*. Relying on the differences of armature to provide the only strict differences between sections, we may trace the following scheme, which notwithstanding its morphological nature possibly has phylogenetic significance:

1. Primarily unarmed. African species. ..... Sect. ANONYCHIUM (species 4).
2. With cauline prickles (internodal hard emergences like the aculei of *Rosa* and *Rubus*). Asiatic and North African species. ..... Sect. PROSOPIS (formerly sect. *Adenopis*) (species 1–3).
3. With stipular (foliar) spines; stipules very early in ontogeny developed into straight, paired spines. American species. ..... Sect. STROMBOCARPA (including "*Sopropis*") (species 5–13).
4. With cauline, axillary, solitary or paired, multi- or uninodal, straight spines. American species.
   a) Spines axillary; shoots differentiated into macroblasts and knotty brachyblasts. Fruit compressed. ..... Sect. ALGAROBIA (syn. *Neltuma*), *pro parte maxima* (species 15–44).
   b) Spines axillary and apical, uninodal, solitary; no brachyblasts. Fruit moniliform. ..... Sect. MONILICARPA (species 14).
5. Secondarily unarmed, because of suppression of the axillary, cauline spines. American species, especially from Paraguay and Argentina. ..... Sect. ALGAROBIA, *pro parte minima* (species 18, 20, 29, 35, 39, etc.).

The term "stipular spines" is ambiguous if not clearly defined. It may mean spinescent stipules, as in sect. STROMBOCARPA, or it may mean geminate, axillary, uninodal, cauline spines developed near the stipules but independent from them, as in sect. ALGAROBIA.

It is interesting to look at another large genus of the Mimosoideae, *Acacia*, to find a similar differentiation. The *Acacia* section or subgenus (Gummiferae Bentham) has spinescent stipules, just as does sect. STROMBOCARPA. *Acacia* subg. ACULEIFERUM Vassal (ser. Vulgares Bentham) has the internodal prickles of *Prosopis* sect. PROSOPIS (although mostly recurved prickles). Then there is one rare *Acacia* species in Australia, *A. pulchella* R. Brown, which has developed primitive, axillary, cauline, uni- or plurinodal, sometimes foliate spines and represents the morphological type of *Prosopis* sect. ALGAROBIA very weakly expressed. The extraordinary leaf polymorphism of the phyllodial acacias in Australia (ser. Phyllodineae Bentham) is not paralleled in *Prosopis*, in which no phyllodes are known. Instead, some species (sect. ALGAROBIA, ser. Sericanthae Burkart) are aphyllous or subaphyllous (leaves small and shed very early in the season), with photosynthesis being accomplished within the cortical tissue of branchlets and spines. This vegetative type is in turn very rare in the genus *Acacia*, although present in a few Australian species.

In other families as well, vegetative differences are also considered to be of infrageneric rank. See, for example, the recent reduction of *Junellia* Moldenke (Verbenaceae) to a section of *Verbena* by N. S. Troncoso (Darwiniana 18: 312. 1974).

There is a floral character which could be considered as important. In sect. ANONYCHIUM, in its only species (and also the only tropical African one), *P. africana* (Guill., Perr., & Rich.) Taubert, the connective of the anther is broadened and the apical gland incurved together with it. This is beautifully portrayed in a recent plate of P. Brenan (in Hubbard & Milne-Redhead, Flora Trop. East Africa 35. London. 1959). At first I thought to use this character as one of sectional value, but later I was able to observe a somewhat similar incurving of the anther gland in *P. farcta* Solander ex Russell) Macbride of sect. PROSOPIS. This fact convinced me again of the generic unity of *Prosopis* in its wider delimitation.

Vegetatively, there is a great diversity in habit. One Oriental species, *P. farcta*, is known by its invading rootsuckers (or rhizomes?), by which it approaches the American *P. strombulifera* (Lam.) Bentham and its relatives. In this and some other characters, sect. STROMBOCARPA comes closer to sect. PROSOPIS than to the entire sect. ALGAROBIA, in which rhizomes or rootsuckers are unknown. However, there remains the basic difference between the two, prickles *versus* spiny stipules.

In sect. PROSOPIS one species, *P. cineraria* (L.) Druce, has longitudinal seeds, another, *P. farcta*, transverse seeds and segments in the fruit. This is a difference to which the rank of series is given in sect. STROMBOCARPA. However, in sect. PROSOPIS the discovery of the new *P. koelziana* Burkart, with its intermediate fruit fabric, reduces the systematic value of this

difference so that no series are distinguished. It is even less possible to revive *Lagonychium* M. Bieb. as a genus for *P. farcta*, as proposed by Bobrov in Komarov's *Flora of the USSR*.

PROBABLE EVOLUTIONARY DEVELOPMENT OF SPECIATION

Prosopis is a rather primitive genus within the Mimosoideae, as the simple pollen grains, the mostly free petals, and the decandrous condition prove. It possibly originated in tropical Africa, where only *P. africana*, the least specialized species, persists. Near relatives are *Adenanthera* L. and *Pseudoprosopis* Harms, with dehiscent legumes. From this or a similar ancestral stock may have evolved the more specialized groups, which have fleshy, indehiscent drupaceous legumes, nearly all with the vegetatively differentiated megablasts and/or brachyblasts (these are absent only in *P. argentina*, aside from in *P. africana*), and with pungent organs (also absent in *P. africana*). The prickly Asian species of sect. PROSOPIS developed in the eastern, arid desert zones. The spiny American ones developed in the western hemisphere into two sharply differentiated, parallel groups, also with desert climate preferences: sect. STROMBOCARPA (with spiny stipules) and sect. ALGAROBIA (with cauline, mostly axillary thorns). In between the two appeared the small section MONILICARPA, with only one isolated member, *P. argentina*, of doubtful origin and affinities. The related genus *Prosopidastrum* Burkart (formerly considered a section of *Prosopis*), with two species, one in Baja California and the other in Patagonia, is a side-branch, which seems to confirm a common origin in one ancient desert floral center. According to the Wegener theory of continental drift, land connections between east and west were easier at the end of the Mesozoic or the beginnings of Tertiary times, when these plant groups must have originated; so the ancestors of present-day *Prosopis* species may have migrated widely from the African center to both east and west, slowly evolving different species that were adapted not to long-distance dispersal, but to a very effective endozoic diffusion through mammals and larger birds (owing to the succulent, edible legumes with hard seeds that escape digestion). Present distribution patterns of species of *Prosopis* do not exclude the possibility of an ancient desert flora common to both Americas which later divided and became widely separated into two centers, the Mexican-Texan center and the Argentine-Paraguayan-Chilean one, where most species occur. The fact that in both centers endemic species exist indicates their antiquity and suggests that long-distance dispersal did play only a secondary role, if any. After millions of years, the speciation process (mainly gene mutations, as suggested by the karyogram uniformity) slowly originated the 40 American species and several varieties now known. Several facts indicate that in America the principal center of origin is Argentina and that the Mexican center is a secondary one. Or perhaps they are of the same age, but some factors, e.g., stronger competition with the boreal floras, prevented a major species development in that northern area of the genus.

TAXONOMIC HISTORY OF THE GENUS

The name *Prosopis*, selected by Linnaeus for this genus, is of ancient Greek origin and means a kind of prickly fruit, such as the head of *Arctium lappa* L. (Compositae). Pfeiffer (Nomencl. Bot. 2(2): 842. 1874) wrote, "Nomen ex Dioscoride, ubi Lappam significat." The interpretation of classic *Prosopis* as a species of *Petasites* (Dictionary of Gardening, Roy. Hort. Soc., Oxford, 1965) is incorrect. Linnaeus, in this case as in others, proceeded arbitrarily, changing a name of age-old tradition and raising the opposition of contemporary, erudite botanists such as Albrecht von Haller. However, at present Linnaeus's name must be accepted. He apparently knew only one species, the type species of *Prosopis* from the Near East, which he called *P. spicigera* in his *Mantissa Plantarum*, published in 1767.

Ludwig Pfeiffer, in his important bibliographic work mentioned above, offers a number of references to the early use of the name since Linnaeus, which I shall not repeat here. However, some of them are of value as milestones in the development of the taxonomy of *Prosopis*.

The *Ceratonia chilensis* of Ignacio Molina (Saggio sulla storia naturale del Chili 172. Bologna. 1782) seems to be the second species described. However, it was ignored for a long time, owing to its inclusion in the wrong genus; its author was misled by the similar Spanish name, structure, and uses of the fleshy legume of the Mediterranean St. John's bread, *Ceratonia siliqua* L. It is *Prosopis chilensis*, the "Algarrobo de Chile" (a big tree of the affinity of *Prosopis juliflora* (Sw.) DC. of northern South America and now the type of ser. Chilenses, ser. nov.) which causes taxonomists so much difficulty.

Mimosa juliflora of Olof Swartz, published in 1788, was the third species recognized, but it was not incorporated into *Prosopis* until 1825. *Mimosa strumbulifera* Lamarck (later corrected to *strombulifera*), Encycl. Méth. Bot. 1: 15, appeared in 1789 and was the first known species of sect. STROMBOCARPA. Willdenow transferred this to *Acacia* (Sp. Pl. ed. 4. 4(2): 1055. 1806).

The voyage of Humboldt and Bonpland to tropical America (1799–1805) contributed various species, first described as species of *Acacia* by Willdenow (*Ibid.* 1058, 1059) and later placed in the proper genus by C. S. Kunth (H.B.K. Nov. Gen. Sp. Pl. folio ed. 6: 305–310. 1823).

The founders of the present limits and subdivisions of the genus are A. P. De Candolle and G. Bentham, the universally known great plant systematists of the 19th century. The former (DC. Prodr. 2: 446 *et passim.* 1825) incorporated the American sect. ALGAROBIA (with the erroneous character "antherae eglandulosae"), enumerating 13 species, if we include the dubious *Prosopis affinis* Sprengel (evidently of this section but listed by De Candolle under species "non satis notae." De Candolle failed to incorporate *Lagonychium* M. Bieb., which is very near sect. ADENOPIS DC., the typical section of *Prosopis*, and he did not recognize sect. STROM-

BOCARPA, defined later by Bentham, in spite of his knowledge of two of its species, *P. torquata* (Lag.) DC. (*loc. cit.* 448) and "*Mimosa*" *strombulifera* Lam. (cited as *Acacia strumbulifera* (Lam.) Willd. in DC. Prodr. 2: 455).

Discrepancies concerning the generic limits of *Prosopis* continued for a time. C. S. Rafinesque Schmaltz, working quite independently and getting no acceptance for his views, founded the genus *Neltuma* Raf. (Sylva Telluriana 119. 1838), with *N. juliflora* as the type. Only a year later, Bentham considered *Prosopis* sect. ALGAROBIA DC. worthy of generic rank (*Algarobia* Bentham, Plantae Hartwegianae 13. 1839), but on false assumptions derived from De Candolle's partially incorrect description. Unfortunately, *Algarobia* is a synonym of *Neltuma* Raf. However, Bentham confirmed De Candolle's diagnosis of the spines, "spec. Americanae spinis nullis aut axillaribus" (Prodr. 2: 446. 1825), of utmost importance in the distinction of sections, stating (*loc. cit.*), "spinae axillares supra stipulas natae ut DC. l. c. in char. sectionis, nec stipulares ut in diagnosibus specificis."

A short time later, Bentham changed his mind and accepted *Prosopis* nearly in its present wider limits (Hooker's Jour. Bot. 4: 346–352. 1842). He maintained his system in the "Revision of the Suborder Mimoseae" (Trans. Linn. Soc. London 30: 376–381. 1875) and was followed by many authors, e.g., P. Taubert (in Engler & Prantl, Nat. Pflanzenfam. 3(3): 118, 119, 385. 1891).

In my paper "Materiales para una monografía del género *Prosopis* (Leguminosae)" (Darwiniana 4: 59, 60. 1940), I accepted and commented upon Bentham's system. In a previous paper on the morphology and ethology of the genus (Darwiniana 3: 24–47. 1937), I tried to give a sound morphological and anatomical basis for the distinction of spines in sects. ALGAROBIA and STROMBOCARPA.

The strongest attack against a wide concept of the genus came in modern times from Britton and Rose in their treatment of "Mimosaceae" (in North American Flora 23(3): 180, 182–187. 1928), followed later by a number of other authors not specialists in the study of Leguminosae. Britton and Rose recognized three genera, *Sopropis*, *Strombocarpa*, and *Neltuma* (*Algarobia*), describing at the same time nine new "species" of *Neltuma*, most of which have since fallen into synonymy. *Sopropis* Britton & Rose (as gen. nov.) is only an outstanding form of *Strombocarpa*. I explain elsewhere in the present paper my opinion that the main differences between sections PROSOPIS, ALGAROBIA, and STROMBOCARPA are the vegetative spine characters and are, therefore, only of subgeneric rank.

Those who prefer to divide the genus (an opinion which I do not sustain) must remember that the section STROMBOCARPA as a genus (*Strombocarpa* Englm. & A. Gray, Boston Jour. Nat. Hist. 5: 243. 1845) is antedated by *Spirolobium* D'Orbigny (Sertum Patagonicum. *tab. 13.* 1839) and sect. ALGAROBIA as a genus (*Algarobia* (DC.) Bentham, Plantae Hartwegianae 13. 1839) by *Neltuma* Raf. (Sylva Telluriana 119. 1838). In this case, *Prosopis* would be reduced to the three Asiatic species

known at present, and all the American ones would become either *Spirolobium* or *Neltuma*. The remaining African section, with only *P. africana*, would also have to be raised to generic rank, because it shows no affinity with the bulk of the American species, nor with the type section of *Prosopis*. This would cause a total change in the nomenclature of many well-known species, with no benefit to anyone. More modern approaches, from the karyological, palynological, and chemotaxonomic researches, do not support (or only slightly support) such a radical subdivision into four genera. Moreover, other large genera of the Mimosoideae, especially *Acacia*, would have to be divided on the same grounds of purely vegetative characters. Finally, why do we have the categories of subgenus, section, and series if we do not use them? These are of great help in expressing intrageneric affinities without the excessive splitting and resulting changes of names so often resisted by those who must use them. I follow here the principles of the *International Code of Botanical Nomenclature*.

Minor changes at the sectional level merit a brief consideration. Bentham, in his famous joint work with Hooker, *Genera Plantarum* (1(2): 591. 1865), defined a section CIRCINARIA with one tropical African species, which he later ("Revision of the suborder Mimoseae," Trans. Linn. Soc. London 30: 515. 1875) reduced to the synonymy of *Acacia albida* Delile. The species was called *P.? kirkii* by Oliver (Fl. Trop. Africa 2: 332. 1871). Such errors concerning the genus are not uncommon in dealing with tropical Mimosoideae when the specimens lack flowers, owing to a certain degree of convergence in the legume characters. Taubert, writing the treatment of the Leguminosae for Engler and Prantl's *Natürlichen Pflanzenfamilien*, accepted sect. CIRCINARIA in the text, but suppressed it in the *errata* section (3(3): 119, 385. 1891).

Another "section" which later had to be suppressed is sect. LOMENTARIA C. Spegazzini (Anal. Soc. Ci. Arg. 47: 286. 1899), based on *Prosopis striata* Bentham, a synonym of *Prosopis globosa* Gillies ex Hooker & Arnott. In a note I tried to clear up the bewildering synonymy of this Patagonian species (Burkart, Physis 20: 53, 54. 1945) without changing its position in sect. LOMENTARIA (Darwiniana 4: 63. 1940). However, the question of the correct genus was raised after the discovery by Dressler of a closely related taxon, *Prosopis globosa* var. *mexicana* Dressler, in Baja California, Mexico. This was later given specific rank, in a new genus, *Prosopidastrum* Burkart (Darwiniana 13: 436–443. 1964), with two species, *P. mexicanum* (Dressler) Burkart (the type) and *P. globosum* (Gillies ex Hooker & Arnott) Burkart. This is a remarkable instance of bicentrism — two very closely related species, one in northwestern Mexico, the other in Patagonia, with no other affinities. The genus *Prosopidastrum* has dehiscent legumes in the type species, but not in the other one; the two species are similar vegetatively, with stipules spiny and recurved and twigs ending in a spine, a combination not found in any *Prosopis*.

A NEW SYNOPSIS OF THE GENUS PROSOPIS
(With Descriptions of the Sections and Series)

Prosopis Linnaeus emend. Burkart.

Type species. *Prosopis spicigera* Linnaeus, Mantissa Pl. 68. 1767; cf. Burkart, Darwiniana 4: 59, 61. 1940. Now a synonym of *P. cineraria* (L.) Druce.

I. Prosopis sect. Prosopis.

Prosopis sect. *Adenopis* DC. Prodr. 2: 446. 1825.
Lagonychium M. Bieb. Suppl. Fl. Taur. Cauc. 3: 288. 1819.

Shrubs or small trees armed with internodal, straight prickles; no stipular or axillary spines. Flowers in spikelike racemes; petals and ovary entirely glabrous; pollen with areolate exine. Fruit slender or turgid, long or short, very slightly curved; seeds longitudinal or transverse.

Type species. The same as for the genus: *Prosopis cineraria* (L.) Druce.

Distribution. Southwest Asia, North Africa; three species.

II. Prosopis sect. Anonychium Bentham in Hooker's Jour. Bot. 4: 347. 1842; sect. "*Anonychia*" Bentham, "Revision of the Suborder Mimoseae," Trans. Linn. Soc. London 30: 377. 1875.

Unarmed trees. Leaves well developed; racemes spikelike. Petals glabrous; ovary and style hairy; anther gland introrse, on an expanded, incurved connective; pollen small, the exine perforated, with costae. Legume subterete, straight, thick; seeds longitudinal.

Type species. *Prosopis oblonga* Bentham, *loc. cit.*, a synonym of *P. africana* (Guill., Perr., & Rich.) Taubert.

Distribution. Tropical Africa; only one species.

III. Prosopis sect. Strombocarpa Bentham in Hooker's Jour. Bot. 4: 351. 1842.

Spirolobium D'Orbigny, Sertum Patagonicum. *tab. 13. 1839.*
Strombocarpa Engelm. & A. Gray, Boston Jour. Nat. Hist. 5: *243.* 1845, according to Hutchinson, Gen. Fl. Pl. 1: 287. 1964.

Always spiny shrubs or trees, the spines foliar; stipules lignified, developed into paired, straight, divergent spines of variable length, mostly fused at base and somewhat decurrent from the nodes, external to the

axillary buds or foliate brachyblasts. Flowers in globose to ovoid heads or in more or less elongated spikes; corolla gamopetalous, the petals villous to scarcely pilose within at the tip; pollen medium-sized, the exine thick, ornamented. Leaves with only one pair of pinnae. Fruit straight, curved, or coiled into a dense spiral.

TYPE SPECIES. *Prosopis strombulifera* (Lam.) Bentham.

In this section two series can be distinguished.

Prosopis ser. **Strombocarpae** A. Burkart, ser. nov.

Endocarpii segmenta seminaque longitudinaliter disposita. Legumen rectum, falcatum, vel lateraliter in spiram tortum.

TYPE SPECIES. The same as for the section: *Prosopis strombulifera* (Lam.) Bentham.

DISTRIBUTION. Southwestern United States and Mexico to Chile and Argentina; seven species.

Prosopis ser. **Cavenicarpae** (Burkart) Burkart, comb. nov. BASIONYM: *Prosopis* sect. *Cavenicarpa* Burkart, Darwiniana **4**: 76. 1940.

Endocarpii segmenta seminaque in legumine transverse bifariam disposita. Legumen subrectum, falcatum, vel annulare, turgidum, haud lateraliter tortum.

TYPE SPECIES. *Prosopis ferox* Grisebach.

DISTRIBUTION. South America; two species.

IV. Prosopis sect. **Monilicarpa** Ruiz Leal ex Burkart, sect. nov.

Prosopis sect. *Monilicarpa* Ruiz Leal *nomen nudum* in Cohen, Cei, & Roig, Rev. Fac. Ci. Agr. Univ. Nac. Cuyo **13**: 31. 1968.

Frutices ramis teretibus elongatis flexuosis, foliis alternis haud fasciculatis, unijugis; spinae solitariae, axillares, breves, uninodales necnon apicales. Racemi laxi, elongati, pauciflori. Flores pro rata magni, pubescentes; petala intus pilosa; glandula antherali minima. Legumen drupaceum, moniliforme, elongatum, rubrum; articuli ovoideo-globosi haud compressi, isthmi valde constricti; endocarpium osseum.

TYPE SPECIES. *Prosopis argentina* Burkart.

DISTRIBUTION. Western Argentina; one species.

V. Prosopis sect. **Algarobia** DC. Prodr. 2: 446. 1825.

Neltuma Raf. Sylva Telluriana 119. 1838.
Algarobia (DC.) Bentham, Plantae Hartwegianae 13. 1839.

Trees, shrubs, or rarely subshrubs without rhizomes, spiny or rarely unarmed; spines cauline, axillary, uninodal, rarely multinodal, solitary or frequently paired and internal in position between the multiple buds and the main internode; stipules small, never spinescent. Flowers in spike-like racemes; petals more or less free, villous inside toward the apex; pollen small, the exine thin, slightly or not at all ornamented. Fruit a drupaceous legume, straight, falcate, annular, or coiled into a very lax and open spiral with 1 to 3 turns, stipitate and acuminate; seeds more or less numerous within, with hard or coriaceous endocarp segments in one longitudinal row.

TYPE SPECIES. *Prosopis juliflora* (Sw.) DC.

DISTRIBUTION. Warmer and drier parts of America; about twenty-nine species.

In this, the largest section, several series can be distinguished.

Prosopis ser. **Sericanthae** Burkart, ser. nov.

Frutices vel arbores subaphyllae, horridae, ramosae; rami spinosi, axillares et terminales, spinas multinodales formantes.

TYPE SPECIES. *Prosopis sericantha* Gillies ex Hooker & Arnott.

DISTRIBUTION. Argentina, Paraguay; two species.

Prosopis ser. **Ruscifoliae** Burkart, ser. nov.

Arbores foliatae; spinae axillares, uninodales, validae, parvae vel nullae, solitariae vel interdum alternatim 1 vel 2. Folia unijuga; foliola saepe pro genere magna vel mediocria, illis serierum sequentium maiores; racemi spiciformes. Legumen elongatum, compressum, articulis subquadratis.

TYPE SPECIES. *Prosopis ruscifolia* Grisebach.

DISTRIBUTION. Gran Chaco (Argentina, Paraguay); four species.

Prosopis ser. **Denudantes** Burkart, ser. nov.

Frutices ramosi, spinosi; spinae axillares, uninodales, semper solitariae. Folia parva vel mediocria, bipinnatim unijuga, caduca. Flores breviter racemosae. Legumen drupaceum, crassiusculum complanatumve, rectum vel incurvatum, subsiccum.

TYPE SPECIES. *Prosopis denudans* Bentham.

DISTRIBUTION. Southwestern Argentina (Patagonia, Cuyo); four species.

Prosopis ser. **Humiles** Burkart, ser. nov.

Frutices vel subfrutices spinosi, ramis (in sicco) striatis. Folia parva, bipinnatim unijuga vel reducta 2-foliolata, caduca. Spinae axillares, geminatae, uninodales, in sicco striatae. Racemi spiciformes, breves. Legumen compressum.

TYPE SPECIES. *Prosopis humilis* Gillies ex Hooker & Arnott.

DISTRIBUTION. Central Argentina, Paraguay; two species.

Prosopis ser. **Pallidae** Burkart, ser. nov.

Arbores vel frutices elati vel nani; spinae uninodales, axillares geminatae. Folia parva vel mediocria, contracta bipinnatim, pauci- vel plurijuga. Racemi elongati, foliis longiores vel subaequales. Legumen compressum, elongatum, subrectum vel annulare; segmenta endocarpi subquadrata vel elliptica, longitudinalia.

TYPE SPECIES. *Prosopis pallida* (Willd.) HBK.

DISTRIBUTION. Argentina to Mexico; seven species.

Prosopis ser. **Chilenses** Burkart, ser. nov.

Arbores vel frutices; spinae uninodales, axillares, geminatae, validae vel parvae, interdum nullae, rarius alternatim 1 vel 2 pro nodo in eodem ramulo. Folia bipinnata pauci-(1–4-)juga, saepe ampla; racemi spiciformes foliis aequilongae vel breviores aut paullo longiores; foliola parva, mediocria usque longiuscule lineares, in rachide approximata vel dissita. Legumen drupaceum elongatum, plus minusve pulposum, lineare, compressum, subrectum, falcatum, annulare vel laxe spiraliter tortum; segmenta endocarpii numerosa, uniseriata, coriacea, saepe subquadrato-ovata, isthmi lati.

TYPE SPECIES. *Prosopis chilensis* (Molina) Stuntz emend. Burkart.

DISTRIBUTION. Southwestern United States and Mexico to Chile, Argentina, and Uruguay; eleven species.

SYSTEMATIC INDEX OF THE KNOWN SPECIES AND VARIETIES OF PROSOPIS

(ARRANGED BY SECTIONS AND SERIES)

Prosopis Linnaeus emend. Burkart

I. *Prosopis* sect. PROSOPIS (syn. sect. *Adenopis*)

1. *P. cineraria*
2. *P. farcta*
   var. *farcta*
   var. *glabra*
3. *P. koelziana*

II. *Prosopis* sect. ANONYCHIUM

4. *P. africana*

III. *Prosopis* sect. STROMBOCARPA (syn. *Spirolobium*)

Ser. Strombocarpae
5. *P. strombulifera*
   var. *strombulifera*
   var. *ruiziana*
6. *P. reptans*
   var. *reptans*
   var. *cinerascens*
7. *P. abbreviata*
8. *P. torquata*
9. *P. pubescens*
10. *P. palmeri*
11. *P. burkartii*

Ser. Cavenicarpae
12. *P. ferox*
13. *P. tamarugo*

IV. *Prosopis* sect. MONILICARPA

14. *P. argentina*

V. *Prosopis* sect. ALGAROBIA (syn. *Neltuma, Algarobia*)

Ser. Sericanthae
15. *P. sericantha*
16. *P. kuntzei*

Ser. Ruscifoliae
17. *P. ruscifolia*
18. *P. fiebrigii*
19. *P. vinalillo*
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   var. *hassleri*
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Ser. Denudantes
21. *P. denudans*
    var. *denudans*
    var. *patagonica*
    var. *stenocarpa*
22. *P. ruizleali*
23. *P. castellanosii*
24. *P. calingastana*

Ser. Humiles
25. *P. humilis*
26. *P. rojasiana*

Ser. Pallidae
27. *P. rubriflora*
28. *P. campestris*
29. *P. pallida* (including *P. limensis*)
30. *P. affinis* (syn. *P. algarobilla*)
31. *P. articulata*
32. *P. elata*
33. *P. tamaulipana*

Ser. Chilenses
34. *P. chilensis*
    var. *chilensis*
    var. *riojana*
    var. *catamarcana*
35. *P. juliflora*
    var. *juliflora*
    var. *inermis*
    var. *horrida*
36. *P. nigra*
    var. *nigra*
    var. *ragonesei*
    var. *longispina*
37. *P. caldenia*
38. *P. laevigata*
    var. *laevigata*
    var. *andicola*
39. *P. flexuosa*
    forma *subinermis*
40. *P. glandulosa*
    var. *glandulosa*
    var. *torreyana*
    var. *prostrata*
41. *P. alpataco*
42. *P. alba*
    var. *alba*
    var. *panta*
43. *P. velutina*
44. *P. pugionata*

TENTATIVE KEY TO THE SPECIES OF PROSOPIS THROUGHOUT THE WORLD

1. Petals glabrous. Prickly or unarmed shrubs or trees; no stipular or axillary spines present. Flowers in elongate, spikelike racemes. Legume elongate, slender or thick, straight to subfalcate.
   2. Ovary glabrous. Shrubs or trees mostly armed with internodal, straight, divergent prickles. Stipules caducous, foliaceous, leafletlike or a little larger; leaflets small. Anther gland straight. (Sect. PROSOPIS.)
      3. Leaves 1–3-jugate, glabrous. Legume long-stipitate, the stipe 0.8–2 cm. long; fruit slender, somewhat moniliform, linear to much elongate, cuneate at base. Seed segments longitudinal to transverse.
         4. Legume very slender and elongate, cylindroid-subtorulose, 8–19 cm. long × 4–7 mm. in diameter. Seeds longitudinal, separated from each other, in one row. Spikelike racemes solitary or mostly paniculate; primary bract amplexicaul, with oblique insertion. Southwest Asia. ..... 1. *P. cineraria.*
         4. Legume short-linear, subtorulose, 4–6 cm. long × 8–10 mm. in diameter. Seeds approximated, in transverse-oblique position. Racemes solitary, axillary; bracts lacking. Iran. ..... 3. *P. koelziana.*
      3. Leaves 2–7-jugate, pubescent or glabrous. Legume short-stipitate, turgid, ovoid to thickly terete, rounded and longitudinally furrowed at base, straight or more often inwardly curved. Seeds transverse, in two rows. Racemes solitary, without basal amplexicaul bract. Southwest Asia. ..... 2. *P. farcta.*
   2. Ovary villous or hirtellous. Unarmed trees. Stipules small, not foliaceous; leaflets medium-sized, larger and fewer. Anther gland introrse, on a broad, inwardly curved connective. Legume straight, subterete, thick. (Sect. ANONYCHIUM.) Tropical West Africa to Ethiopia. ..... 4. *P. africana.*
1. Petals internally villous or at least somewhat pilose toward the apex, externally glabrous or pubescent. Ovary pubescent to villous. Trees, shrubs, or subshrubs armed with stipular or axillary spines, sometimes (secondarily) unarmed, never prickly. Flowers in spikelike racemes or heads. Legume elongate, subcylindric or more often compressed, straight, curved, or spirally coiled, rarely moniliform.
   5. Spines foliar; stipules transformed into straight, divergent, paired spines, small or large, but present on all nodes, mostly united at base and more or less decurrent, external in position to the axillary bud or brachyblast (short shoot). Leaves with only one pair of pinnae; leaflets small, numerous. Flowers in spikes or heads, reddish-yellow, corolla gamo- or dialypetalous. Legume straight, falcate, or coiled into an open or dense spiral. Endocarp segments longitudinal or transverse. (Sect. STROMBOCARPA.)
      6. Endocarp segments and seeds in longitudinal position, forming one row; segments developed and closed, or endocarp thin, nearly continuous. Fruits various, ranging from straight to laterally coiled like a corkscrew. Trees or shrubs. (Ser. Strombocarpae.)

7. Legume subterete, nearly straight to subfalcate. Flowers sessile, in spikes. Petals highly connate, nearly glabrous inside. Mexico, Baja California. ..... 10. *P. palmeri.*
7. Legume always laterally curled or coiled in more than 1 or 2 open or closed circles. Flowers in heads or spikes. Petals more or less free.
   8. Flowers in elongate spikes; floriferous rachis 2–8 cm. long.
      9. Legume moniliform, in a few (1–3) coils with a central hole. Endocarp segments bony. Small tree. Central and northwestern Argentina. ..... 8. *P. torquata.*
      9. Legume not or scarcely moniliform, in closed coils without central hole. Endocarp segments coriaceous to thin, delicate, often continuous.
         10. Coils of the legume few (1–3), irregular, submoniliform, several legumes together forming a globose mass. Large, dense shrub with spreading horizontal branches. Northern Chile: Tarapacá. 11. *P. burkartii.*
         10. Coils of the legume numerous, regular, the margins parallel, the spirals usually forming a cylindrical structure. Tree. Southwestern North America. ..... 9. *P. pubescens.*
   8. Flowers in short-cylindric, ovoid or globose heads; floriferous rachis 1 cm. or less long.
      11. Heads ovoid to short-cylindric, 1.5–1.8 cm. long. Legume reddish-brown, in 2 to 7.5 irregular, dense coils. Tall shrub or small tree. Central Argentina. ..... 7. *P. abbreviata.*
      11. Heads perfectly globose. Legume yellow, in more numerous, regular coils. Smaller shrubs forming loose thickets by creeping gemmiparous roots (or rhizomes?).
         12. Leaflets separated, glabrous, in 3 to 8 pairs per pinna. Western Argentina, northern Chile, Peru(?). ..... 5. *P. strombulifera.*
         12. Leaflets close together, mostly pubescent after drying imbricated, in (2 to) 6 to 12 pairs per pinna, smaller. ..... 6. *P. reptans.*
            13. Leaflets pubescent; bracts small. Central Argentina, Peru. ..... 6. *P. reptans* var. *reptans.*
            13. Leaflets glabrous or of a more villous type, especially when young; bracts larger and villous. Texas. ..... 6. *P. reptans* var. *cinerascens.*
6. Endocarp and seeds in transverse position, mostly alternate segments forming two rows. Fruits thicker, subcylindric, nearly straight, falcate or once-annular, ring-shaped, incurved, not laterally coiled. (Ser. Cavenicarpae.)
   14. Tree becoming 15–18 m. tall in age. Stipular spines 0.5–3.8 cm. long. Leaflets obtuse. Legume curved, forming a half to complete ring, subtorulose, 7–11 mm. in diameter, the sutures impressed. Seeds 3–4.3 mm. long. Northern Chile. ..... 13. *P. tamarugo.*
   14. Trees or shrubs 2–5 m. tall. Stipular spines up to 5 cm. long. Leaflets acute or mucronate. Legume straight or

incurved, not torulose, 10–18 mm. in diameter, 2.5–7 cm. long × 1–1.8 cm. thick; placental suture prominent. Seeds 4.5–6 mm. long. Extreme northwestern Argentina, southern Bolivia. ..... 12. *P. ferox.*

5. Spines cauline; thorns resulting from metamorphosed branchlets, multi- or uninodal, long or short, not on all nodes but seldom entirely absent, solitary or frequently in axillary pairs ("geminate"), then internal in position between the multiple buds (brachyblasts or short shoots) and the main branch internode. Leaves with one to 8 pairs of pinnae, sometimes reduced. Racemes spikelike (amentiform), slender; flowers yellowish or sometimes red, the petals little connected, more or less free. Fruit a drupaceous loment, linear, rarely moniliform, straight, falcate or in a few open coils. Endocarp articles longitudinal, in one row. (Sect. MONILICARPA and sect. ALGAROBIA.)
   15. Plants spiny; spines present on at least some nodes, generally better developed on strong shoots than on small twigs.
      16. Spines multinodal; terminal and lateral thorns, with scars representing the reduced leaves. Subaphyllous, horridulous shrubs or trees, with all branchlets spiny. Legume nearly straight or slightly curved, dark or dullish red. (Sect. ALGAROBIA, ser. Sericanthae.)
         17. Shrubs. Calyx and corolla hirtellous outside. Flowering racemes short, ovoid. Spiny twigs slender, ca. 0.8–2.5 mm. in diameter. Legume 7–14 cm. long × 0.8–13 cm. wide, somewhat constricted between the endocarp segments; exocarp dark, dullish red. Northwestern and west-central Argentina. .... 15. *P. sericantha.*
         17. Trees. Calyx and corolla glabrous outside. Flowering racemes slender, elongated. Spiny twigs thicker, ca. 1.2–5 mm. in diameter. Fruit larger, 10–17 cm. long × 1.5–2.6 cm. thick, not constricted, the exocarp nearly black at maturity. Paraguay, southeastern Bolivia, north-central Argentina (Gran Chaco region). ..... 16. *P. kuntzei.*
      16. Spines uninodal; thorns lateral or exceptionally so (*P. argentina*) and some terminal, without scars. Foliage well developed or some species subaphyllous. Fruits varied, yellowish to brown, red, or violet-spotted.
         18. Axillary spines solitary, only one per node, exceptionally solitary or geminate on the same twig. Leaves with one pair of pinnae, rarely bijugate.
            19. Spines axillary and some terminal, small. Branching uniform, with only megablasts (long shoots), but without brachyblasts (short axillary, knotty shoots). Flowers rather large; calyx and corolla pubescent outside. Legume moniliform; segments globose-ovoid, acute, thick, with thin isthmi; exocarp bright red, showy. Anther gland very small. (Sect. MONILICARPA.) Northwest Andean Argentina. ..... 14. *P. argentina.*
            19. Spines always axillary (or lateral). Branching double, with elongate megablasts forming the skeleton of the treetops and abbreviated axillary brachyblasts from multiple buds producing fascicles of smaller leaves and inflorescences. Corolla glabrous or pubescent outside; florets smaller. Legume linear-oblong,

compressed; endocarp segments flat, subquadrate to ellipsoid, with broad, rarely contracted isthmi; exocarp yellow, brown, or violet-spotted. Anther gland larger. (Sect. ALGAROBIA.)

20. Leaflets exceptionally large and broad, 2–10 cm. long × 0.7–3.8 cm. broad, only 2 to 5 pairs per pinna. Spines always solitary, large, up to 33 cm. long. Legume long, compressed, constricted between segments. Trees. (Ser. Ruscifoliae.) ..... 17. *P. ruscifolia.*

20. Leaflets smaller to very small, sometimes medium-sized, or if long, then linear, narrow.

21. Spines always solitary per axil. Leaflets small, 1.5–12 mm., exceptionally to 15 mm. long, alternate on lower part of pinna. Leaves small to medium-sized (*P. ruizleali*). Shrubs. Racemes medium to short. (Ser. Denudantes.) Argentine endemics: Cuyo and Patagonian provinces.

22. Racemes spikelike; flowers pedicellate. Leaflets distant on the rachis.

23. Twigs without prominent nerves, soon reddish-brown. Legume turgid, nearly black at maturity, glabrous. Leaves glabrous.

24. Leaves small, with 1 to 4 pairs of leaflets per pinna. Legume falcate to annular, sometimes straight or thin. Argentina: Patagonia. ..... 21. *P. denudans.*

24. Leaves larger, to 8–9 cm. long, with 3 to 9 pairs of leaflets per pinna. Legume thick, straight, falcate to subannular. Western Argentina: Mendoza and Neuquén. ..... 22. *P. ruizleali.*

23. Twigs longitudinally nerved, green for a longer period. Legume compressed, olive-brown, pubescent. Leaflets pubescent, 4 to 7 pairs per pinna. West-central Argentina: Prov. San Juan. ..... 24. *P. calingastana.*

22. Short, subglobose flower heads; florets sessile. Leaflets very small, approximate-imbricate, 1.6–3.5 mm. long, 3 to 12 pairs per pinna. Twigs greenish, with several longitudinal, prominent nerves. Legume broadly oblong, much flattened, somewhat curved; pericarp thin, dry; segments subquadrate. Western Argentina: Mendoza and Neuquén. ..... 23. *P. castellanosii.*

21. Spines solitary or geminate alternately along the branchlets, sometimes all solitary. Leaflets larger, medium-sized to long and narrow, mostly 15–63 mm. long, exceptionally only 8 mm. long, opposite on the pinnae. Leaves medium to rather large. Spikelike racemes cylindrical, long. Trees or large shrubs.

25. Legume not moniliform, its margins parallel or subparallel. Spines short.

26. Leaflets oblong, less than 5 times as long as broad, herbaceous, ca. 6–23 mm. long ×

1.6–5.5 mm. broad. Legume straight, falcate only at the apex, mostly straw-colored or brown. Trees or tall shrubs. Tropical coasts, Mexico, Central America, Antilles, northern South America. Also cultivated. (Ser. Chilenses.) ..... 35. *P. juliflora* var. *juliflora*.

26. Leaflets linear (except for abnormal, diseased(?) ones usual on the same twigs), more than 5 times longer than broad, subcoriaceous, ca. 0.7–63 mm. long × 1.5–4.5 mm. broad. Legume straight, brownish. Trees or shrubs, erect to prostrate. Southwestern North America. ..... 40. *P. glandulosa*.

25. Legume moniliform, slender, elongate, compressed, its margins undulate, faces spotted. Spines large, small, or absent. Leaflets tending to fusiform, 10–30 mm. long × 2–12 mm. broad. Argentina: Gran Chaco. (Ser. Ruscifoliae.) ..... 19. *P. vinalillo*.*

18. Axillary spines geminate, nearly constantly two pairs of spines per node. Leaves with 1 to 8 pairs of pinnae, in most species ample, 1–3-jugate, in some reduced.

27. Leaves reduced, very small, deciduous, dominated by the well-developed, long spines. Subaphyllous glabrous shrubs or subshrubs. Twigs and spines longitudinally striate. Legume subfalcate, compressed. (Ser. Humiles.)

28. Subshrub with woody rootstocks; branchlets and spines prominently nerved and sulcate. Flowers bright red. Leaves 1-jugate, the leaflets 1 to 3 pairs per pinna, small, oval; or leaves simply pinnate, with 1 to 2 pairs of leaflets. Spikes frequently replacing one spine of a pair. Central Argentina. ..... 25. *P. humilis*.

28. Larger shrub or tree; branchlets and spines longer, less striate. Flowers dull in color. Leaves always bipinnate, 1-jugate; petiole dilated at summit; leaflets 8 to 17 pairs, small, imbricate. Paraguay: Chaco. ..... 26. *P. rojasiana*.

27. Leaves well developed or if small, never simply pinnate. Twigs and spines terete, neither nerved nor sulcate.

29. Pinnae 3 to 8, mostly 5 pairs per leaf. Stamens and styles bright red. Racemes long, slender, longer than the leaves; leaflets numerous, small, approximate. Medium-sized tree; spines small. Northeastern Paraguay. (Ser. Pallidae.) ..... 27. *P. rubriflora*.

29. Pinnae only 1 to 4 pairs per leaf. Flowers greenish-white to yellowish with age.

* See also species no. 20, *P. hassleri*, with small spines.

30. Dwarf, 10–50 cm. tall, prostrate, extended, much-branched, hard, thorny little shrub. Leaves small, with 1 to 2 pairs of pinnae, pubescent; leaflets 1.5–6 mm. long, linear, approximate, 6 to 17 pairs per pinna. Racemes ovoid-cylindric; flowers pubescent. (Ser. Pallidae.) Central Argentina: Córdoba mountains. ..... 28. *P. campestris.*

30. Larger shrubs or trees, mostly 1 m. to more than 15 m. tall. Pinnae 1 to 4 pairs.

31. Leaves small, contracted; racemes long, slender, longer than or equalling the leaves. Leaflets approximate, pubescent to glabrous or only ciliolate. (Ser. Pallidae and ser. Chilenses *pro parte.*)

32. Legume dry, compressed, its margins undulate, the pericarp thin; endocarp segments rhombic, with longitudinal or oblique seeds, the isthmi very narrow, central. Leaves 1(–2)-jugate; leaflets 6 to 20 pairs per pinna; pinnae 0.4–6.5 cm., shorter than or equalling the racemes. Northwestern Mexico. ..... 31. *P. articulata.*

32. Legume fleshy, compressed but thicker; endocarp segments ovate to subquadrate, the isthmi broad, nearly as broad as the segments. Leaves various.

33. Leaflets prominently pinnatinerved below; 6 to 30 pairs per pinna, broadly oblong, obtuse, 2–8.3 mm. long, more or less pubescent or ciliate. Legumes straight with parallel margins or little constricted.

34. Legumes broad, 0.9–1.6 cm. in diameter.

35. Leaflets obtuse or obtuse and mucronate, 6 to 15 pairs per pinna, 2.5–8.3 mm. long and 1.4–4 mm. broad. Spines small, sometimes absent. Legume straight, thick, straw-yellow, 1–1.5 cm. broad, glabrous. Southern Colombia to Peru; Hawaiian Islands. ..... 29. *P. pallida.*

35. Leaflets subacute or acute, 10 to 30 pairs per pinna, linear, 2–7.5 mm. long × 0.8–1.8 mm. broad. Spines small. Legume submoniliform, annular, spotted, glabrous, 0.9–1.6 cm. broad. Northeastern Argentina, Paraguay. ..... 30. *P. affinis.*

34. Legumes narrow, 0.6–0.8 cm. broad.

36. Spines strong, divergent horizontally, the internodes to 7.5 cm. long, often constricted at base. Foliage green. Legume straight, pubescent. Tall shrubby tree. Western Gran Chaco. ..... 32. *P. elata.*

36. Spines weak, never horizontally divergent. Foliage small, glaucous.

Legumes straight, glabrous or puberulous. Small trees. Mexico: Tamaulipas. ..... 33. *P. tamaulipana.*

33. Leaflets without nerves or only the midrib (costa) visible below. Leaves small, delicate; racemes longer. Large tree. Central Argentina. ..... 37. *P. caldenia.*

31. Leaves larger, ample, expanded, lax, equalling the racemes in length or a little longer or shorter. Leaflets numerous, distant or approximate on the rachis. Trees or shrubs.

37. Leaflets small, 2–7.5(–10) mm. long, linear-oblong, obtuse, approximate, overlapping, touching each other or separated by less than their own width; glabrous or rarely ciliolate. Trees or large shrubs. (Ser. Nigrae.)

38. Trees, becoming large in age, the tops round with pendulous twigs and neat trunk. Spines small, absent on small branchlets.

39. Leaflets pubescent, close together on the pinna. Mexico. .. 43. *P. velutina.*

39. Leaflets glabrous.

40. Leaflets oblong, reticulately pinnate-nerved below, 4–7 mm. long × 1.2 mm. broad, neither distant nor approximate, touching the rachis. Legume straight to subfalcate, compressed-moniliform. Central Argentina and the Gran Chaco. ..... 36. *P. nigra.*

40. Leaflets linear, smaller, without nerves or only the midrib (costa) visible below, 2.7–5.4 mm. long × 0.2–1.1 mm. broad, approximate. Legume falcate to coiled in 2 to 3 open, lax spirals, not moniliform. South-central Argentina. ..... 37. *P. caldenia.*

38. Large shrub. Spines large, directed horizontally, stout. Argentina: western Gran Chaco (see ser. Pallidae in key (31) above). ..... 32. *P. elata.*
With slender, long spines; trees. ..... 36. *P. nigra* var. *longispina.*

37. Leaflets (or at least most of them) larger, 4–63 mm. long. (Ser. Chilenses and a transitional species of ser. Ruscifoliae.)

41. Leaflets pubescent, medium-sized, 5–15(–20) mm. long × 2–4.8 mm. broad. Pinnae 1 to 4 pairs.

42. Legume glabrous. Leaflets distant, 12 to 14 pairs per pinna, pubescent to subglabrous. Racemes 9–12 cm. long. Twigs soon blackish or gray. Northern Peru. ..... 35. *P. juliflora* var. *horrida.*

42. Legume velvety pubescent, mainly when unripe. Leaflets approximate, 12 to 30 pairs per pinna, pubescent. Racemes 5–10 cm. long. Twigs greenish-brown. Southwestern North America. ..... 43. *P. velutina.*

41. Leaflets glabrous or only ciliolate on the margins, medium-sized to large.

43. Leaflets large, 10–63 mm. long, glabrous, separated on the rachis by more than their own width.

44. Leaflets linear, narrow, or in some varieties broader, 1.1–5.4 cm. long × 1.1–3(–5) mm. broad; costa visible but of the same color as the mesophyll; secondary veins absent, obscure, or a few subparallel from base. Legume broad to narrow, straight, falcate, or annular according to varieties. Large trees or tall shrubs; spines always geminate, sometimes absent. Peru, Bolivia, central Chile, northwestern Argentina. ..... 34. *P. chilensis.*

44. Leaflets somewhat broader or veins more visible; costa light-colored, contrasting with the mesophyll. Spines alternately geminate or solitary on the same shoot. Legumes straight.

45. Leaflets lanceolate to elliptic-oblong or fusiform, 10–30 mm. long × 2–12 mm. broad. Legume slender, elongate, subfalcate or straight, compressed-moniliform. Tree. Argentina: Gran Chaco. ..... 19. *P. vinalillo.*

45. Leaflets linear to oblong-linear, 7–63 mm. long, distant, 5 to 15 times as long as broad. Usually shrubby. Legume thicker. North America: Texas, Mexico. ..... 40. *P. glandulosa.*

43. Leaflets medium-sized, ca. 4–23 mm. long, approximate or distant, glabrous or only ciliolate on margins.

46. Leaflets elliptic-oblong, broad, usually not separated by more than their own width.

47. Leaflets ca. 15 to 41 pairs per pinna, approximate, subcoriaceous, 5–15 mm. long, 2 to 7 times as long as broad. Legume straight, thick. Mexico. ..... 38. *P. laevigata.*

47. Leaflets less than 30 pairs per pinna, more distant.

48. Leaflets herbaceous, oblong, pinnatinerved, corrugated when dry, 6 to 15 pairs per pinna, 10–23 mm. long. Trees or tall shrubs; spines rather small, geminate or alternately solitary and paired. Legume elongate, subfalcate, yellow, with parallel margins. Tropical coasts, Antilles, northern South America, and Central America. ..... 35. *P. juliflora.*

48. Leaflets subcoriaceous, thicker, not becoming corrugated by dessication, distant on the rachis.

49. Leaflets short, 4–12 mm. long. West-central Argentina. ..... 39. *P. flexuosa.*

49. Leaflets longer, 15–25 mm. Mexico, southwestern United States. ..... 40. *P. glandulosa* var. *torreyana.*

46. Leaflets very narrowly linear.

50. Large trees. Leaflets numerous, 25–50 pairs per pinna, moderately separated or approximate, 5–17 mm. long × 1–2 mm. broad. Legume much compressed, yellow, falcate to annular; margins parallel; pulp sweet. Central and northwestern Argentina. .. 42. *P. alba.*

50. Trees or shrubs. Leaflets less numerous and the pairs farther apart on the rachis; distance greater than the width of the leaflets.

51. Tall (0.2–3 m.) shrub with thick underground horizontal branches and thin erect aerial shoots. Pinnae 1 to 2 pairs, 3–14 cm. long; leaflets 9 to 25 pairs, 5–17(–30) mm. long × 0.9–1.5 mm. broad. West-central Argentina. ..... 41. *P. alpataco.*

51. Trees or tall shrubs with trunk, this sometimes short.

52. Spines very long and strong. West-central Argentina. ..... 44. *P. pugionata.*

52. Spines small or scarce. Western Argentina. ..... 39. *P. flexuosa.*

15. Plants unarmed; spines probably absent by reduction. Trees. (Various series of sect. ALGAROBIA.)

53. Leaflets large, 0.8–6.5 cm. long. Branchlets reddish; leaves darkening when dry, 1-jugate.

54. Leaflets large, 2 to 9 pairs per pinna, 2.5–6.5 cm. long × 2–4 cm. broad, similar to those of *P. ruscifolia*, but more nearly ovate, obtuse, darkening when dry. Legume linear, compressed, yellow, its margins parallel. Paraguay; Argentina: Formosa (eastern Chaco). ..... 18. *P. fiebrigii.*

54. Leaflets somewhat smaller, more nearly linear and more numerous, 6–26 pairs per pinna, 0.8–4 cm. long × 1.8–16 mm. broad, glaucous-reddish when dry. Legume similar. Paraguay; Argentina: eastern Formosa to northern Santa Fe. ..... 20. *P. hassleri.*

53. Leaflets much smaller, ovate or linear. Branchlets not reddish.

55. Leaflets glabrous. Leaves 1–2-jugate.

56. Leaflets distant, 5–13 mm. long. Heartwood dark. Western Argentina. .. 39. *P. flexuosa* var. *subinermis.*

56. Leaflets approximate, shorter, 1.5–3.2 mm. long. Heartwood yellow. Argentina: Santa Fe. ..... 36. *P. nigra* var. *ragonesei.*

55. Leaflets pubescent.

57. Racemes longer than the leaves. Leaflets 2.5–8.3 mm. long. Southern Colombia, Ecuador, northern Peru, Hawaiian Islands. ..... 29. *P. pallida* forma *pallida.*

57. Racemes of nearly the same length as the leaves. Leaflets 6–20 mm. long. .. 35. *P. juliflora* var. *inermis.*

TABLE 1. The natural geographic areas of development of species of Prosopis.

AREA	TOTAL NO. OF SPECIES	SPECIES
SOUTHWEST ASIA AND NORTH AFRICA	3	*P. cineraria*; *P. farcta*; *P. koelziana.*
TROPICAL AFRICA	1	*P. africana.*
TEXAN-MEXICAN AREA	8	*P. pubescens*; *P. palmeri*; *P. articulata*; *P. tamaulipana*; *P. juliflora*; *P. laevigata*; *P. glandulosa*; *P. velutina.*
TROPICAL ANDEAN REGION (Colombia to the extreme north of Chile and northwest of Argentina)	6	*P. burkartii*; *P. ferox*; *P. tamarugo*; *P. pallida* (including *P. limensis*); *P. chilensis*; *P. juliflora.*
ARGENTINIAN-PARAGUAYAN CENTER AND NEIGHBORING AREAS		
GRAN CHACO AND ADJOINING AREAS	23	*P. strombulifera*; *P. reptans*; *P. abbreviata*; *P. torquata*; *P. sericantha*; *P. kuntzei*; *P. ruscifolia*; *P. fiebrigii*; *P. vinalillo*; *P. hassleri*; *P. humilis*; *P. rojasiana*; *P. rubriflora*; *P. campestris*; *P. affinis*; *P. elata*; *P. chilensis*; *P. nigra*; *P. caldenia*; *P. flexuosa*; *P. alpataco*; *P. alba*; *P. pugionata.*
PATAGONIAN AND CUYO REGION	5	*P. argentina*; *P. denudans*; *P. ruizleali*; *P. castellanosii*; *P. calingastana.*

THE NATIVE AND INTRODUCED SPECIES OF PROSOPIS A GEOGRAPHICAL ENUMERATION

Numbers in parentheses represent the number of the species in the text.

ASIA AND NORTH AFRICA

NATIVE SPECIES

P. cineraria (1): Arabia; Iran, Afghanistan, Pakistan, and India.

P. farcta vars. **farcta** and **glabra** (2): Algeria and Tunisia; Egypt; Turkey and Cyprus; Syria and Israel; Iraq, Iran, Afghanistan, and Pakistan; USSR: Transcaucasia and Turkestan.

P. koelziana (3): Iran.

INTRODUCED SPECIES

P. pallida (29): India.

P. juliflora (35): Iraq, Pakistan, India, and Vietnam.

P. glandulosa (40): Southern Arabia, Pakistan, India, and Burma.

NOTES. Species successfully grown in the botanical garden at El Staff in middle Egypt: **P. alba, P. nigra, P. laevigata** (? sub **P. chilensis** and **P. dulcis**), **P. glandulosa, P. affinis** (sub **P. nandubay**), **P. kuntzei** (sub **P. kunzii**), **P. pubescens, P. strombulifera,** and the Oriental **P. cineraria** (sub **P. spicigera**); see Warda H. Bircher, *Gardens of the Hesperides*, 343–347. 1960.

TROPICAL AFRICA: one native species.

P. africana (4): Senegal, Guinea-Bissau to Nigeria, Cameroons, Sudan, Uganda, and Ethiopia.

SPECIES IN CULTIVATION

P. juliflora var. **juliflora** (35): Senegal.

SOUTH AND SOUTHWEST AFRICA: introduced species only.

P. pubescens (9).
P. chilensis var. **catamarcana** (34).
P. glandulosa (40).

PACIFIC ISLANDS (Hawaii, Marquesas, and the Philippines): introduced species only.

P. pallida formae **pallida** and **armata** (29).
P. juliflora (35).

AUSTRALIA: introduced species only.

P. pallida (29): only in cultivation.
P. chilensis? (34).
P. juliflora (35): Queensland.
P. glandulosa (40).
P. velutina (43): cultivated.

AMERICA: native species only.

UNITED STATES (continental): 5–7 species; none endemic.

P. strombulifera? (5): California.
P. reptans var. **cinerascens** (6): Texas, Oklahoma, and southeastern Colorado.
P. pubescens (9): Texas to southern California and southern Utah.
P. articulata (31): Arizona.
P. laevigata (38): Texas, rare.
P. glandulosa vars. **glandulosa, prostrata,** and **torreyana** (40): California to Kansas, Texas, and Louisiana.
P. velutina (43): Southern Arizona, California.

MEXICO: 9 native species; 3 endemic.

P. reptans var. **cinerascens** (6).
P. pubescens (9).
P. palmeri (10).
P. articulata (31).

P. tamaulipana (33).
P. juliflora (35).
P. laevigata (38).
P. glandulosa vars. **glandulosa, torreyana,** and **prostrata** (40).
P. velutina (43).

CENTRAL AMERICA (Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama).

P. juliflora (35).

ANTILLES (West Indian Islands: Cuba, Hispaniola, Jamaica, Puerto Rico, and many smaller islands): probably only species introduced from the mainland.

P. pallida (29): including **P. limensis.**
P. juliflora (35).
P. glandulosa (40): cultivated in Puerto Rico; see León & Alain, Fl. Cuba 2: 251. *fig. 108.* 1951.

VENEZUELA

P. juliflora (35).

COLOMBIA

P. pallida (29).
P. juliflora (35).

ECUADOR

P. pallida (29).
P. juliflora vars. **juliflora** and **inermis** (35).

PERU: 5–6 species, all native; none endemic.

P. strombulifera? (5).
P. reptans (6).
P. pallida (29): including **P. limensis.**
P. chilensis (34).
P. juliflora vars. **juliflora, horrida,** and **inermis** (35).
P. laevigata var. **andicola** (38).
P. alba var. **panta** (42).

BOLIVIA: 7–8 native species; none endemic.

P. ferox (12).
P. kuntzei (16).
P. ruscifolia (17).
? **P. affinis** (30).
P. chilensis (34).
P. nigra (36).
P. laevigata var. **andicola** (38).
P. alba var. **panta** (42).

CHILE: 6 native species; 2 endemic.

P. strombulifera (5).
P. burkartii (11).
P. tamarugo (13).
P. chilensis var. **chilensis** (34).
P. flexuosa (39): including **P. fruticosa.**
P. alba var. **panta** (42).

PARAGUAY: 11 native species; 2 endemic.

P. kuntzei (16).
P. ruscifolia (17).
P. fiebrigii (18).
P. vinalillo (19).
P. hassleri (20).
P. rojasiana (26).
P. rubriflora (27).
P. affinis (30).
P. elata (32).
P. nigra (36).
P. alba var. **panta** (42).

BRAZIL: 3 native species on very small areas, 1 introduced; none endemic.

P. ruscifolia (17): Piauhy/Parahyba (very local, introduced?).
P. rubriflora (27): extreme south of Mato Grosso.
P. affinis (30): extreme southwestern Rio Grande do Sul.
P. juliflora (35): *sensu stricto, haud sensu* Bentham in Fl. Brasil., 1876; introduced, cultivated, northern states.

URUGUAY: 3 native species.

P. affinis (30).
P. nigra (36).
P. alba (42).

ARGENTINA: native species only, ca. 28; 13 endemic. Center of polymorphism of the genus.

P. strombulifera vars. **strombulifera** and **ruiziana** (5).
P. reptans var. **reptans** (6).
P. abbreviata (7).
P. torquata (8).
P. ferox (12).
P. argentina (14).
P. sericantha (15).
P. kuntzei (16).
P. ruscifolia (17).
P. fiebrigii (18).
P. vinalillo vars. **vinalillo** and **parvifolia** (19).
P. hassleri vars. **hassleri** and **nigroides** (20).
P. denudans vars. **denudans, patagonica,** and **stenocarpa** (21).

P. ruizleali (22).
P. castellanosii (23).
P. calingastana (24).
P. humilis (25).
P. campestris (28).
P. affinis (30).
P. elata (32).
P. chilensis vars. **chilensis, riojana,** and **catamarcana** (34).
P. nigra vars. **nigra, ragonesei,** and **longispina** (36).
P. caldenia (37).
P. laevigata var. **andicola** (38).
P. flexuosa formae **flexuosa** and **subinermis** (39).
P. alpataco (41).
P. alba vars. **alba** and **panta** (42).
P. pugionata (44).

(To be concluded)

A MONOGRAPH OF THE GENUS PROSOPIS (LEGUMINOSAE SUBFAM. MIMOSOIDEAE)*

ARTURO BURKART

CATALOGUE OF THE RECOGNIZED SPECIES OF PROSOPIS[1]

(An enumeration with critical notes, citations of selected specimens,[2] descriptions, synonymies, distributions, ecologies, discussions of economic importance, and various other observations.)

Sect. PROSOPIS

1. **Prosopis cineraria** (L.) Druce, Rep. Bot. Soc. Exch. Cl. Brit. Isles 1913, 3: 422. 1914 (see Index Kewensis Suppl. 5. 1921); Burkart, Darwiniana 4: 61. 1940; Macbride, Contr. Gray Herb. 59: 16. 1919. BASIONYM: *Mimosa cineraria* Linnaeus, Sp. Pl. ed. 2. 2: 1500. 1763, excl. ref. Brown.

Prosopis spicigera Linnaeus, Mantissa Pl. 68. 1767; DC. Prodr. 2: 446. 1825.
Prosopis spicata Burmann, Fl. Indica 102. 1768, according to Index Kewensis and Macbride, *op. cit.*

ILLUSTRATIONS. Lamarck, Tabl. Encycl. 2: 340. 1797; Brandis, Illustr. Fl. N. West and Central India. *t. 25.* 1874.

Trees to 6.5 m. high; cortex cinereous; prickles internodal, scattered, straight, somewhat acroscopic, conical with broad bases. Leaves 1–3-jugate, glabrous or puberulous; petiole and rachis 0.5–4 cm. long, the pinnae 2–7 cm. long; leaflets 7–14-jugate, ovate, straight to subfalcate, without nerves (or 2–4-nerved at base, the midrib excentric), mucronate, 4–15 mm. long × 2–4.5 mm. broad, grayish when dry; stipules foliaceous, deciduous. Racemes spiciform, 5–13 cm. long, several together, subpaniculate; peduncle with amplexicaul bract (or 2 bracts united), this caducous and leaving an oblique scar, 1.5–2 mm. long; bractlets ovate, sessile, 0.5–0.8 mm. long, caducous; pedicels 0.5 mm., to 1.5 mm. long when mature; flowers yellow, glabrous; calyx truncate, 0.8–1.2 mm. long; corolla 3.5 mm. long, glabrous, the petals rolled back in age; anthers 0.8–1 mm. long; pistil glabrous. Fruit slender, elongate, 8–19 cm. long

* Continued from Volume 57, page 249.

[1] Herbarium acronyms indicating the location of cited specimens follow those cited in *Index Herbariorum* (ed. 6, 1974, compiled by P. K. Holmgren and W. Keuken, General Editor, F. A. Stafleu, Reg. Veg. 52).

[2] Herbarium specimens cited in an earlier paper of mine, "Materiales para una monografía del género *Prosopis* (Leguminosae)," Darwiniana 4: 57–128. 1940, are not included in the present lists of exsiccatae, except when necessary for correction or revision.



FIGURE 1. **Prosopis.** Left: Fruiting specimen of *P. cineraria* (*Wight 877*) (GH). Right: Fruiting specimen of *P. palmeri* (*I. L. Wiggins 5486*) from Baja California, Mexico (GH); flowering specimen, on same sheet, (*B. J. Hammerly 423*) from Baja California, Mexico (GH).

(including the stipe 0.8–2 cm.), subcylindric-torulose, 4–7 mm. in diameter, glabrous; pericarp thin, brittle; endocarp segments thin, longitudinal, little developed; seeds distant, longitudinal, ovate, 6 mm. long, the tegument with open horse-shoe fissural line on faces.

COMMON NAMES. Jand (Punjab); Ghāf (Arabia); Shumi (India, *fide* DC., 1825); and Jandi (Pakistan).

SELECTED SPECIMENS EXAMINED. **Arabia:** Arabia orientalis, Trucial Oman coast, Jebel Ali, south of Dubei, *Field & Lazar* 14 V 1950 (GH); Süd-Arabien, Wadi Schigu bei Balhaf, *Schweinfurth 147*, fl. & fr., 27 III 1881 (US). **Iran:** Prov. Kerman, Bam to Faradj, limit. austral. deserti Lut, *Aellen & Esfandiari 3902* (MO, UC); same specimen, *Rechinger II-3902* (US). **Pakistan:** near Karachi, *S. ul Abedin 1394* (NY); Karachi University Campus, cult., *Asad Raza 99* (MO). **India:** Punjab, Ghogripur Jungle, Karnal Distr., *Drummond 24318, 24319, 24320, 24322* (UC); Flora Pentapotamica, Hansi in ditione Hissar, *Drummond 15139, 15140* (UC); Punjab, Gujranwala Distr., Rougah Drogan Desert, *Stewart 1426* (NY); India orientalis, *Wight 877* (GH); Hort. Bot. Calcuttensis (US 325480).

USES. According to Sarwar *et al.* (Pakistan Jour. Sci. Ind. Res. 10: 248–250. 1967, under *P. spicigera*), this tree grows up to 20 feet in the former Punjab and is evergreen, being the chief tree in localities where the rainfall is less than 30 inches a year. Its rather scanty, purplish-

brown heartwood is preferred to other kinds for firewood. It contains sugars, 5 flavonones, fatty acids, and tannins. It is not used commercially.

2. **Prosopis farcta** (Solander ex Russell) Macbride, Contr. Gray Herb. n.s. **59**: 17. 1919; Burkart, Darwiniana **4**: 62. 1940; *Prosopis farcta* (Banks & Solander) Eig, Jour. Bot. (Brit.) **75**: 189. 1937 ("*farcata*"). BASIONYM: *Mimosa farcta* Solander ex Russell, The Natural History of Aleppo, ed. 2. **2**: 266. 1794.

Mimosa stephaniana M. Bieb. Beschreibung der Länder zwischen den Flüssen Terek und Kur am Caspischen Meere. 120, 205. 1800.

Acacia stephaniana (*M. Bieb.*) Willdenow, Sp. Pl. **4**(2): 1088. 1806; M. Bieb. Fl. Taur. Cauc. **2**: 449. 1808.

Prosopis stephaniana (M. Bieb.) Kunth ex Sprengel, Syst. Veg. **2**: 326. 1825.

Lagonychium stephanianum (M. Bieb.) M. Bieb. Suppl. Fl. Taur. Cauc. **3**: 288. 1819; DC. Prodr. **2**: 448. 1825.

Lagonychium farctum (Solander ex Russell) E. G. Bobrov in Komarov *et al.*, Fl. USSR **11**: 13. 1945 (ed. Israel Program Sci. Transl., Jerusalem **11**: 13. 1971).

? *Prosopis aculeata* Koenig, Asiatic Researches **4**: *lám. X.* 18 . . . , according to Pritzel, Icon. Bot. Index, 1866.

ILLUSTRATION. Bobrov, *loc. cit.* 17. *fig. 1*, sub *Lagonychium.*

Prickly shrubs or subshrubs 30–80 cm. high; sometimes "shrub-trees" of 2–3 m. or more, subscandent, deep-rooted, and invading by root-suckers (or rhizomes?); branchlets with white-cinereous cortex; internodes with dispersed straight prickles 3–5 mm. long, the basal part of the petiole and peduncle often with one prickle, broad at base, dilated. Leaves recalling those of the *Acacia farnesiana* group, small, (2–)3–7-jugate, commonly 4–6-jugate, pubescent (glabrous in one variety); rachis plus petiole 1–3 cm. long, the pinnae 1–2.3 cm. long; leaflets in 10–15 pairs per pinna, dimidiate-lanceolate, auriculate, nearly enervate, pubescent (glabrous in one variety), 2–6.5 mm. long; stipules foliaceous, ovate-acute, larger than the leaflets, 3–6 mm. long, pubescent, very caducous. Racemes simple, axillary, glabrous, elongate, 4–12 cm. long, multiflorous, exceeding the leaves; peduncles solitary, lacking a primary bract, pubescent, often with a prickle at base; flowers pedicelled (but many aborting), green, creamy-greenish or yellowish-white, the buds acuminate; calyx 1 mm. long, puberulous; corolla 3.5–4 mm. long, glabrous outside and within, the petals linear, nearly free; stamens 4–5 mm. long, the anthers 0.8–1 mm., with an incurved apical gland; ovary entirely glabrous. Legume ca. 1.5–4.5 cm. long × 1.5–2.5 cm. thick, turgid, globose to cylindric, glabrous, subfalcate; placental suture somewhat prominent, the opposite one sulcate; exocarp shiny, smooth, orange-red, becoming black when ripe, thin, brittle; mesocarp spongy or farinaceous, apparently dry; endocarp thin, segmented, with transverse articles in two longitudinal rows; seeds also transverse, brown, ovoid-compressed, 7–8.5 mm.

long × 5–6 mm. broad × 2.5–3 mm. thick, with an open horse-shoe fissural line on the faces.

DISTRIBUTION. North Africa (Tunisia, Algeria (rare), Egypt) and southwestern Asia (Asia minor, Cyprus, Syria, Palestine, Iraq, Iran, Caucasia, Afghanistan, Pakistan, India: Punjab).

COMMON NAMES. Acatia; schamuth (Arabic); tofshandrnaq (Caucasus orientalis), secundum M. Bieberstein "leporis unguem significante"; kharnub, shok, according to Blakelock, Kew Bull. 3: 419. 1948 (Iraq).

ECOLOGICAL AND ECONOMIC NOTES. Flowering takes place from June to August and the legumes mature from August to October.

Widely distributed but apparently rare at its western limits, e.g. in eastern Algeria (Quezel & Santa, Nouvelle Flore de l'Algérie 1: 556. *fig. 1634.* 1962, sub *Prosopis stephaniana*). While collecting in Cyprus, David Fairchild was impressed by the economic potential of the plant and referred to it as a range shrub for dry lands "good in spring for sheep and goats and cattle, a splendid bee plant, [which] roots very deeply" (June 25, 1930, in schedula). In the countries of the Near East it is abundant, but there it is sometimes considered a weed, especially in Transcaucasia, where Bobrov (*loc. cit.*) called it "a noxious weed, readily spreading due to the formation of root-suckers. Because of the spiny branches, it is little eaten by livestock and then only when young. The roots contain tannids and may be of interest as a tanning agent."

Eig, Feinbrun, and Zohary (in a note on the label of their collection no. *247* from the Mediterranean coast of Israel) are more appreciative. They refer to the species as "a most important plant, both in the Irano-Turanian countries and in the countries of its penetration in the Mediterranean region. Its main ecological requirements are deep alluvial soils, especially with shallow ground water. This seems to be the cause of its absence in the Mediterranean mountain districts of Palestine. But in the Irano-Turanian region, its main area, it is less sensitive to the edaphic conditions and there we found it also in the mountain districts. *P. stephaniana* is a leading plant in several associations of Palestine. . . . We met the most curious form of this species in the *Populetum euphraticae* of the Jordan Valley, where it is a bush-tree 2–3 m. high, or a liana, climbing sometimes as high as 8–10 m. on the *Populus euphratica* trees. Extremely common in fields of the maritime and interior plains."

The habit of *Prosopis farcta* as an invading shrub with root-suckers or rhizomes, brings it nearer to *P. strombulifera* (Lam.) Bentham than to any species of section ALGAROBIA in America, but *P. farcta* is not known as a weed, as it thrives in nontilled, saline soils under semiarid conditions.

Eshel and Waisel (Israel Jour. Bot. 14: 50, 51. 1965) have studied the salt relations in the growth of this species of *Prosopis*.

The western border of its natural area seems to be Algeria and Tunisia (see A. Labbe, Bull. Soc. Sci. Nat. Tunisie 8: 201. 1955 (sub *P. stephaniana*).

Neubauer (Ann. Naturh. Mus. Wien 60: 87. 1955, sub *P. stephaniana*) observed, in northern Afghanistan, that the species is an invader in wheat and cotton fields, frequent on clayey, dry soils; where it thrives best, the soils are considered of good quality.

SELECTED SPECIMENS EXAMINED. **Egypt:** Nil-Thal, Belbes, *Schweinfurth 43*, 1880 (R, US); Kharga, *N. El Hadidi*, 13 VIII 1967 (MO). **Cyprus:** Yerolakkos, *Larsen 851* (UC); Nicotia, *Kotschy 983* (GH); Epikho, near Kythraea, *Fairchild*, Armour Exped. *3572* (US); Limassol, *Mavromoustakis 7, 8, 9* (MO). **USSR.** TRANSCAUCASIA: Baku, *Prilipko*, 4 VI 1927, *Matveeva 805* (NY), *Svovitz 593* (US), steppe, *Heideman et al.*, 2 VIII 1929 (UC); Caucasus, C. Czermak, Muratinsk region, *Knorring & Emme 106* (US). TURKESTAN: Buchara, Hissar, *Bornmüller 932* (GH); Regio Transcaspica, Aschabad in steppis ad Mekrowa, *Sintenis 445*, Kisil Arwat, Karakala, *Sintenis 1932*, Plant. Turcomaniae, *Litwinow 122*, Atropatania, Balachany, *Petunnikov 3332* (GH, NY, US); Turkestania, *Korshinsky 1256* (GH), *1269* (US), *Regel* (SI 1047); Sallien et Mingatschour Georg. Cauc., *Hohenacker*, Unio Itiner. *1838* (MO). **Turkey:** Mersina stationary sand dunes, *Eig & Zohary*, 12 VIII 1931 (HUJ, UC); Cilicia, Plaine de Mersina, *Balansa 491* (GH, US). **Palestine:** east of Jordan, *Paine*, 1873 (US); Esdraelon Plain, *Zohary* (HUJ); near Tel Aviv, *Eig, Feinbrun, & Zohary 247* (GH, NY, US); Jericho versus Mare Mortum, *Ball 916* (GH); Palestina maritima, *F. Meyers 250* (GH); W. lower Galilee, Tivon, *Feinbrun* (HUJ 16398); Tel Aviv, cultivated ground, *Eig, Feinbrun, & Amdursky*, VII 1933 (Fl. Palaest. Exsicc. 247; HUJ). **Syria:** in planitie prope Aleppum, *E. Boissier*, VI 1846 (GH); Aleppo, *Sintenis 1447*, 26 VIII 1888 (GH); Damascus, *Dingler* (GH); Palmyra, *Field & Lazar 351* (GH). **Iran:** Prov. Kerman, *Bornmüller 3654* (GH, US); Iran, without further locality, *Rechinger II 6800* (UC, US); Persia, garden ad Rayy, *Field & Lazar 998*, Persia austro-orientalis, *Bornmüller 3655, 3656* (GH); Gurgan, in fields, *Koelz 16110* (US); Chesmagirin, Bakhtiari, *Koelz 15277* (US); Iran (?), in planit. Scheherisur, *Haussknecht* (UC); Persia, in desert. argillososalsis ad Cyrum, *Hohenacker* (CORD, MO, SI); Khuzestan, W of Behbahan, *Grant 15909* (MO); Kurdistania, Mardin Wüste gegen Khurs, *Sintenis 1039* (GH). **Afghanistan:** Baghlan, 3000 ft. elev., *Koelz 12176* (US); Helmund Valley, *Long 394* (US). **Iraq:** Abul al Kasib, Basrah Liwa, date orchard, *Barkley & Abbas al Ani 8905* (GH); Falluja, Bagdad Liwa, *Grant & Barkley 8560* (NY); Wadi Bakok, Mosul, *Grant & Barkley 8990* (GH); Kut Liwa, near Nuamaniya, Digila River, *J. Brahim M. 6191* (NY); Inter Chanikin et Baghdad, *Rechinger 2147*, Baghdad Liwa, *Abbas & Brahim 13* (MO). **Pakistan:** (?) N.W. Himalaya, Peshawar, N.W.F.P., Islamia College, *Stewart 9161* (NY).

Prosopis farcta var. glabra Burkart, var. nov.

A var. *farcta* differt foliis foliolisque omnino glabris, tota planta glabra.

TYPUS VARIETATIS: Iran. Persia austro-orientalis, Kerman, *Bornmüller 3654*, flowering, 18 V 1892 (holotype, US; isotype, SI 1044).

This variety is distinguished from *Prosopis farcta* var. *farcta*, by its entirely glabrous leaves, leaflets, and branches.

OBSERVATIONS. Other specimens of var. *glabra*: Transcaspia, *Sintenis 1932* (MO, US); USSR, Transcaucasia (?), *Kapa-Kaua 2840* (MO).

3. **Prosopis koelziana** Burkart, sp. nov.

Affinis *Prosopidis cinerariae*, arborea, aculeata, cortice cinereo; aculei sparsi 3–6 mm. longi; folia 2–3-juga (an semper ?), subglabra, pinnae 1.5–2 cm. longae, foliola 10–11-juga, rachides subpilosae; foliola 3–5 mm. longa × 1.1–1.5 mm. lata, lanceolata subdimidiata acuta subfalcata obscure 1–2-nervosa, margine exteriori ciliolato caeterum glabra. Spicae axillares solitariae 6–7 cm. longae; flores desunt. Legumen lineare, 4–6 cm. longum × 8–10 mm. latum, ad basin cuneatum breviterque stipitatum, subtorulosum subrectum puniceum, stipite 0.8–1 cm. acumine 5 mm. longo; indehiscens subcoriaceum farctum; semina circiter 6–8 in pseudoloculis ovatis oblique transversis, subcompressa ovata fusca, 5–5.5 mm. longa.

TYPE SPECIMEN. **Iran**: Madenu, Kirman, in desert, *Koelz 14246*, December 26, 1939 (US 2194261, holotype).

This new species is intermediate between *Prosopis cineraria* (L.) Druce and *P. farcta* (Solander ex Russell) Macbride, the leaves being similar to those of the first species. It is easily distinguished from both of these species, however, by its peculiar fruits, which are stipitate and cuneate at base as in *P. cineraria*, but much shorter, thicker, and with transverse seeds, approaching by this character *P. farcta*. However, in *P. farcta*, the pods are much thicker, shorter and abruptly narrowed at base. It may be a natural hybridogen "stirps" originated by the cross *P. cineraria* × *P. farcta*. According to the collector, it is a tree up to 10 feet high, with crimson-colored fruits. The material is scarce, but the ripe legumes are very characteristic and different from those of any species known at present. Their red color seems to be a good character; the ripe fruit of *P. farcta* appears to be black and that of *P. cineraria* brown.

OBSERVATIONS. This species is named for the collector, Dr. Walter Norman Koelz of Michigan, U.S.A., a zoologist and botanist temporarily engaged in Asiatic research (see: American Men of Science, A Biographical Directory, ed. 11. Physical and Biological Sciences. 2861. J. Cattell Press, New York & London. 1965). The type may be a duplicate of a specimen at the University of Michigan, Ann Arbor, which I have not seen.

Sect. ANONYCHIUM

4. **Prosopis africana** (Guill., Perr., & Rich.) Taubert in Engler & Prantl, Nat. Pflanzenfam. 3(3): 119. 1891; Burkart, Darwiniana 4: 62. 1940; Brenan in Hubbard & Milne-Redhead, Fl. Trop. E. Africa, Leguminosae subfam. Mimosoideae, 36. 1959.

Coulteria ? *africana* Guill., Perr. & Rich., Florae Senegambiae Tentamen 1: 256. 1830.

Prosopis oblonga Bentham, Hooker's Jour. Bot. 4: 348. 1842; Bentham, "Revision of the Suborder Mimoseae," Trans. Linn. Soc. 30: 377. 1875; E. G. Baker, The Leguminosae of Tropical Africa 3: 805. 1930.
Prosopis lanceolata Bentham, Hooker's Jour. Bot. 4: 347. 1842.

ILLUSTRATIONS. Volkens, Notizbl. Bot. Gart. Berlin, App. 22: 10. 1909; Engler, Die Vegetation der Erde 9. Pflanzenwelt Afrikas 3(1): 394. *fig. 225.* 1915; Brenan in Fl. Trop. E. Africa, 35. *fig. 10.* 1959; Institut Français d'Afrique Noire, Icones Pl. Afr. 2: 30. Ifan-Dakar. 1953. G. Figueiredo & A. Sousa, Mém. Soc. Brot. Univ. Coimbra 1: 37. *tab. 23.* 1930 (sub *P. oblonga* Bentham).

Unarmed, tall trees, ca. 4–20 m. high; branches without axillary brachyblasts, the twigs and leaves somewhat pubescent, the branchlets and leaves dullish red when dry. Leaves drooping, 1–4-jugate, ample, the petiole 3–5 cm., the rachis 5–9 cm., the pinnae 6–15 cm. long; leaflets in 4–13 pairs, opposite, variable, ovate-lanceolate, 1.3–3.5 cm. long × 0.4–1.5 cm. broad, glabrous or finely pubescent, costate to slightly pinnatinerved, uniformly colored, reddish when dry, the midvein subcentral, the acroscopic half of the leaflet slightly larger. Racemes spiciform, ca. 5–9 cm. long, axillary, solitary or geminate, densely flowered; rachis pubescent; pedicels 0.5 mm. long, pubescent; flowers small, yellowish or greenish-white, perfumed; calyx 1 mm. long, pubescent; corolla 3.5 mm. long, the petals linear, free, glabrous on both sides; anthers with apically broadened and apiculate, incurved connective, pedicelled gland globose and incurved; pollen with costae on the pores; ovary and style pilose to villous. Legume indehiscent, straight to subfalcate, brown to blackish, shiny, subterete, 10–20 cm. long × 1.5–3.3 cm. in diameter; exocarp hard, 1–2 mm. thick; mesocarp spongy, massive, apparently dry; endocarp segments thin, longitudinal in one row; seeds many, dark, shiny, ovate-compressed, 8–10 mm. long × 4–9 mm. wide, with endosperm; fissural line large, submarginal; mature fruit sounding like rattlesnake tails when shaken.

AREA AND ECOLOGY. Tropical Africa, the whole savannah belt south of the Sahara and north of the great rain forest districts, especially in mesophytic woodland, from Guinea to the Sudan, Uganda, and Ethiopia.

USES. The bark is used as a medicine in case of fevers. The wood has a great variety of uses, including its use as a charcoal; in certain countries stands of *Prosopis africana* have been destroyed by exhaustive exploitation (see Adam, Echart, & Lescot, "Plant. Médic. Hausa de l'Ader (Rép. Niger)," Jour. Agr. Trop. Bot. Appl. 19(8–9): 331. 1972). Unlike the American *Algarobiae*, the fruits seem to be dry and inedible. The wood is hard and very resistant to putrefaction and insect attack. *Prosopis africana* is a tree of quick growth (Devillers & Schnell, Icon. Pl. Afr. 2: 29. 1953) and probably worthy of trials for reforestation programs.

MATERIAL EXAMINED. **West Tropical Africa:** without further locality, *Mann 1193* (GH, NY). **Nigeria:** northern part, *Yates 15* (K), *J. M. Dalziel s.n.* (MO).

Senegambia: *Heudelot*, photograph of type of *P. oblonga* Bentham (US). **Guiné-Bissau:** Estrada de Prabis, *Brigada Estac. Florestais Guiné no. 10* (R 76448); *Bor*, Espirito Santo Expl. Bot. *1* (MO). **Sierra Leone:** *Small 446* (MO). **Ghana:** Gold Coast, savannah forest tree, Epira, *Vigne 2042* (GH, MO, US); Yalinga, Haut Drebangui, *Le Testu 2703* (GH, NY, UC). **East Tropical Africa. Uganda:** Akka Ferry, Aswa River, Chua, *Eggeling E-1688* (MO, NY); Uganda, without further locality, *Lind 2414* (MO). **Ethiopia:** Nubaland, Tira, *Kotschy 381* (NY, isotype of *P.(?) lanceolata*).

Sect. STROMBOCARPA
Ser. Strombocarpae

5. Prosopis strombulifera (Lam.) Bentham, Hooker's Jour. Bot. **4**: 352. 1842; Bentham, Trans. Linn. Soc. London **30**: 380. 1875; Burkart, Darwiniana **4**: 71. 1940. BASIONYM: *Mimosa strumbulifera* Lamarck, Encycl. Méth. Bot. **1**: 15. 1783 ("1789").

Acacia strumbulifera (Lam.) Willdenow, Sp. Pl. ed. 4. **4**(2): 1055. 1805; DC. Prodr. **2**: 455. 1825.

Spirolobium australe D'Orbigny, Sertum Patagonicum *tab. 13*. 1839.

Strombocarpa strombulifera (Lam.) A. Gray, Boston Jour. Nat. Hist. **5**: 243. 1845; Bot. United States Expl. Exped. **1**: 475. 1854; Hutchinson, Genera of Flowering Plants **1**: 287. 1964.

Spiny shrub 0.15–1.5(–3) m. high, with small foliage and long underground, spreading, horizontal runners (probably gemmiferous roots); branches flexuous, the spiny stipules straight, cinereous, very decurrent, 0.1–2 cm. long. Leaves 1-jugate, glaucous, puberulous or glabrescent; petiole 2–15 mm. long, the pinnae 1–3 cm. long; leaflets distant, alternate to opposite, 3–8 pairs per pinna, the distance between pairs 1 to 3 times their own width, in the upper leaves somewhat less; leaflets oblong, obtuse, enervate or slightly 1–3-nerved at base, 2–9 mm. long × 0.8–2 mm. broad. Peduncles axillary, solitary, 1.5–5 cm. long, elongating when the fruits ripen; globose heads ca. 1.5 cm. in diameter at anthesis; flowers yellow, the young filaments red; calyx and corolla striate, the former puberulous, 1.5–2.2 mm. long, the petals united the distance of their width, 3–4 mm. long, villous within; stamens and style exserted; ovary villous. Fruits lemon-yellow when ripe, puberulous when young, radiating (1–21 in number) from the receptacle as straight cylindrical bodies 1.8–5.2 cm. long × 0.6–1.0 cm. in diameter, formed by 8 to 17 dense, closed, regular coils (like corkscrews) each, 3–5 mm. thick; exocarp crustaceous; endocarp delicately segmented in longitudinal articles that are easy to open; mesocarp pulpy, tannic, reddish; seeds ovate, grayish green, 4.5–5.4 mm. long.

COMMON NAMES. Retortuño; mastuerzo; espinilla; algarrobilla; pata de loro; seca trapo; retortón (Chile).

DISTRIBUTION. Western Argentina; northern Chile. Also Peru, Huancavelica, Mayocc, according to C. Vargas (Rev. Fac. Ci. Univ. N. S. An-

tonio Abad, Cuzco, 2: 3–6. 1968), but the illustration given (*fig. 1*) and the specimens collected agree better with *P. reptans*.

One specimen seen from the United States, Imperial Co., California (see below) was introduced, but is reported as escaped (Munz, 1959, cited by D. Isely, Madroño 21: 296. 1972). Clos, in Gay, Fl. Chilena 2: 249. 1846, states that this screwbean was cultivated in gardens at Santiago, Chile, at that time, the fruits being used as a remedy for toothache.

MATERIAL EXAMINED. **United States.** CALIFORNIA: Imperial Co., Bard, SW corner of the old U.S. Dept. Agriculture Exp. Sta., *Osborn & Flock*, 3 VII 1963 (UC). **Chile:** Tarapaca, *R. A. Philippi*, 1888 (US); Atacama, Copiapó, *Werdermann 932* (MO, NY); Copiapó, *I. M. Johnston 4980* (US); Coquimbo, Ovalle, La Chimba, *Kausel 3300* (NY, SI); La Chimba, *Wagenknecht 168* (SI), *C. Jiles P. 497* (SI); Aconcagua, *Mexía 7850* (NY, US); Rancagua, in hortis cult., *Bertero*, Oct. 1828 (SGO). **Argentina.** SALTA: Cafayate, *Senn 4115*, *Humbert 21039*, *Killip 39542* (US); Cafayate, *Hueck 4* (SI); Cafayate a Sta. Bárbara, *Ruiz Leal 12200* (SI). TUCUMÁN: Tafí, *Venturi 4274* (LP, US); Valles Calchaquíes, *Castillón 9020* (LIL, SI). CÓRDOBA: Dept. Ischilín, S. José de las Salinas, *Hosseus 687* (CORD). LA RIOJA: Salinas Grandes, entre Baldes y Nabar, *Hieronymus & Niederlein 158* (CORD); Vinchina, *Covas 1270* (NY); *J. H. Hunziker 2036*); Villa Unión, *T. Meyer 4149* (UC, US); Villa Castelli, *T. Meyer 4066* (UC, US); General Lavalle, Los Palacios, *Palacios, Balegno & Cuezzo 1655* (MO). SAN JUAN: S. Juan a Calingasta, *Sayago 2458* (SI); Calingasta, Pachaco, *Rodrigo 3042* (LP, SI); Ullún, *Rodrigo 2825* (LP, SI); Valle del Zonda, *Bartlett 20511* (SI, US); S. Juan a Mendoza, Km. 24, *Nicora 4278* (GH, SI); Dept. Albardón, El Salado, *Volponi & Zardini 97* (LP, SI). MENDOZA: Sta. Rosa, Las Catitas, *Ruiz Leal 7976–220* (US); Travesía, Herb. *Miers 447* (US); La Paz, Paso de las Tropas, *Ruiz Leal 9932* (SI); Las Heras, Borbollón, *J. H. Hunziker 3155*, *Soriano 1107* (SI); Dept. San Martín a Sta. Rosa, *Ruiz Leal 9588*, Maipu, *Ruiz Leal 1648*, Las Heras, *Ruiz Leal 3550*, Las Catitas, *De la Barrera 2223* (SI); San Rafael, *Dawson & Pujals 1681* (BAB, SI); Rivadavia, *Catena*, Herb. *O. Boelcke 476* (SI); Dept. La Paz, Desaguadero a Bajada del Gato, *Ruiz Leal 8885*, *8931* (SI); Luján, Dique Cipoletti, *Dawson & Pujals 1387* (BAB, SI); Mendoza, without further locality, *Rose & Russell 20974* (NY, US). SAN LUIS: Las Palmas, *Isern 8060* (MA, SI); El Morro, *F. Pastore 29*, Alto Pencoso, *Bruch & Carette 100* (SI); Dept. Pedernera, Cramer a Villa Reynolds, *Anderson 1499*, *B. S. Vuilleumier 1010* (GH, SI). NEUQUÉN: Cabo Alarcón, camino de Piedra del Aguila a Neuquén, *Nicora 4000* (SI). RÍO NEGRO: Cipoletti, *Rasp 82* (SI), *Scala 34* (NY); General Roca, *Soriano 1233* (SI), *Fischer 72* (MO, NY, US); Pichi Mahuida, *O'Donell 1589*, *Eyerdam*, *Beetle*, *& Grondona*, Univ. Calif. Exp. Andes, II *23473* (SI); Dept. Conesa, Conesa, *Eyerdam*, *Beetle*, *& Grondona*, Univ. Calif. Exp. Andes, II *23558* (MO, SI); Conesa, *T. Meyer 7083* (SI). LA PAMPA: Guatraché, *J. J. de Hernández ex Burkart 5956* (SI); General Acha a Lihuel Calel, Laguna La Asturiana, *Bacigalupo* (SI 20522). BUENOS AIRES: Partido Villarino, Pedro Luro, *Bartlett 19921* (SI, US). ARGENTINA, without further locality (Córdoba?), "Pampas," *Kuntze*, I 1892 (US).

USES. The fruit of *Prosopis strombulifera* is commonly collected and offered for sale in markets as a remedy. The Italian traveler and botanist C. Bertero found the plant grown in central Chile (Rancagua, *in hortis*)

in the year 1828 and noted that the legume was considered a remedy. Perhaps its curious shape lends itself to being used for imaginary cures. Hosseus states that the fruits are astringent and diuretic.

The roots contain a brown dye and may be used for tanning.

Prosopis strombulifera (Lam.) Bentham, var. **ruiziana** Burkart, var. nov.

A typo differt solummodo fructibus duplo maioribus crassioribusque, i.e., 6–7 cm. longis × 1.3–1.4 cm. diametro, spiris 12, 5–6 mm. crassis, ad medium subsulcatis; fructuum numero per capitulum 1 vel 2 (in var. *strombulifera*, 1–21).

This variety differs from the common typical variety in its large fruits, 6–7 cm. long × 1.3–1.4 cm. thick, with 12 coils 5–6 mm. thick; there are only 1 or 2 legumes formed on each flower-head.

Prosopis strombulifera var. *ruiziana* is dedicated to the collector, Professor Dr. h. c. Adrián Ruiz Leal, University of Cuyo, Mendoza, Argentina, who discovered it. *Prosopis strombulifera* var. *ruiziana* was growing with var. *strombulifera* and was selected intentionally because of the fruits, nearly twice the size of those of var. *strombulifera*, and the correlated small number of legumes per head, in contrast to var. *strombulifera*, in which these number from one to as many as 21 per head.

TYPE SPECIMEN. **Argentina.** MENDOZA: Dept. Junín, in aridis salsis inter Barrancas et Rodríguez Peña, *Adrián Ruiz Leal 3787*, with mature fruits, 25 II 1936 (holotype SI; isotype in Herb. Ruiz Leal, Univ. Cuyo).

This may be a natural tetraploid form.

6. **Prosopis reptans** Bentham, Hooker's Jour. Bot. **4**: 352. 1842; Bentham, Trans. Linn. Soc. London **30**: 381. 1875; Burkart, Darwiniana **4**: 74. *tab. V.* 1940.

Strombocarpa reptans (Bentham) A. Gray, United States Expl. Exped. Bot. **1**: 475. 1854.

Prosopis abbreviata Bentham var. *argentina* Grisebach, Pl. Lorentzianae in Abhandl. Ges. Wissensch. Goettingen **19**: 85. 1874.

Low, spiny desert shrub, with underground runners (gemmiferous roots or rhizomes?) by which it invades the soil. Very near *P. strombulifera* in all of its characters, but with different leaves; leaflets smaller, more pubescent and close to each other on the rachis of the pinna, even on the long shoots, so as to touch by their margins or become imbricated when in "sleeping" position. Heads axillary, globose; corolla striate. Fruits yellow, in close, dense, regular, numerous (up to 19) spirals, forming a cylindrical body ca. 5 cm. long × 7 mm. diameter, held in radiate position and not intermingling.

DISTRIBUTION. Central Argentina; apparently also in Peru.

COMMON NAMES. Mastuerzo; retortuño.

MATERIAL EXAMINED. **Peru:** Huancavelica, Mayocc, at 2100 m. elev., *Diers 942*, flowering, 11 XII 1960 (SI); Tayacaja, Mayocc, *Vargas 12856* (MO). **Argentina.** TUCUMÁN: Cruz Alta, Aráoz, *Schreiter 3977* (LIL, SI); Leales, Tres Pozos, *Descole & Schreiter* (LIL 68255; SI); Cruz Alta, *Venturi 7495* (US); Leales, *Villa Carenzo 3497*, *De la Sota 132* (LIL). SANTIAGO DEL ESTERO: Brea Pozo a Río Huayco Hondo, *Bartlett 19748* (NY, SI, US); Colonia Dora a Angá, *Ragonese & Castiglioni 6680* (BAB, SI); Route 9, just south of Loreto, *B. S. Vuilleumier 1035* (GH, SI); Santiago del Estero, without further locality, *Argañarás 135* (SI). CÓRDOBA: Totoralejos, borde de las Salinas, *Burkart 12913* (LIL, SI); Totoralejos, *O. Kuntze*, Nov. 1892; Cañada del Gobernador, *Isern 8030*, flowering, 13 II 1863 (MA, SI); Salinas Grandes, Km. 907, *Soriano 771*, *760* (SI); Cruz del Eje, *O'Donell 4530*, *T. Meyer 12837* (LIL); Dept. Rio Seco, Saladillo, *Sayago 2215*, Dept. Ischilín, Villa de Quilino, *Sayago 2094*, Dept. Tulumba, Totoralejos, *Sayago 2046* (SI); Salinas Grandes, *Lorentz & Hieronymus*, fruct., 10 XI 1872 (NY); Córdoba, without further locality, *Kuntze*, Dec. 1891 (NY). PROV. SANTA FE: Logroño, FCE, Estancia Las Norias, Dept., 9 de Julio, *Krapovickas 808*, Vera FCSF, *Burkart 5935* (SI).

OBSERVATIONS. This is the first mention of *Prosopis reptans* for Peru. It bridges the gap between the areas of var. *reptans* and var. *cinerascens* (see below).

Prosopis reptans Bentham var. **cinerascens** (A. Gray) Burkart, Darwiniana **4**: 75. 1940; Benson, Am. Jour. Bot. **30**: 238. 1943. BASIONYM: *Strombocarpa cinerascens* A. Gray, Pl. Wrightianae **1**: 61. 1852.

Prosopis cinerascens (A. Gray) Bentham, Trans. Linn. Soc. London **30**: 381. 1875; Benson, Am. Jour. Bot. **28**: 754. 1941; Isely, Madroño **21**: 289. 1972.

Spiny shrub 1–4 dm. tall, distinguished by more pubescence than in var. *reptans*; leaflets slightly larger (4 mm. long and pubescent or glabrous; calyx and corolla striate, as in related species, the calyx 2–2.5 mm. long, the corolla 4 mm. long; anthers 1.5 mm. long. Legume cylindrical, yellow, in 9 to 12 close, regular coils.

DISTRIBUTION. U.S.A.: Texas; adjoining Mexico (Isely, *loc. cit.*). Grows on saline soils.

COMMON NAMES. Screwbean; tornillo.

MATERIAL EXAMINED. **U.S.A.** TEXAS: Willacy Co., Port Mansfield, sand dunes at bay, *Creighton 131* (COLO); Brooks Co., *Gould, Reeves, & Morrow 6583* (UC); Point Isabel Road, *Rose & Russell 24258* (US); Green Island, *Tharp 1238*, Carrizo Springs, Dimmit Co., *E. J. Palmer 33766*, Laredo, *Orcutt 5775*, Brownsville, *Fisher 41121*, *Cory 51422*, *Schiller 938*, Cameron Co., *Traverse 1088* (MO, US); Webb Co., *Lundell 13804* (US); Lower Rio Grande, *A. Schott*, in 1853 (US); Webb Co., Aquilares, *Tharp et al. 51–1688* (LIL); Brownsville, clay dune, *Small & Wherry 11843* (LIL); Cameron Co., along coast, *Tharp & Gimbrede 52–519* (MEXU); Webb Co., *Lundell 13804* (TEX). **Mexico.** TAMAULIPAS: sudeste de Matamoros, *Medrano 663* (MEXU); Santa Teresa Laguna Madre, *Medrano 47* (ENCB).

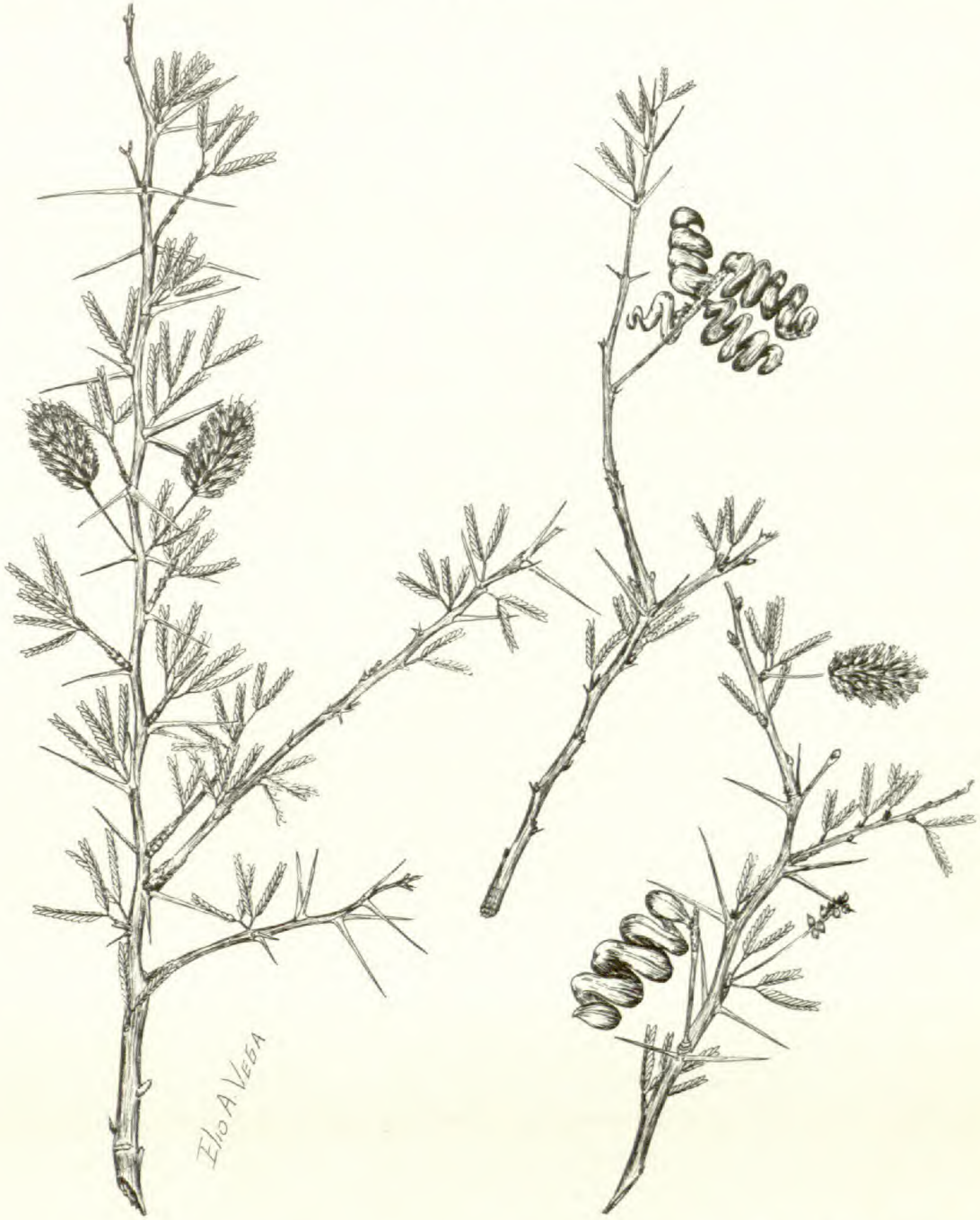


FIGURE 2. **Prosopis.** Flowering and fruiting branchlets, × 5/8, of *P. abbreviata* (*Tinto 2018*), from La Laja, San Juan, Argentina.

OBSERVATIONS. Recent phytochemical analyses by N. J. Carman (1973) strongly support the specific identity of *Prosopis reptans* var. *reptans* and var. *cinerascens*. As could be expected from the morphological similarity, no differences from *Prosopis strombulifera* could be detected. Perhaps all three taxa are only one natural species with some variations. Even the recognition of the Texan plant as a variety is problematic.

Variation occurs in the Texan material of var. *cinerascens*. Tharp and Gimbrede's collection no. *52–519* bears glabrous leaflets and puberulous legumes.

7. **Prosopis abbreviata** Bentham, Hooker's Jour. Bot. 4: 352. 1842; Burkart, Darwiniana 4: 70. 1940; *Ibid.* 9: 77. 1949.

Strombocarpa abbreviata (Bentham) Hutchinson, Genera of Flowering Plants 1: 287. 1964.

Small tree, ca. 2–3 m. high; trunk short, to 10 cm. in diameter; branches armed with the spiny stipules characteristic of the section, up to 3.5 cm. long. Leaves unijugate, short-petioled, glabrous; leaflets minute, approximate, in 5–16, mostly 8–15 pairs per pinna. Flower heads ovoid-elliptic, the rachis 1 cm. long; peduncles axillary, 1.5–3 cm. long; calyx 2 mm., the petals 4 mm. long; ovary villous. Legumes in 2–7½ irregular, closed, dense spirals, coiled, 2–4 cm. long × 1–1.5 cm. in diameter, brownish, puberulous; endocarp segmented; seeds 4.5 × 3 mm. long and broad.

DISTRIBUTION. Endemic in west-central Argentina (in the provinces of Catamarca, Córdoba, Santiago del Estero, San Juan, and San Luis). A rather rare species, perhaps because of early exploitation. Used for firewood.

COMMON NAME. Algarrobillo espinoso.

MATERIAL EXAMINED. **Argentina.** CATAMARCA: Dept. Belén, Huiliche (La Ciénaga), *Schreiter* (LIL 68581; SI); El Carrizal, *Devoto & Rial Alberti*, Herb. Dir. Forestal *1686* (SI); Dept. Belén, La Ciénaga, *Sayago 2259 bis*, fl. & fruct., I 1956 (SI). CÓRDOBA: Salinas Grandes, Km. 907, *Soriano 793* (SI). SAN JUAN: La Laja, north of S. Juan, *J. C. Tinto*, Herb. Dir. Forestal *2018* (SI). SAN LUIS: Dept. Capital, Alto Pencoso, *Bruch & Carette 100* (LP, SI); Laguna Seca, *Bruch & Carette 211* (LP, SI).

OBSERVATIONS. *Prosopis abbreviata* is a well-marked species, with no problems of delimitation. *Prosopis torquata* is similar in its tree habit, but it has different fruits, with a few open coils. *Prosopis strombulifera* is shrubby with underground runners; its fruits have more numerous, regular coils and yellow exocarp. *Prosopis burkartii* has affinity with *P. abbreviata*, but is of a bushy, creeping habit, with longer spikes, larger leaflets and flowers, and more irregular, shorter legumes.

8. **Prosopis torquata** (Cavanilles ex Lagasca) DC. Prodr. 2: 448. 1825; Burkart, Darwiniana 4: 66. *illustr.* 1940.

Acacia torquata Cavanilles ex Lagasca, Elench. Pl. Hort. Matrit. 16. 1816; Lagasca, Gen. Sp. Pl. 16. 1816.

Prosopis adesmioides Grisebach, Pl. Lorentzianae in Abhandl. Ges. Wissensch. Goettingen 19: 84. 1874; cf. Burkart, *loc. cit.*

Strombocarpa torquata (Cavanilles ex Lagasca) Hutchinson, Genera of Flowering Plants 1: 287. 1964.

Erect or spreading shrub or small tree 1–5 m. high, spiny, small-leaved; stipules spiny, as in the related species, more robust on vigorous shoots, 0.1–5.5 cm. long. Leaves 1-jugate; petiole 1–4 mm. long; leaflets 14–30 pairs per pinna, approximate to imbricate, small, oblong, obtuse to sub-

acute, 1-nerved, glabrous or mostly pubescent, 2–4 mm. long × 0.6–0.8 mm. broad; pinnae 0.5–3.5 cm. long. Spikes axillary, ovoid to cylindric, 3–8 cm. long (including peduncle of ca. 1 cm.); flowers about 40–55 per inflorescence, bright yellow, sessile, glabrous outside; calyx 1.5 mm. long; petals 3–4 mm. long, united to their middle; stamens twice as long; ovary villous, the style 4 mm. long. Fruit puberulent in 1–3 irregular spirals, these rather open; articles compressed-globose, with isthmi 2–5 mm. broad, excentric, each one 5–8 mm. long and broad; mesocarp pulpy; endocarp segments hard, closed, approximately 6 × 6 × 4 mm., disclike, ca. 8–13 per legume.

DISTRIBUTION. Argentina, northwestern provinces, apparently endemic. Common and important in the semidesert Monte-vegetation, from Salta southward to San Luis and Mendoza.

COMMON NAMES. Tintitaco, quenti; schinqui, tusca, lata.

MATERIAL EXAMINED. **Argentina.** SALTA: Cafayate a Sta. Bárbara, *Ruiz Leal 12198* (SI); Cafayate, *Krapovickas & Cristóbal 20679* (SI); S. Carlos, Angastaco, Ruta 40, *Krapovickas & Cristóbal 20639* (SI); Coronel Moldes, *Dawson & Calastremé 2012* (BAB, SI), *Bartlett 19667* (SI, US); Guachipas, *Peirano* (LIL 71730); Payogasta, *Ruiz Leal 21292* (SI); Rosario de la Frontera, *Schulz 6554* (SI); Alemania a Cafayate, *Schulz 6640* (SI). TUCUMÁN: Dept. Tafí, Amaicha, 2120 m. elev., *Krapovickas & Cristóbal 20546* (SI); Dept. Trancas, Vipos, *Lillo 7246*, *Schreiter 4596* (LIL, SI); Julipao (Cumbres, Calchaquíes, at 1900 m. elev.), *Morello 1248* (SI); Las Arcas a Tiapunco, *Schreiter 4739*, Cruz Alta, Tacanas, *Schreiter 4605* (SI). CATAMARCA: Belén, El Pozo, *Sayago 1584*, Cerro de la Banda, *Sayago 1478* (SI); Capital, Las Rejas, *Ulibarri 461* (SI); Andalgalá, *Parodi 14249* (SI); Campo Las Heras, *F. E. Devoto*, Herb. Forestal *1678* (SI); Campo de Belén, *Sayago 2011* (CORD, SI); Los Nacimientos, *Falcone & Castellanos*, Herb. Forestal *3554* (SI); La Puerta y Yacutula, *Sayago 640* (SI); Andalgalá, *Solbrig 4216* (GH, SI), *Joergensen 969* (MO). LA RIOJA: Gral. San Martín, Estancia Copahue de Mangino, *Anderson 1526* (SI); Chilecito, Cerro Bola, *Dawson 3436* (LP, SI); Chilecito, *T. Meyer 3511* (UC), *4101* (GH); Guandacol, *T. Meyer 4995* (US); Route 38, 38 km. south of La Rioja, *B. S. Vuilleumier 1019* (GH, SI); Route 9, 46 km. north of Bazán, *B. S. Vuilleumier 1021* (GH, SI). SAN JUAN: Jáchal, Cuesta de Huaco, *Ruiz Leal & Roig 18851* (SI), *Cabrera et al. 24556* (LP, SI); Jáchal, La Ciénaga, *Cabrera et al. 24542* (LP, SI); Valle Fértil, *Fabris & Zuloaga 8327* (LP, SI), *Piccinini & Leguizamón 1773* (SI); Caucete, camino a Vallecito, *Rodrigo 2876* (SI); S. Agustín del Valle Fértil, *Bartlett 19556* (SI, US); Pismanta, *Ruiz Leal & Roig 18979* (SI). SANTIAGO DEL ESTERO: Ojo de Agua, *Sayago 1379* (SI); Dept. Copo, Los Tigres, *Roig 8* (SI); Espada, *Argañarás 363* (SI); El Palomar a Pampa Pozo, *Schreiter 6720* (LIL, SI); Dept. Ojo de Agua, Navarro, *Sayago 2807b* (SI); Giménez, Gramilla, *Venturi 9749* (GH, MO). CÓRDOBA: Córdoba a La Calera, *Hieronymus 125* (CORD, US); San Javier, Loma Bola, *J. H. Hunziker 8288* (SI); Capilla del Monte a Cruz del Eje, *Burkart 20408* (SI); Cerritos de Malagueño, *A. T. Hunziker 7820* (CORD, SI); Dept. Tulumba, S. Pedro a Pozo del Algarrobo, *Sayago 1886* (SI); Sierras del Oeste, *Báez 27* (SI); Sta. María, Los Chinos, *Sayago 1422*, Río Seco, sierra, *Sayago 301* (SI). SAN LUIS: S. Luis de la Punta, *Isern 8062*, 10 III 1863 (MA, SI); La Calera, *Burkart 10716*, Alto Pencoso, *Ruiz Leal 9601*, *9605* (SI); De-



FIGURE 3. **Prosopis.** Flowering and fruiting branchlets, × 5/8, of *P. torquata* (*Cabrera 24556*), from Jachal, San Juan, Argentina.

saguadero a Jarilla, *Ruiz Leal 9092*, *9442*, *9934* (SI); Bajo de Velis, *Kurtz 8491* (R). MENDOZA: Dept. La Paz, Paso de las Tropas, *Ruiz Leal 9067* (SI).

USES. Wood for fuel.

9. **Prosopis pubescens** Bentham, London Jour. Bot. 5: 82. 1846; Bentham, Trans. Linn. Soc. 30: 380. 1875; Jepson, Fl. Calif. 2: 240. 1936; Burkart, Darwiniana 4: 69. 1940; Benson, Am. Jour. Bot. 28: 753. 1941; Shreve & Wiggins, Fl. Sonoran Desert 1: 603. 1964; Isely, Madroño 21: 294. 1972; Standley, Contr. U. S. Nat. Herb. 23: 350. 1922.

Strombocarpa pubescens (Bentham) A. Gray, Pl. Wrightianae 1: 60. 1852; cf. Britton & Rose, N. Am. Fl. 23(3): 183. 1928, in synon.

ILLUSTRATIONS. Sargent, Sylva N. America 3: 107. *tab. 138*. 1890 (ed. 1947); Jour. Torrey Bot. Club Expl. California, in Rep. Expl. Surv., Railroad fr. Miss. R. to Pacific Ocean 5, 7: 360. *pl. 4*. 1853.

Tall shrub or tree 2–10 m. high, much branched; trunk short, to 30–40 cm. in diameter; stipules spiny, straight, cinereous, decurrent, 0.2–2 cm. long. Leaves 1-jugate, short-petioled; leaflets elliptic-oblong, in 5–9 pairs per pinna, pubescent, not overlapping, slightly 1–3-nerved at base, subacute, 4–12 mm. long × 2–4 mm. broad. Spikes axillary, simple, elongate, 5–8 cm. long (including the peduncle of 1–1.5 cm.); florets pubescent, sessile, yellow; calyx 0.7–1.2 mm.; corolla 2–3 mm. long, gamopetalous, thin, the petals 1-costate, finely pubescent outside and on the inner apex; stamens 4–5 mm. long, the anthers 0.5–0.8 mm. long; ovary white-villous, the style glabrous; young fruit 4–5 mm. long, densely white-villous and already 2 to 3 times coiled. Fruits very similar to those of *P. strombulifera* and *P. reptans*, divergent on the rachis, never intermingling, puberulous or glabrescent, with 8–24 dense, closely set spirals, forming on the whole a cylindrical, yellow body 2.5–5.5 cm. long × 5–6 mm. in diameter; seeds reniform-ovoid, 3–3.5 mm. long; endocarp thin.

COMMON NAMES. Screwbean; tornillo.

DISTRIBUTION. Southwestern North America; Mexico (Baja California to Chihuahua); U.S.A. (California to Utah, Arizona, New Mexico, Nevada, Texas); bottomlands along streams and waterholes in desert climate; naturalized in South Africa.

MATERIAL EXAMINED. **U.S.A.** CALIFORNIA: San Bernardino Mts., *Parish 2982* (US); Colorado Desert, Riverside, lower Sonoran Zone, *C. B. Wolf*, Rancho Sta. Ana Bot. Gard. *4348* (COLO); Indio, *Thackery 377* (COLO); Imperial Valley, *J. B. Marks*, IV 1948 (LIL); California, *Brandegee*, V 1912 (UC 185747); N. lower Calif., *C. R. Orcutt*, 27 VII 1885, S. Diego Co., *Abrams 3999* (NY); Riverside Co., Palo Verde Valley, *Carter 1430* (MO, NY, US); Riverside Co., W. Colorado Desert, *M. D. Clary*, V 1931 (SI); Little S. Bernardino, *Munz & Johnston 11231* (SI). NEVADA: Clark Co., Charleston Mts., *Clokey 8397* (LIL, MO, NY, US); Las Vegas on Highway 91, *Raeder 171* (COLO). UTAH: Washington Co., St. George, *Eggleston 14789, 14793* (NY, US), *M. E. Jones 6089* (US). ARIZONA: Sacatón, *Harrison 163, Harrison & Kearney 2311* (US); Tucson, *Thomber 451* (US); Arizona, without further locality, *Pringle 1370* (BA, GOET). NEW MEXICO: Black Range, Animas Creek, Sierra Co., *Metcalfe 1116* (COLO, LIL, MO); Dona Ana Co., El Paso, *Lee, Berkman, & Tharp 46310* (UC); Dona

Ana Co., Mesilla Valley, *Wooton & Standley 3173* (COLO, NY, US), *Wooton 18* (MO, US); Jornada del Muerto, *G. Engelmann*, 29 VII 1846 (MO); New Mexico, without further locality, *E. O. Wooton*, 26 VI 1902 (COLO). TEXAS: Presidio Co., Sierra Tierra Vieja, *Hinckley 1897* (NY); Porvenir, *York 48245* (TEX); near Rio Grande, *Steiger 457* (NY); Presidio Co., along Rio Grande, *Cutler 1917* (MO, SI); Texas Co., *Turner 3654* (TEX); El Paso, *E. J. Palmer 31090* (MO). **Mexico:** Baja California, Alaska to Mexicalí, *Wiggins & Gillespie 4178, 4179* (GH, MEXU, NY); Baja California, Mexicalí, *Inst. Biol. Herb. 3454* (MEXU); Chihuahua, *C. G. Pringle*, 12 VIII 1887 (MEXU); Palm Valley, *C. R. Orcutt*, June-July 1883 (MO). **South Africa:** Carnarvon District, forming thickets along river at Van Wyk Vlei, *Acocks 1788*, flowering, II 1937 (NY).

OBSERVATIONS. A well-characterized species, without problems of delimitation. It has been called *Prosopis odorata* or *Strombocarpa odorata*, but these names are to be rejected (see Benson, 1941, and list of excluded names at end of this paper).

On one raceme normally only a few legumes develop, but in Cutler's specimen no. *1917*, from Presidio County, Texas (MO), as many as 35 unripe legumes are seen on the same peduncle.

USES. *Prosopis pubescens* is used as fuel; the legumes are important as food and forage for cattle.

10. **Prosopis palmeri** S. Watson, Proc. Am. Acad. Arts Sci. **24**: 48. 1889; Standley, Trees and Shrubs of Mexico, Contr. U. S. Natl. Herb. **23**(2): 351. 1922; Burkart, Darwiniana **4**: 62. 1940.

Sopropis palmeri (S. Watson) Britton & Rose, N. Am. Fl. **23**(3): 183. 1928; Hutchinson, Genera of Flowering Plants **1**: 290. 1964.

Shrub or tree 1.2–6(–7.5) m. high, much branched, spreading symmetrically, flat topped; trunk to 1–3 m. long, reaching 45 cm. in diameter; bark gray or dark purple, splitting off in long strips; branchlets spiny, finely pubescent or subglabrous; the spiny stipules as usual straight, paired, cinereous, 0.5–3.5 cm. long, caducous with age; wood very hard, dark purple; brachyblasts congested, perennial, blackish, elongating to 1–2 cm., capable of a reversion to macroblasts by apical growth. Leaves 1-jugate; petiole short, to 5 mm. long, the pinnae 2–3 cm. long; leaflets 3–10 pairs, glabrous, elliptic-oblong, obtuse or mucronate, tending to obovate, enervate or with 1 to 2 main nerves scarcely visible, 4–8 mm. long × 2–3 mm. broad. Spikes axillary, slender, 3.5–6 cm. long (the nude peduncle ca. 1.5 cm. long); flowers bright- or lemon-yellow, fragrant, sessile, tubular, puberulous; calyx 1.3–2.3 mm. long; corolla 5-toothed, angled, 4.5–6 mm. long, the petals connate for much of their length, pilose or subglabrous inside at their tips; stamens 10–12 mm. long, yellow, the anthers 0.8–1.5 mm. long; apical gland globose; ovary white-villous, the style pilose to glabrous. Legume straight to falcate, indehiscent, puberulous, almost terete to compressed, 4–9 cm. long × 0.8–1 cm. broad, reddish-brown, with delicate oblique striae forming a V, sessile, cuneate at

base, obtuse and mucronate at tip, the placental margin convex (legume recurved); exocarp thin, brittle, nearly membranous, subtended by a layer of longitudinal close-set fibers; mesocarp thin, brittle, tannic-reddish; endocarp tiny, membranous, segmented in one row, but opening easily at maturity, the segments rectangular; seeds numerous, oblique, oblong, brown, 6–7 mm. long; fissural line broadly open at base.

DISTRIBUTION. Mexico (Baja California); a narrow endemic, but locally abundant, as shown by the beautiful collections and remarks of H. S. Gentry and Miss Annetta Carter; grows mainly on dry riverbeds.

USES. Browsed by cattle and much used for fuel (Gentry).

COMMON NAMES. Palo de hierro; palo fierro.

MATERIAL EXAMINED. **Mexico:** Baja California, Muleje, *E. Palmer 2*, June 1887 (GH, type; NY); bank of Arroyo de la Presa, *Wiggins 15496* (GH, TEX); Médano a Venancio, *Wiggins 5545* (GH, NY, UC); Arroyo Hondo, Sierra de la Giganta, *Gentry 4164*, *4165* (GH, MO); Magdalena Plain, Sauce, *Gentry 4189* (GH, UC); Sierra de la Giganta, *Carter 4935*, *4275* (MO, NY, TEX), *4139* (LIL, UC), *4816*, *5280* (MEXU, UC); Baja California, *Nelson & Goldman 7259*, *7310* (NY); near Comondú, *Wiggins 5486* (NY, UC), *Carter 2477* (UC); 9.6 km. NE of Rosarito, *Carter 2944* (MEXU, UC); Concepción Bay, 24 miles S of Muleje, *Wiggins 11420* (GH, UC); Juncal y Purísima, *Brandegee s.n.*, 12 I 1890, 13 II 1889 (GH, UC); San Javier a Loreto, cerca de Comondú, *Chambers 964* (UC); 5 miles N of Comondú, *Hammerly 423* (GH).

OBSERVATIONS. This species has not been correctly interpreted up to now. The original author considered it, erroneously, as a member of sect. ALGAROBIA. He failed to recognize that the petals are, at least often, hairy inside their tips. Later, Britton and Rose (1928, p. 182) treated it as a new genus (*Sopropis*). To increase the confusion, I regret to state that in my former paper on *Prosopis* (1940, p. 62), misled by descriptions citing the petals as glabrous, I tentatively treated the species as approaching *P. africana* in sect. ANONYCHIUM, with which it has no affinity at all (as already shown by P. Guinet as a result of his pollen studies, *Les Mimosacées, Etud. Palynol. Fondament.*, Thèse Univ. Toulouse, p. 53. 1969). After a thorough comparison of the excellent material at the Berkeley, Harvard, St. Louis, and New York herbaria, it is clear to me that *P. palmeri* is a true STROMBOCARPA. While it is a very well-marked species within this section (the only one without fruits which coil), it nevertheless lacks qualifications to form a special group or genus because of its gamopetaly and sessile flowers, which also occur in several related species. Furthermore, the supposed absence of hairs inside the petal tips does not appear to be true, so there is no really sharp distinction from the ordinary condition. The key to the species presented by C. M. Rowell (in J. L. Schuster, Literature on the Mesquite (*Prosopis* L.) of N. America, An annotated bibliography. Texas Tech. Univ. 5. 1969) must therefore be emended.

11. **Prosopis burkartii** Muñoz; C. Muñoz Pizarro, Bol. Mus. Nac. Hist. Nat. Chile 32: 363–370. *illustr.* 1973 ("1971").

Large, densely and intricately branched, creeping shrub 0.5–1.5 m. high; spiny stipules cinereous, 0.5–3 cm. long, decurrent as costae on the internodes. Leaves glabrous, unijugate; petiole short, 3–5 mm., the pinnae 2.5–3.5 cm. long; leaflets 7–12 pairs, elliptic-oblong, obtuse to subacute, glabrous or ciliolate, 4–7 mm. long × 1–2 mm. broad. Peduncles solitary, axillary, 2–3 cm. long, flower-spike short-cylindric, to 3 cm. long × 1.5 cm. in diameter. Flowers sessile; calyx puberulous, 3 mm. long; corolla 4–5 mm. long, the petals acute, glabrous outside, villous at the inner apex; stamens 5 mm. long, the anthers 1.5–1.8 mm. long; ovary white-villous, the styles glabrous (protruding in bud). Legumes puberulous, submoniliform in 1 to 3 spirals (placenta on the concave border), brown, mostly many legumes of a spike intermingled, forming a globose mass; endocarp segments and seeds longitudinal, the seeds 5.2 mm. long × 4 mm. broad.

DISTRIBUTION. Northern Chile, Prov. Tarapacá, Pampa del Tamarugal. This species is known only from the type locality, but Professor Otto Zoellner has written to me that he thinks he found more stands in the Camarones Valley, Tarapacá, unfortunately lacking flowers and fruits.

MATERIAL EXAMINED. **Chile:** Tarapacá, El Gobierno, La Guaica, *C. Muñoz Pizarro 7370* (SGO, SI).

OBSERVATIONS. The original description is contradictory concerning the position of the endocarp segments. These are not transverse, but rather longitudinal, as I have observed in the type material. Therefore, the species must find its place in ser. Strombocarpae. By its morphology and distribution, it may have originated from hybridization of *Prosopis tamarugo* × *P. strombulifera*, both of which occur in its area. The fertility of the material discovered by Professor Muñoz indicates a stabilized biotype.

Ser. Cavenicarpae (Burkart) Burkart

12. **Prosopis ferox** Grisebach, Symbolae ad floram Argentinam in Abh. Kön. Ges. Wiss. Göttingen 24: 118. 1879; Burkart, Darwiniana 4: 76. 1940.

Shrub or tree 2–5 m. high (with age up to 7 m. high), with a short trunk up to 1 m. in diameter; branches, leaves, and flowers of the general *Strombocarpa* type; stipular spines minute on brachyblasts, on macroblasts 1.5–5 cm. long, straight, cinereous, divergent, fused at base and decurrent on the branchlet. Leaves 1-jugate; petiole 1–3 mm. long, the pinnae 1–4 cm. long; leaflets 9–18 pairs per pinna, linear-oblong, mucronate, 3.5–8 mm. long × 1–1.5 mm. broad, glabrous or ciliolate. Spikes pedunculate, 2–6 cm. long; calyx 1–2 mm. long, glabrous; corolla ga-

mopetalous, 5–6 mm. long, glabrous outside; ovary villous. Legume straw-yellow when ripe, resembling *P. farcta* because of its thickness, cylindric, with prominent placental suture, straight or slightly falcate-incurved, not laterally coiled, 2.5–7 cm. long × 1–1.8 cm. in diameter, sessile, globose at base, obtuse and mucronate at apex; exocarp rigid, smooth, 1 mm. thick; mesocarp spongy, tannic(?), bitter; endocarp segments transverse in 2 irregular rows; seeds compressed, ovate, 4.5–6 mm. long.

DISTRIBUTION. Limited to southern Bolivia and the extreme northwest of Argentina in the Puna region of Jujuy and Salta provinces. Typical tree of the semidesert vegetation rich in cacti, in the Quebrada de Humahuaca; often the only tree there, growing at rather high elevations (2400 to 3700 m.). A historical tree, known to be nearly 200 years old, at Tilcara, Jujuy, measures ca. 7 m. tall, with a trunk 1 m. in diameter (*T. Meyer 22650* (SI)).

COMMON NAMES. Quiscataco; churqui; churqui jujeño.

MATERIAL EXAMINED. **Bolivia:** Prov. Nor-Chichas, Dept. Potosí, Quechisla, *Cárdenas 39* (GH). **Argentina.** JUJUY: Humahuaca, Puna, *Hieronymus & Lorentz 786*, III 1873 (phototype, Field Mus. 1461, GH, SI; specimens, CORD, GOET, NY); La Quiaca, *Pflanz 933* (M); Humahuaca, *Krapovickas 1521* (SI); Camino Iturbe a Humahuaca, *Soriano 689* (SI); Ruta 9, Uquía, *Okada 2995* (SI); Humahuaca, *Cabrera & Kiesling 20255* (LP, SI); Dept. Yaví, Yaví Chico, *Bolsi & Werner 5* (LIL, SI), *T. Meyer s.n.* (LIL 31466); Dept. Sta. Catalina, El Angosto, *Cabrera, Crisci & Kiesling 19881*, at 3700 m. elev. (LP, SI); Quebrada de Humahuaca, *Ruthsatz, 22* VIII 1971 (ripe fruits, SI 26540); Tilcara, *T. Meyer 22650* (LIL, SI). SALTA: Dept. Poma, Campo de la Paciencia cerca de Cerrillos, *Cabrera 8306* (LP, SI).

USES. Fuel, shade; fruits for food. In spite of its systematic affinity with *Prosopis tamarugo* (from Chile), *P. ferox* is probably not as valuable for desert reforestation purposes, since it is smaller, more spiny, and probably of slower growth.

13. **Prosopis tamarugo** F. Philippi, Verh. Deutsch. Wiss. Ver. Santiago, Chile 1: 159. 1886 (Index Kewensis Suppl. 9); Burkart, Darwiniana 4: 80. *fig. 4, tab. 7.* 1940; Maldonado, Rev. Chilena Hist. Nat. 22: 65–71. 1918; R. A. Philippi, Anal. Mus. Nac. Chile, 21. 1891.

Tree when old up to 18 m. high, very similar to *P. ferox*; stipules spiny, smaller, 0.5–3.8 cm. long; leaves unijugate, similar to those of *P. ferox*, pinnae 3–4 cm. long or less, with 10 to 15 pairs of leaflets, these linear, obtuse or subacute, 4–8 mm. long, more distant. Spikes axillary, 3.5–6.5 cm. long; flowers yellow, sessile, glabrous outside; calyx 1.5 mm.; corolla 4–5 mm. long, the petals united, the tips villous within; ovary villous. Legumes straw-yellow or clear brown, cylindric-subtorulose, turgid, of the same structure as in *P. ferox*, but more strongly incurved.

falcate to ring-shaped, smaller, 2–3.5 cm. in diameter and thinner, 7–10 mm. thick, the sutures impressed; seeds smaller, ovate, 3–4.3 mm. long, brown.

COMMON NAME. Tamarugo.

DISTRIBUTION. Chile, only in the northern, desert provinces, especially in Tarapacá, where, on arid mesetas, it is the only tree; the region bears its name, "Pampa del Tamarugal." Its area of distribution covers the central strip of Tarapacá, south of Arica and Antofagasta and north of Chuquicamata, a surface of roughly 15,000 km.^{2} The natural stands are very scattered or devastated, however, since this is the only firewood over long desert expanses.

MATERIAL EXAMINED. **Chile:** Tarapacá, Pampa de Tamarugal, cerca de La Guaica, entre Pica y Pozo Almonte, *Hans Niemeyer*, X 1962, Herb. *Looser 5794*, Santiago (SI); Tarapacá, La Choique cerca de La Tirana, *C. Muñoz Pizarro*, with flowers and fruits, 10 XII 1966 (SGO, SI 26292); Iquique, Pozo Almonte, *Zoellner 3965* (SI).

USES AND PHYSIOLOGY. The tamarugo has been cultivated to some extent, but only in recent years has a real desert-forestation program been started in northern Chile. The "Corporación de Fomento" (CORFO) is planting large areas of desert with this valuable tree, especially for Merino sheep and Karakulor Angora goat raising. Sheep or goats feed on the falling leaves and legumes and occasionally browse the young shoots. It is said that after some years, the planted tamarugo will support 16 sheep per hectare. This is a new development, of which several publications speak enthusiastically (e.g., S. Polanco N., "Los Milagros del Tamarugo," in Patria (2a. Época) 1(3): 23–26. 1967. Santiago de Chile). I have seen photographs by Mario A. Habit C. (from CORFO, January, 1973) showing the transformation of the salt-desert into a dense forest through plantings of tamarugo. Thousands of young seedlings, nursed in seedbeds, are yearly put into the field. Near Iquique, in a nursery, at least 100,000 seedlings were being raised for transplantation in 1970 (Prof. Otto Zoellner, *in litt.* to the author). Polanco writes that every month 150 hectares of desert are planted with tamarugo. He states that the capital put into this forestation is recovered in a period of 9 to 12 years with livestock farming. "It is a unique experience in the whole world, which revolutionizes principles of the live-stock industry" (Polanco, *loc. cit.*, 26). Moreover, sanitary conditions for livestock raising in the desert are excellent. Surely, the tamarugo should be tested in many arid regions of the world.

A very important physiological behavior of this tree has recently been discovered. In the Pampa del Tamarugal it does not rain, and formerly it was thought that the trees could thrive only from subterranean humidity or water currents coming from the western slopes of the Cordillera. However, the investigations of Sudzuki and coworkers have shown that *Prosopis tamarugo* is capable of absorbing the atmospheric humidity, which

is great in northern Chile (owing to the fogs, which are called "camanchacas"). The leaves of this tree absorb water through their stomata when the relative humidity of the air is 95% or more. At night this initiates a flow of sap into the roots and from these into the soil; during the day, the flow reverses. Stomata open mainly at night and are closed in the daytime. (See F. Sudzuki, Absorción foliar de humedad atmosférica en tamarugo, *P. tamarugo* Phil., in Bol. Téc. Estac. Agron. Fac. Agron. Univ. Chile 30: 1–23. *illustr.* 1969; Sudzuki, Botti, & Acevedo, Relaciones hídricas del tamarugo (*Prosopis tamarugo* Phil.) en la localidad de Canchones. *Ibid.* 37: 3–23. 1973.)

The wood of tamarugo is used not only for fuel, but also for furniture, although it is difficult to work on.

Cultivation and a "forest reserve for the tamarugo," considered most important for the Chilean desert, were already demanded more than fifty years ago in an interesting study by the inspector of forests, E. Maldonado (Contr. Estud. Tamarugo, Rev. Chilena Hist. Nat. 22: 65–71. *pls. 3, 4.* Santiago, 1918).

Sect. MONILICARPA Ruiz Leal & Burkart

14. **Prosopis argentina** Burkart, Rev. Arg. Agron. 4: 39. *illustr.* 1937; Burkart, Darwiniana 4: 91. *figs. 6, 7, tab. 13.* 1940; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. Pp. 130, 133. 1952.

Shrub 1.5–2 m. high, laxly branched; twigs cylindric, flexuous, glabrous, reddish when dry, with rather long internodes, the peripheral ones arched downward; axillary shoots elongate, no brachyblasts formed; spines uninodal, axillary, and frequently apical, solitary, absent from many nodes, 0.2–3.5 cm. long. Leaves small, unijugate, puberulous; petiole 5–18 mm. long; stipules very small, triangular, dry; pinnae 1–4.5 cm. long, with 5 to 27 pairs of leaflets, approximate to distant, linear, puberulous to scarcely ciliolate or glabrous, obtuse, nearly enervate, 2.5–5.5 mm. long × 0.6–1 mm. broad. Spikelike racemes axillary, solitary, 4–7 cm. long (including peduncle), with only 20 to 50 florets on pedicels to 1.6 mm. long, all very pubescent; calyx 2 mm.; corolla 5 mm. long, with almost free petals, pubescent outside like the calyx, the tips inside with a few hairs or nearly glabrous; stamens 8 mm. long, the anthers 1.2 mm. long; pistil 1 cm. long, the ovary white, strigose-pubescent, the style glabrous (some florets functionally staminate because of short pistil). Fruit linear-moniliform, bright red when ripe (a color lost in dried specimens), to 13 cm. long, lax, glabrous, with 4 to 14 globose or ovoid segments and very thin, central isthmi; segments 8–12 mm. long × 6–8 mm. in diameter; one suture 2-nerved, the other 3–4-nerved, both broad; faces striate-corrugate; mesocarp thin; endocarp bony, with convex faces and acute extremities; seeds brown, compressed-ovate, 7 mm. long.

COMMON NAME. Algarobilla (and several others).

DISTRIBUTION AND ECOLOGY. Endemic in northwestern Argentina in the Andean provinces of Catamarca, La Rioja, San Juan, and northern Mendoza. A typical xerophyte and psammophyte capable of thriving in conditions of extreme drought. Its preference for sand dunes is in marked contrast to that of the common species of *Prosopis* sect. ALGAROBIA, which prefer heavier soils, sometimes salty clay, on lower mesetas, riverbanks, etc. In Catamarca *P. argentina* has been found at elevations of 2000 m.

SELECTED SPECIMENS SEEN (not previously published). **Argentina.** CATAMARCA: Belén, *Sayago 2846* (LIL, SI); Tinogasta, Arenales de Guanchín, *Schreiter 6030* (LIL, SI), *O'Donell & Meyer 5068* (LIL, TEX). LA RIOJA: Arauco, *A. T. Hunziker 4961* (LIL, SI, SP); Quebrada de la Troya, *Covas 1236* (LP, NY); Arauco, *Parodi 14931* (BAA, SI); Quebrada de la Troya, *J. H. Hunziker 2043* (MO). SAN JUAN: El Balde a Adán Quiroga, *Covas 515* and *Ruiz Leal & Roig 18838* (SI); Ullún, *Rodrigo 2843* (SI). MENDOZA: Dept. Santa Rosa, Las Catitas, *Ruiz Leal 11814* (LIL, SI), *15905* (SI).

Sect. ALGAROBIA DC.
Ser. Sericanthae Burkart

15. Prosopis sericantha Gillies ex Hooker & Arnott in Hooker's Bot. Misc. 3: 204. 1832 ("1833"); Burkart, Darwiniana 4: 84. *fig. 5a, tab. 8.* 1940.

Aphyllous, horrid, spiny shrub, very similar to species number 16, *P. kuntzei*, but clearly differentiated, smaller, 0.3–2.5 m., rarely to 3.5 m. high; branchlets spiny, shorter and commonly more slender, 0.8–2.5 mm. in diameter. Spikelike racemes shorter, 1.5–4 cm. long, densely pubescent; flowers red, very pubescent on calyx and corolla; pedicels pubescent, to 1.6 mm. long. Fruit linear, more slender, 7–14 cm. long × 0.8–1.3 cm. broad × 6–7 mm. thick; compressed, reddish, endocarp segments hard, closed, subquadrate; mesocarp pasty, bitter.

COMMON NAMES. Temoj; barba de tigre; algarobilla; huaschilla; retama; espina de Dios; albardón.

DISTRIBUTION. Argentina, widely distributed in the western Gran Chaco and Monte regions. To its known area must be added some provinces, such as Salta, Formosa, La Rioja, and San Luis to the south. One incomplete specimen from Corrientes (between Sauce and Perugorría, in bud, without fruits, *Martínez Crovetto & Cherini*, BAB 6119) seems to be this species, but is indicated as a tree and needs confirmation. Small, slender, sterile specimens have been collected in the eastern part of Salta and may be a form of this species or a new related one.

SELECTED SPECIMENS SEEN. **Argentina.** FORMOSA: Ing. Juárez, *Burkart 20233, 20257* (SI). CHACO: Las Breñas, *Venturi 9757* (MO). SANTIAGO DEL ESTERO: entre Torres y Robles, *Bartlett 19735* (GH, NY, SI, UC); Miel de Palo, FCE, *Krapovickas 823* (SI); Beltran, *B. S. Vuilleumier 1029* (GH, SI); Giménez, *Venturi 9695, 10289* (MO). SALTA: Guachipas, Alemanía, 1300 m. elev., *Venturi 9808* (GH, MO, US). CATAMARCA: Dept. La Paz, *Brizuela 15576* (LIL). LA RIOJA: Dept. S. Martín, Bajo Hondo a Pozo Piedra, *Anderson 1534* (SI); Punta de



FIGURE 4. **Prosopis.** Left: Flowering specimens of *P. sericantha*, from wild plants from San Luis, Argentina. Right: Fruiting specimens of same. *Photo.* Dr. Carlos Bruch.

los Llanos, Ruta 38, *B. S. Vuilleumier 1015* (GH, SI). SAN LUIS: 30 km. W of Santa Rosa, Bañado de Cantana, *Burkart 13973* (SI); Candelaria, *B. S. Vuilleumier 1014* (GH, SI). MENDOZA: Dept. La Paz, Desaguadero, Paso de las Tropas, *Ruiz Leal 9575* (SI). TUCUMÁN: Leales, Los Puestos, *T. Meyer 12795* (MO); Burruyaco, El Puestito, *Venturi 7651* (MO).

16. **Prosopis kuntzei** Harms in Kuntze, Rev. Gen. Pl. 3(2): 71. 1898; Burkart, Darwiniana **4**: 85. *fig. 5b*, *tab. 9*. 1940; [3] Hassler, Bull. Herb. Boissier, II. 7: 171. 1907.

Prosopis casadensis Penzig, Malpighia **12**(12): 405. *lám. 9*. 1899.
Prosopis barbatigridis T. Stuckert, Comun. Mus. Nac. Hist. Nat. Buenos Aires **1**(3): 66. *2 tables*. 1899, Pharmazeuth. Post **15**: 1, 2. 9 IV 1899, *Ibid.* **33**: 1–4. 1899.

Subaphyllous, horrid, glabrous tree 4–10(–15) m. high; trunk 40–60 cm. in diameter, much branched, round-topped, consisting mainly of spine-tipped, rigid, straight, cylindrical, multinodal branchlets 8–50 cm. long × 1.2–5 mm. in diameter, glabrous, slightly striate, with small scales on the alternate nodes. Leaves small and falling off very soon in spring after the development of the young shoot, which becomes a spine; petiole

[3] In *fig. 5* (flowers of *P. sericantha* and *P. kuntzei*) the indicated enlargement of × 16 should be corrected to × 10.6.

5 mm.; pinnae unijugate, 1 cm. long; leaflets 3 to 5 pairs, 3–5 mm. long; some leaves reduced to 5 mm. in length and with only 1 pair of leaflets. Spikelike racemes solitary or fascicled, 3–7 cm. long (peduncle 0.5–1 cm.); florets white or yellow, perfumed, glabrous outside; calyx 1 mm.; corolla 3 mm. long, villous within; ovary villous, the style pilose. Legume black, thick, compressed-turgid, straight or subfalcate, mucronate, 10–17 cm. long × 1.5–2.6 cm. broad × 0.6–1.5 cm. thick; pulp mealy-spongy, dry; endocarp segments subquadrate, bony, closed, 1.2 × 1.2 × 0.6 cm.; seed compressed, ovate, brown, with umbo, 7–10 mm. long × 5–6 mm. broad; new shoots with leaves deciduous in July to November; flowering in spring (October to December); ripe fruits from March to May.

DISTRIBUTION. A typical Gran Chaco species of the mixed subxerophilous woods of northern Paraguay and eastern Bolivia to central Argentina (northern Córdoba, Santa Fe, and Corrientes).

COMMON NAMES. Itin; palo mataco; lanza-lanza; jacarandá; carandá; yacarandá; barba de tigre.

MATERIAL EXAMINED. **Paraguay:** Gran Chaco region, Loma Clavel, at 23° 20′ lat. S, *T. Rojas*, Herb. *E. Hassler 2487* (G, MO, NY, SI); Puerto Casado, *Pedersen 4172* (SI). **Bolivia:** Sta. Cruz, Sierra, at 2000 m. elev., *O. Kuntze*, V 1892 (isotype, NY; phototype, Field Mus. 1465, NY, SI); Dept. Santa Cruz, Mairana, 1400 m. elev., *Steinbach 8271* (GH, MO, NY). **Argentina.** SANTIAGO DEL ESTERO: El Charco, *Venturi 9694* (GH, MO, SI), *Schreiter 5948* (LIL, SI); Brea Pozo a Huayco Hondo, *Bartlett 19751* (GH, SI); Lavalle, *Burkart 20360* (SI); E of Quimilí, Route 94, *Solbrig & Vuilleumier 4276, 4279* (GH, SI). FORMOSA: Bartolomé de las Casas, *Solbrig 4244, 4250, 4268*, Las Lomitas, *Solbrig 4260*, west of Bazán, *Solbrig 4262* (GH, SI). CHACO: Colonia Benítez near Resistencia, *Martínez et al.* (BAA 9507, SI); Villa Angela, *Solbrig & Vuilleumier 4280, 4284* (GH, SI). CÓRDOBA: Dept. Totoral, Las Peñas, *Burkart 20100*, Simbolar, *Sayago 2248* (SI).

USES. Heartwood, hard and flexible, bluish-black, specific weight 1.20–1.35; used by the Chaco Indians for bows and spears; at present used for fence-posts because of its resistance to decay, and lumbered for various local uses; said to yield a very valuable timber.

REFERENCES. Record and Hess, Timbers of the New World, 317. 1943; Tortorelli, Maderas y Bosques Argentinos, 403. 1956; Costantino, Arbol Forest. Arg., 1956.

Ser. Ruscifoliae Burkart

17. **Prosopis ruscifolia** Grisebach, Plantae Lorentzianae in Abh. Kön. Ges. Wiss. Göttingen **19**: 82. 1874; Burkart, Darwiniana **4**: 87. *tab. 10*. 1940; Hieronymus, Icon. et Descript. Pl. Arg. **6**: *tab. 2*. 1885.

Spiny, large-leaved, glabrous tree 5–12 m. high, with trunk to 70–90 cm. in diameter; branchlets arched downward, flexuous, green, becoming

dark gray, slender; spines uninodal, solitary, straight, strong, cylindrical, subulate, not at all nodes, 1–33 cm. long, commonly 3–15 cm. long, above their bases 0.6–1.4 cm. in diameter, thicker than the subtending twig. Leaves unijugate, lax; petiole 1–7.5 cm. long; rachis of pinnae 4–11 cm. long; leaflets 2 to 5 pairs, opposite, large, lance-ovate, more or less acute, coriaceous, palmate-pinnatinerved, (2–)4–10 cm. long × 0.7–2.5(–3.8) cm. broad, smooth, not reddish when dry. Racemes 8–15 cm. long (peduncle 1.5 cm. or less), spikelike; rachis and pedicels (1–2.2 mm. long) pubescent or glabrous; florets greenish-yellow, small; calyx 1–1.5 mm., pubescent; petals 3–4 mm. long, glabrous, villous within; stamens 5–7 mm. long; ovary villous. Legume slender, compressed, submoniliform, stipitate and acuminate, subfalcate, straight or S-shaped, 13–29 cm. long × 0.9–1.1 cm. wide, many-seeded; margins undulate, straw-colored, violet-tinged.

COMMON NAMES. Vinal; visnal; quilín; ibopé-moroti. In NE Brazil: Pao de espinho; yuncumarim. In Paraguay: olkhá (in Chamacoco).

DISTRIBUTION. Gran Chaco region, from eastern Bolivia and Paraguay to north-central Argentina (Formosa, Chaco, and Santiago del Estero); a limited area in northeastern Brazil on the boundaries of Piauhy and Pernambuco states in the Catinga (Cachoeira do Roberto, first cited by H. Harms, Notizbl. Bot. Gart. Mus. Berlin-Dahlem **8**: 712. 1924, then by A. Ducke, Legum. Pernamb. e Paraiba, Mem. Inst. Osvaldo Cruz **51**: 429. 1953).

In Argentina, in the western parts of the Gran Chaco, where it invades pastures, it is considered a serious pest, the "plaga nacional" (see discussion below).

SELECTED SPECIMENS SEEN. **Brazil:** Piauhy, Cachoeira do Roberto, *Luetzelburg 49, 1418* (B, NY, US); Pernambuco, Petrolina, Cachoeira do Roberto, 3 km. abaixo da paragem do acude, entre Lago e Sombrío, *Lima & Magalhaes 52–1060* (R 76276). **Bolivia:** Dept.?, Velasco, Seeufer San Pablo, *O. Kuntze*, VII 1892 (NY). **Paraguay:** Dept. Olimpo, Pto. Diana cerca de Bahía Negra, *Arenas 324* (SI); Concepción, *Hassler 7153* (G, GH, MO, NY, UC, US); Curso sup. Río Apa, reg. calcarea, *Hassler 11504* (GH); Pilcomayo River, *Morong 1098* (GH, MO, NY, US); Puerto Casado, *Pedersen 4063* (SI); Bahía Negra, Chaco paraguayo, *Rojas 13720* (SI), *13721* (MO, SI), *13722* (SI). **Argentina.** FORMOSA: La Fidelidad, *Joergensen 2718* (US); Fortín Pilcomayo, *Krapovickas 1207* (GH); Bartolomé de las Casas, *Solbrig 4236, 4237, 4239, 4249, 4266* (GH, SI); Dept. Patiño, *Palacios 307, 313, 321, 326, 332, 335, 478* (BAFC, SI); Las Lomitas, *Solbrig 4259* (GH, SI); Formosa, without further locality, *Maradona 7* (SI). CHACO: Barranqueras, *Curran 79* (MO, NY, US); Dept. Güemes, Ruta 95, *Palacios 489, 498* (SI); Dept. 1° de Mayo, Campo Antequera, *Martínez et al.* (BAA 9564, SI). SALTA: Dept. Anta, Palermo, *Ragonese 76* (SI). TUCUMÁN: Burruyacu, El Puestito, *Venturi 7640* (US); Capital, *Venturi 3819* (US); Leales, Chañar Pozo, *Venturi 5353* (MO, UC, US); Capital, *Lillo 11854* (GH). SANTIAGO DEL ESTERO: Giménez, El Charco, *Venturi 9697, Pellegrini & Venturi 5830* (GH, MO, UC, US); Los Telares a Ramírez de Velasco, *Bartlett 19771* (NY); Capital, Parque Aguirre, *López 3* (SI); Arroyo Saladillo, *Sayago 1775, 1778* (SI); Ruta 9, Km. 1012,

borde de salina, *Burkart 20115* (SI); along Route 9, N of Saladillo, *B. S. Vuilleumier 1037* (GH, SI). CÓRDOBA: Dept. Río Seco, Los Hoyos a Villa Candelaria, *Sayago 2203* (SI).

ECONOMIC IMPORTANCE. When full-grown, this tree yields good timber, of the same quality as *Prosopis alba* or *P. nigra*; it is good for flooring, barrels, etc. (L. Tortorelli, Maderas y Bosques Argentinos, 415. 1956). Unfortunately, it grows in regions that are far away from markets and difficult to settle, where primitive cattle-raising is practiced. Owing to the great occupying capacity of *P. ruscifolia*, it is considered a serious pest in the western Gran Chaco region because it colonizes rapidly, forming in its young state dense, spiny, impenetrable thickets where no grass thrives and the livestock industry has to be abandoned. The leaves contain substances capable of reducing or suppressing the germination capacity of other seeds (Souto & Eilberg, Rev. Investigac. Agropecuar. INTA, ser. 2. 9(1): 19–27. 1972. Buenos Aires). The vinal, as noted, has been declared a "plaga nacional." Its behavior reminds one of the "mesquite" problem in Texas. All kinds of livestock and herbivores eat the legumes and propagate the hard seeds of this species endozoically. The seeds germinate much better after passing through the digestive tract, and they are also widely dispersed by the animals. Ranchers believe that a "tropa" of cattle that has been browsing in a vinal-infested area must be in quarantine for 48 hours before being put into a "clean" pasture, so that it will not introduce seeds into the new paddocks. Many experiments have been carried on with herbicides in an attempt to kill the vinal, but they have had only limited success in areas outside the principal infestation regions of the species. Biological control, as far as the writer knows, has not been tried, although it may be the most promising way; however, few, if any, parasites are known on *Prosopis ruscifolia*. I once found heavy infestation of a scale insect or coccid (probably *Lepidosaphes* sp., fam. *Diaspididae*) on my herbarium specimen no. *20115*, collected in 1957 in the province of Santiago del Estero. No field notes on the effect of the parasite on the host were taken, but this scale insect unfortunately seems to belong to a group which attacks important cultivated trees.

18. **Prosopis fiebrigii** Harms, Repert. Sp. Nov. 13: 524. 1915; Burkart, Darwiniana 4: 89. *tab. 11.* 1940.

Tree, apparently unarmed but sometimes with small, solitary or geminate spines 0.2–1 cm. long, otherwise very similar to *P. ruscifolia*, 4–15 m. high; branches flexuous, reddish when dry, the brachyblasts knotty; leaves large, unijugate, glabrous; petiole 0.5–5 cm. long; pinnae (rachis) 6–17 cm. long, with 2 to 9 pairs of opposite leaflets, these coriaceous, pinnatinerved, oval-lanceolate, often undulate or irregularly deformed, 2.5–6.5 cm. long × 0.6–3 cm. broad, emarginate, reddish when dry, obtuse to subacute. Racemes slender, 4–11 cm. long, glabrous, short-peduncled; pedicels 0.2–0.5 mm. long; flowers numerous, small; calyx 1 mm.; corolla 3 mm.; stamens yellowish, 4.5–5 mm. long; ovary white-villous, petals

nearly free, linear, greenish, glabrous but villous within at apex. Legumes subfalcate or straight, long and slender, stipitate and acuminate, similar to those of *P. alba* var. *panta*, 14–29 cm. long × 1.1–1.8 cm. broad, flat-compressed, straw-yellow when ripe; margins nearly straight, parallel; articles up to 23 to 32, subquadrate, compressed, sometimes broader than long, umbonate before ripening; pulp probably edible.

DISTRIBUTION. Paraguay (humid Chaco region); Argentina (Formosa).

MATERIAL EXAMINED. **Paraguay.** CHACO: Puerto Guaraní, barranca riacho, *Rojas 13611* (SI); Puerto Casado, *Rojas* XII 1916 (LIL 54639, GH), *Rojas 2146* (GH), *Pedersen 4064* (SI), *Rojas 8229* (SI). **Argentina.** FORMOSA: Dept. Patiño, El Cogoik, *Palacios 484* (BAFC, SI); Dept. Patiño, Ibarreta, Maruñak, *Quarín & Schinini 441* (CTES, SI); Pilcomayo, *Morel 5006, 6560* (LIL).

OBSERVATIONS. While the closely related *Prosopis ruscifolia* Grisebach, of more western distribution, is known ecologically as a terrible invader of savanna lands in the Gran Chaco, *P. fiebrigii* has not been detected as a nuisance.

19. **Prosopis vinalillo** Stuckert, Anal. Mus. Nac. Buenos Aires 7: 73. *tab. 4.* 1900; Burkart, Darwiniana 4: 90. 1940.

Tree to 3–10 m. high; trunk 10 to 50 cm. in diameter; branchlets flexuous, in time knotty; foliage glabrous; spines axillary, robust, alternately solitary or geminate, 0.5–12 cm. long, similar to those of *P. ruscifolia* but smaller. Leaves unijugate, large, glabrous, variable as to number of leaflets, these lanceolate or oblong-linear, intermediate in size between *P. ruscifolia* and *P. alba*, in 4 to 12 pairs per pinna, more or less distant on the rachis, coriaceous, penninerved, 10–30 mm. long × 2–12 mm. broad. Racemes spiciform, 6–8 cm. long, like those of *P. ruscifolia*, as are the small flowers; pedicels 0.6–1.5 mm. long. Legume slender, subfalcate, subtorulose, multiarticulate, 6–24 cm. long × 6–12 mm. broad × 3–8 mm. thick, exocarp sprinkled with violet; endocarp segments hard, compressed, subquadrate, with oblique transverse septae; mesocarp pulpy, sweet.

Probable natural hybrid population originated by crosses of *Prosopis ruscifolia* × *P. alba* var. *panta*, as the founder of its name, Don Teodoro Stuckert, rightly supposed. The leaves show evident *P. ruscifolia* affinities, but they have many more and somewhat smaller leaflets; the spines are also intermediate in size and arrangement between those of the putative parents; curiously, on the same twig alternately solitary and paired spines occur, a fact I have also observed on some North American Algarobiae, as stated in the key to the species. The legumes are closer to the *P. nigra* type, but longer.

COMMON NAMES. Vinalillo; algarrobo santiagueño; quilin.

DISTRIBUTION. Argentina, Gran Chaco region (Santiago del Estero, Tucumán, Salta, Chaco, Formosa, and northern Santa Fe); Paraguay

(Chaco). One specimen from Misiones, Argentina, needs confirmation, because up to now no *Prosopis* has been found in that northeastern province.

SELECTED SPECIMENS SEEN. **Argentina.** SALTA: Yuto, Carmelich, *Devoto & Rial Alberti*, Herb. Forestal *1003* (SI). SANTIAGO DEL ESTERO: Río Dulce, *López 4* (SI); Arroyo Saladillo, *Sayago 1770* (SI); Quebrachos, *Sayago 2898* (SI); Dept. Pellegrini, *Venturi 5827*, *5828* (SI); Sierra de Guasayán, Choya, *Sayago 2647* (SI); along Route 9, N of Río Saladillo, *B. S. Vuilleumier 1036* (GH, SI); Dept. Copo, Matoque, *T. E. Luna 348* (LIL, TEX); Algarrobal Viejo, Dept. Pellegrini, *F. Luna 362* (MO). CÓRDOBA: Río Seco, *Candelaria & Sayago 158* (SI). CHACO: Güemes, Ruta 95, *Palacios 483*, *493*, *497*, *500* (SI); La Breñas, *Venturi 9758* (GH, MO); Resistencia, *T. Meyer 16274* (US). FORMOSA: Estanislao del Campo, *Maradona 45* (SI); Dept. Patiño, La Primavera, *Palacios 324*, *479* (SI); Ing. Juárez, *Bordón 59* (SI).

20. **Prosopis hassleri** Harms, Repert. Sp. Nov. 13: 523. 1915; Burkart, Darwiniana 4: 91. *tab. 12*. 1940.

Tree 6–10 m. high, glabrous, unarmed or with a few small, axillary, solitary, or geminate spines; branchlets soon reddish-gray, flexuous, knotty; leaves similar to those of *P. vinalillo*, unijugate, occasionally some leaves bijugate; petiole 1.2–4 cm. long; pinnae 5–19 cm. long; leaflets 6 to 26 pairs per pinna, opposite, ovate-oblong to oblong, obtuse or subacute, subcoriaceous, penninerved, glaucous-reddish when dried, 0.8–4 cm. long × 1.8–7(–16) mm. broad, distant on the rachis more or slightly less than their own width. Spikelike racemes like those in the species group, 6–12 cm. long (peduncle 1 cm.); pedicels 0.5–0.8 mm. long, glabrous or pubescent, as is the rachis; petals (within) and ovary white-villous. Legume of the *P. alba* or *P. alba* var. *panta* type, subfalcate to nearly straight, straw-yellow, compressed, sutures parallel or slightly undulate, stipitate and acuminate, 14–24 cm. long × 1.2–1.5 cm. broad, flat, with 24–33 segments, these subquadrate or rectangular, broader than long; mesocarp pulpy, sweet, edible.

DISTRIBUTION. Paraguay, Argentina, eastern Chaco region, forming open woods of the savanna type.

COMMON NAMES. Algarrobo paraguayo; algarrobo.

SPECIMENS EXAMINED. **Paraguay.** CHACO: Sector López de Felippis, *Rojas 8477* (SI); Sector Puerto Casado, Km. 160, *Rojas 8450*, Asunción, Santísima Trinidad, *Pavetti & Rojas 10807*, L'Assomption, *Balansa 1445*, fruct., 20 XII 1875 (SI); Pilcomayo, inferior, *Rojas 329*, VII 1906 (isotype, P, GH; phototype, Field Mus. 1463, ser. Berlin Mus. 1264); Asunción, *Rojas 14000a* (LIL). **Argentina.** FORMOSA: Dept. Patiño, various localities, *Palacios et al. 311*, *320*, *322*, *325*, *462*, *467*, *468*, *480* (BAFC, SI); Pozo de Tigre, *J. Acuña*, Herb. Forestal *1884* (SI); Dept. Pilcomayo, Km. 101, Ruta 11, *Morel 4307* (LIL); Estancia Riacho Negro, *Morel 4045*, *4504*, Clorinda, *Rojas 12307* (LIL). CHACO: Fontana near Resistencia, *T. Meyer 1086* (SI).

OBSERVATIONS. This species seems to hybridize in the Patiño area, Formosa, according to field observations made by Ramón A. Palacios and associates in 1972. His collection no. *485* seems to be *Prosopis hassleri* × *P. fiebrigii*; and his collection nos. *466* and *481*, *P. alba* × *hassleri*.

Prosopis hassleri Harms var. **nigroides** Burkart, var. nov.

A var. *hassleri* differt imprimis fructu minori, compresso-moniliformi violaceo-tincto articulis ovato-quadratis subobliquis. Inermis videtur, foliis var. *hassleri* similibus, foliolis circa 8–20 mm. longis × 2–4 mm. latis, distantibus.

TYPE SPECIMEN: **Argentina.** PROV. SANTA FE: Dept. General Obligado, Estancia Las Camelias, *Arturo E. Ragonese 2423*, with ripe fruits, 15 I 1937 (SI).

According to the collector, the heartwood is yellowish-brown; the common name "algarrobo amarillo" is unfortunately the same one as for *Prosopis nigra* var. *ragonesei* Burkart (see below), a species with different leaves and very small leaflets.

This new variety differs from var. *hassleri* by the legume, which resembles *Prosopis nigra* rather than *P. alba*; the leaves in this variety are the same as in var. *hassleri*.

USES. A species certainly worthy of cultivation for shade, timber, and the edible fruits, which are valuable for sweets or forage.

Ser. Denudantes Burkart

21. **Prosopis denudans** Bentham, in Hooker's Jour. Bot. **4**: 351. 1842; Burkart, Darwiniana **4**: 95. *fig. 8, tab. 14.* 1940.

Spiny shrub 1–2 m. high, glabrous; branchlets flexuous, arched, rather short, hard, grayish with age, knotty; spines always axillary, solitary, hard, light brown, 0.5–4 cm. long. Leaves deciduous, small, glabrous, unijugate; petiole 2–15 mm. long; rachis of the pinnae 6–18 mm. long; leaflets linear, obtuse, 4–13 mm. long, in 1 to 3(to 4) pairs per pinna, the lowest alternate. Racemes axillary or fascicled on brachyblasts, short-peduncled, 2.5–7 cm. long; rachis and pedicels (0.2 mm. long) glabrous; flowers glabrous outside; calyx 1.5 mm. long; petals 3 mm. long, villous within; stamens 5–7 mm. long; ovary villous. Fruit dark reddish-black, shiny when ripe, glabrous or puberulous, very short-stipitate, thick, subcompressed, 2–7 cm. long × 0.7–1.4 mm. broad, typically falcate to annular, with 1 to 1½ open turns and with central hole.

TYPE SPECIMEN. Collected near Puerto Deseado, Santa Cruz, by Middleton (approximately 47° 50′ S latitude).

DISTRIBUTION. Argentina, endemic in Patagonia; an extreme xerophyte adapted to the semidesert shrub steppe with very cold winters (Provinces Neuquén, Río Negro, Chubut, and northern Santa Cruz). The

species reaches nearly 48° S latitude in eastern Santa Cruz, which marks the southernmost limits of the genus.

COMMON NAMES. Algarrobo patagónico; algarrobo de chancho.

SELECTED SPECIMENS SEEN. **Argentina.** PROV. NEUQUÉN: Zapala, R. Castro, *A. Krapovickas 3671* (BAB, SI); Río Picún-Leufú, *Ruiz Leal 16047* (SI); Plaza Huincul, *Cabrera 11003* (LP, SI); Zapala, *Correa, Crespo, & Piccinini 4743* (BAB, SI), *Sayago 3318, 3320, 3326* (CORD, SI); Zapala a Junín de los Andes, *Descole 2224*, R. Salado a Pichi, *Castellanos 20598* (LIL). RÍO NEGRO: El Rincón, Meseta de Somuncura, *Ruiz Leal 25568* (SI); Dept. Valcheta, Pailemán, Sierra Colorada, *Ruiz Leal 25635* (SI); Los Menaccos a Gral. Roca, *Ruiz Leal 25996* (SI). CHUBUT: Dept. F. Ameghino, Uzcudun, leg.? *2078*, Dept. Escalante, Pampa del Castillo, *Crespo & Troncoso 1631* (BAB, SI); Pico Salamanca, *E. De Marco de Kreibohm 236* (SI); Comodoro Rivadavia, *Ruiz Leal 14789*, *Burkart 27576*, Dept. Sarmiento, Laguna Palacios, *Ruiz Leal 25699*, Sarmiento, leg.? *2138* (SI); Dept. Escalante, 100 km. N of Com. Rivadavia, *Eyerdam, Beetle, & Grondona*, Univ. Calif. Exp. Patag. II *23783* (GH, MO, UC). SANTA CRUZ: Dept. Deseado, Bosque Petrificado, *Crespo & Troncoso 1754, 1755*, límite con Chubut, *Ruiz Leal 24140*, Caleta Olivia, *Crespo & Troncoso 1672* (SI).

USES. Wood for fuel; fruit eaten by stock.

OBSERVATIONS. New long shoots in spring (November) are very flexuous and develop the long axillary spines at once, but they produce very few reduced leaves or none at all. Well-developed leaves appear the following year on the knotlike brachyblasts in the axils of the spines in fascicles of 2 to 8.

Prosopis denudans Bentham var. patagonica (Spegazzini) Burkart, comb. nov.

Prosopis patagonica Spegazzini, Pl. Patag. Austr., Rev. Fac. Agron. y Vet. La Plata 3(30–31): 510. 1897; Burkart, Darwiniana 4: 95. *figs. 9, 10.* 1940.

This variety differs from the typical one in the fruits, which are nearly straight, not curved. The difference in number of leaflets given by the original author does not hold true. The fruits measure (2–)4–10.5 cm. long × 0.9–1.3 cm. broad × 0.8–1 cm. thick.

COMMON NAMES. Algarrobillo; espinillo.

MATERIAL SEEN. **Argentina.** MENDOZA: Dept. Malalhue, entre Río Barrancas y Ranquil Norte, *Ruiz Leal 16070* (SI); Río Barrancas, *Burkart 13823* (SI). NEUQUÉN: Loncopué, Churriaca, *Ruiz Leal 18018*; Zapala, 40 km. to the south, *Sayago 3321* (SI); Zapala, *O'Donell 1997* (NY). RÍO NEGRO: Valcheta, *J. L. Alfonso*, Herb. Forestal *2287* (SI); 9 de Julio, Ministro Ramos Mejía, *Pedersen 1664* (US); camino a Somuncurá, *Ruiz Leal 25968* (SI); entre Sierra Colorada y Los Menucos, *Ruiz Leal 26003* (SI); Meseta de Somuncurá, *Roig* (Herb. Ruiz Leal *26071*; SI). PATAGONIA: Santa Cruz, loc.?, at 50° 3′ S latitude, *Moreno & Tonini 453* (NY).

OBSERVATIONS. As I supposed already in 1940, *Prosopis patagonica*

Spegazzini is not a good species and merits only varietal rank. Spegazzini failed to compare it with *P. denudans*.

P. denudans Bentham var. stenocarpa Burkart, Darwiniana 9: 75. *fig. 4.* 1949.

Spiny shrub similar to the preceding varieties, differing from them in the slender, thin legume, falcate to annular as in var. *denudans* but only 0.5 cm. in diameter, contracted between the seeds and with more elongated oblong segments, the mesocarp very thin, the seeds 4.5–7 mm. long.

MATERIAL SEEN. **Argentina.** CHUBUT: Dept. Rawson, south of Trelew, *Krapovickas 4367* (holotype, SI). SANTA CRUZ: Dept. Deseado, entre Fitz Roy y Monumento Natural de los Bosques Petrificados, *Ruiz Leal 25681* (SI).

22. **Prosopis ruizleali** Burkart, Darwiniana 4: 328. *fig. s.n.* 1942.

Spiny shrub 0.6–3 m. high, deciduous, with solitary, axillary spines and gemmiparous horizontal roots (Burkart, *loc. cit.* 331), very similar to *P. denudans* Bentham, but differing in its larger leaves; petioles 0.5–2.5 cm. long; pinnae (1 pair per leaf) 2.5–6 cm. long; leaflets 3 to 9 pairs per pinna, linear, larger, 6–12 mm. long × 1–2 mm. broad, glabrous, distant, the lower ones alternate and the inner lowest often abortive; racemes to 8 cm. long; fruit similar, larger, nearly straight to falcate, 5–17 cm. long × 1–1.5 cm. broad, thick, somewhat compressed; endocarp articles subquadrate to obliquely ovoid; seeds ovoid, 7 mm. long.

DISTRIBUTION. Argentina, Prov. Mendoza, Andes foothills; arid, southern region, where the area connects with that of *P. denudans* Bentham.

SELECTED SPECIMENS EXAMINED. **Argentina.** MENDOZA: Dept. Luján, Estancia El Salto, *Ruiz Leal 21682* (SI); Dept. San Rafael, Volcán Diamante, *Ruiz Leal 17007*, La Faja, 70 km. al N de El Sosneado, *Burkart, Troncoso, & Nicora 13822*, Bardas Blancas, *Burkart, Troncoso, & Nicora 14148*, Malargüe, *Burkart 14802*, Calmucó a Ranquil, *Ruiz Leal 21459* (SI); Calmucó cerca de Ruta 40, *J. H. Hunziker 6376* (BAB, SI); Atuel Valley near El Sosneado, *Böcher, Hjerting, & Rahn 1391* (C, SI). NEUQUÉN: Dept. Pehuenches, Barrancas a Buta Ranquil, *Ruiz Leal 21463*, Ruta 40, *Ruiz Leal 24402*, Chichico Sur, *Ruiz Leal 24506* (SI); Pehuenches, Río Barrancas, Ruta 40, *Ancibor, Cano, & Crespo* (BAB 90181, SI).

OBSERVATIONS. Closely related to *Prosopis denudans* and perhaps not more than a more robust, northern subspecies of it. There is some intergradation in the leaf characters.

23. **Prosopis castellanosii** Burkart, Darwiniana 5: 66. *fig. 4.* 1941; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 130. 1952.

Spiny shrub of horrid, globose appearance, 0.6–1.5 m. high, apparently with a taproot of 15–20 cm. diameter at top; branching basal, with thick woody branches below or on soil surface, procumbent; aerial shoots

hard, flexuous, greenish-glaucous and striate when young, puberulous or glabrescent; internodes short; spines solitary, up to 4.5 cm. long, strong, straw-colored. Leaves small, unijugate, pubescent; petiole to 3 mm. long; pinnae 2–20 mm. long; leaflets small, ovate, subglabrous or puberulous, imbricate or subdistant, 3–12-jugate, 1.6–3.8 mm. long, alternate to opposite. Spikes axillary, short; peduncle and rachis villous or pubescent, 5–16 mm. long; flower head ovate; calyx 1.5–2 mm.; corolla 2.5–3.5 mm. long. Legume oblong-elongate, very flat, lomentoid, reddish-brown, 3.5–8 cm. long × 1.5–2 cm. broad × 0.4 cm. thick, subfalcate, nearly dry; mesocarp thin, the articles subquadrate or broader than long.

DISTRIBUTION. Argentina, endemic in southern Mendoza and northern Neuquén. An extreme xerophyte growing on arid hills at elevations of 600–1300 m.

SPECIMENS EXAMINED. **Argentina.** MENDOZA: Payún-Matrú, *A. Castellanos*, I 1941 (BA 36732; GH, SI, type); Payún-Matrú, Los Ranquiles, *Castellanos 14253*, fruct., 30 I 1941 (LIL). NEUQUÉN: Dept.?, Rincón del Aguila, *Ruiz Leal 24414*, entre Chihuío del Sur y Chihuío del medio, *Ruiz Leal 24510* (SI); Meseta de los Chihuidas, fr. al Cerro Rayoso, *A. Castellanos*, I 1954 (SI); Dept. Picún Leufú, *Ruiz Leal 26850* (SI); Dept.?, Sierra de la Vaca Muerta, camino a Bajada del Agrio, *Castellanos 20587* (LIL).

OBSERVATIONS. Very isolated species within section ALGAROBIA. The flat, lomentoid fruit is very distinct, as is its vegetative habit.

24. **Prosopis calingastana** Burkart, Bol. Soc. Arg. Bot. **6**: 223. *fig. 1.* 1957.

Horrid, spiny, low shrub less than 1 m. high, creeping; branchlets very flexuous; internodes short, longitudinally striate, green, becoming cinnamon-brown; spines solitary, strong, 0.4–3 cm. long; leaves small, pubescent, apparently deciduous, unijugate, in axillary fascicles; petioles 0.3–1.7 cm. long; pinnae 0.6–3 cm. long, 4–7-jugate, ovate-elliptic, pubescent, nearly enervate, 3–8 mm. long × 2–3 mm. broad. Racemes 1.5–6 cm. long, axillary; peduncle and rachis pubescent; florets (not yet described) as usual; calyx pubescent, 1–1.5 mm. long; petals nearly free, 3 mm. long, glabrous outside, villous within at the tip; stamens 6 mm. long, the anthers oblong, 0.7 mm. long; apical gland small; ovary stipitate, villous, the style filiform, glabrous. Legume falcate, linear-compressed, 5.5–10 cm. long × 6–9 mm. broad, velutino-pubescent; margins thickened, nearly parallel; faces convex on the longitudinal endocarp segments, these ovate, thin; seeds longitudinal-oblique, mostly 6 to 9, ovate, 8–9 mm. long.

DISTRIBUTION. Argentina, endemic in the Andean regions of San Juan Province at elevations of approximately 2500 m. in arid quebradas of Dept. Calingasta.

COMMON NAME. Cusqui.

MATERIAL EXAMINED. **Argentina.** SAN JUAN: Calingasta, *Moreau & Perrone*, II 1950 (BA 55032; SI, type); Calingasta, Cerro Castaño, Quebrada Amarilla, *Fabris & Marchionni 2278* (CTES, LP, SI); Quebrada del Río Calingasta, *Cabrera, Zardini, & Deginani 24342*, flowering, 15 I 1974 (LP, SI).

OBSERVATIONS. Like *Prosopis castellanosii*, but spikes a little longer and the legume very different, more slender, thick margined, with oblong, longitudinal endocarp segments.

Ser. Humiles Burkart

25. Prosopis humilis Gillies ex Hooker & Arnott in Hooker, Bot. Misc. 3: 204. 1832 ("1833"); Burkart, Darwiniana 4: 98. *fig. 11. tab. 15.* 1940; Monticelli, Lilloa 3: 347. *lam. xv, fig. A.* 1938.

Subaphyllous, spiny, erect to prostrate subshrub 20–40 cm. high, of peculiar habit, with thick, short, woody rootstocks and more slender, running rhizomes; aerial shoots rather tender, hardening when mature; stems and spines striate with longitudinal, prominent nerves; spines axillary, geminate, a pair at every node, erect-spreading, 0.5–5 cm. long. Leaves small, reduced and deciduous, less than 1 cm. long, bipinnate, unijugate, with 1 to 3 pairs of glabrous, elliptic, small leaflets or once-pinnate, with only 1 to 2 pairs of leaflets. Spikelike racemes axillary, replacing one of the spines, 3–6 cm. long, showy because of the numerous red florets; petals 5–6 mm. long, glabrous outside. Legume linear, slightly curved, 4–10.5 cm. long × 1 cm. broad, compressed, reddish, with up to 16 subquadrate endocarp segments.

DISTRIBUTION. Central Argentina, endemic in the pampas or open semixerophytic woodlands (in the provinces of Córdoba, San Luis, La Pampa, and SW Buenos Aires); sometimes in rocky or sandy soils. Ornamental, worthy of cultivation as an oddity.

COMMON NAMES. Algarobilla; barba de tigre (and others).

MATERIAL EXAMINED. **Argentina.** CÓRDOBA: Capital, *Lanfranchi 951*, *A. T. Hunziker 8118* (SI); Dept. Tulumba, S. Pedro, *Sayago 1891* (SI); Villa María a Tío Pujio, *Hunziker 11421*, Río Tercero, *Burkart 13350* (SI); Cañada del Gobernador, a 20 leguas de Córdoba, *Isern 8622* (MA, SI); Pampa de Olain, *Ragonese & Piccinini 9528* (BAB, SI); Dept. General Roca, Huinca Renancó, *A. T. Hunziker 9382* (SI); Dept. Punilla, La Cumbre, *Goodspeed*, Univ. Calif. Andes Exped. II *23242* (GH); Córdoba, without further locality, *Lossen 88* (GH). SAN LUIS: Las Barranquitas a 1000 m. alt., *A. I. Pastore*, Herb. Burkart *6624* (SI). LA PAMPA: Dept. Conelo, E. Castex, *M. Sayago 3198*, Dept. Loventué, Estancia San Jorge, *Cano 4508* (SI); Dept. Caleu-Caleu, Anzoátegui, *Ruiz Leal 25498* (SI); Realicó, *Schulz 5863* (GH); Dept. Capital, Santa Rosa, *Krapovickas 3585* (SI). BUENOS AIRES: Bahía Blanca, *Soriano 525* (SI); Dept. Villarino, 60 km. W of Río Colorado, *Eyerdam, Beetle, & Grondona*, Univ. Calif. Andes Exped. II *23448* (GH, MO, SI).



FIGURE 5. **Prosopis.** Left: Paratype of *P. rojasiana* (*Rojas 8314*), from Chaco, Margariños, sector Pilcomayo, Paraguay (GH). Right: *P. pallida* (*Mann & Brigham 200*), from Hawaii (GH).

26. **Prosopis rojasiana** Burkart, Darwiniana **5**: 70. *fig. 5*. 1941; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 131. 1952.

Prosopis striata sensu C. Fiebrig & T. Rojas, Ensayo fitogeográfico Chaco Boreal, Rev. Jard. Bot. Paraguay **3**: 83, 85. 1933. Asunción, non *P. striata* Bentham.

Tall, spiny, microphyllous, subaphyllous shrub or tree 2–6 m. high; branchlets slender, striate, glabrous, green; axillary spines in pairs, numerous, long and slender, 1–11.5 cm. long, scarcely striate. Leaves unijugate, deciduous; petiole 0.5–2 cm. long, apically expanded, more persistent than the pinnae, these 1–2.5 cm. long; rachis glabrous, leaflets 8 to 17 pairs, approximate, ciliolate, oblong-elliptic, 1.5–4 mm. long × 0.5–1.2 mm. broad. Spikes slender, 1–5.5 cm. long; peduncle and rachis puberulous; flowers yellow; calyx 1 mm.; petals 2–2.6 mm.; stamens lilac, 4–5 cm. long; ovary stipitate, villous. Legume (not yet described) 4–5 mm. long, 7–8 mm. broad, linear, straight, compressed, reddish, fleshy.

DISTRIBUTION. Paraguay, northern Chaco woods, on clay soils.

MATERIAL EXAMINED. **Paraguay:** Dept. Boquerón, Puerto Casado, *Pedersen 4171* (C, GH, NY, SI, UC, US); Chaco paraguayo, Sector López de Filippis, *Rojas 8310* (SI, holotype); Sector Pilcomayo, Margariños, *Rojas 8314* (GH, paratype; SI).

Ser. Pallidae Burkart

27. **Prosopis rubriflora** E. Hassler, Repert. Sp. Nov. **8**: 552. 1910; Burkart, Darwiniana **4**: 101. *tab. 16.* 1940.

Small tree 5–6 m. high; bark grayish, longitudinally split, permanent; crown flat, the trunk to 25 cm. in diameter; foliage abundant, reminiscent of *Acacia caven* or *Acacia farnesiana*; branchlets moderately flexuous, reddish-brown, knotty; spines axillary, geminate, uninodal, small, 1 cm. long or less, rare, only on new long shoots. Leaves medium-sized, 3–8-jugate, puberulous; petiole 0.3–1.5 cm.; rachis to 3.5 cm. long, crested, with a small annular gland at the junction of every pair of pinnae, these 1–2.5 cm. long; leaflets approximate to imbricate, small, linear, 1.5–3.5 mm. long × 0.4–1 mm. broad, ciliolate, 1-nerved, 11 to 24 pairs per pinna. Racemes spiciform, axillary, much longer than the leaves; rachis with the short, bracteate peduncle, puberulent, 6–16 cm. long; pedicels 0.5–0.8 mm. or less; florets red; calyx 1.5–2 mm. long, puberulous; petals 4–4.5 mm. long, nearly free, pubescent outside, villous within, especially at the tip; stamens and style red, 8–9 mm. long; ovary stipitate, villous. Legume linear, compressed, straight or subfalcate, subtorulose, 9–14 cm. long, 1–1.7 cm. broad, 0.7–0.8 cm. thick, straw-yellow, fleshy; endocarp segments rectangular, hard, in one row as in all Algarobiae; seeds transverse, 6–7 mm. long.

DISTRIBUTION. Known only from northeastern Paraguay and adjoining southern Mato Grosso, Brazil.

COMMON NAME. Espinillo.

NEW MATERIAL EXAMINED. **Brazil:** Mato Grosso, arroyo Rapadura, en grandes grupos, *Praderi 346*, flowering, 25 VII 1958 (LIL). **Paraguay:** Alto Paraguay, Puerto Risso, Dept. Concepción, *Schulz 8841*, *T. Meyer 18694* (SI); N Paraguay, Centurión, zwischen Apa und Aquidaban, 9 I 1909, *Fiebrig 5348* (isotypes, GH, HBG); Paraguay, without further locality, *Fiebrig 10940* (BAF).

OBSERVATIONS. In its habit, in its small leaves shorter than the racemes, and in its fruit characters, this well-marked species is close to *P. affinis* Grisebach. Its salient peculiarities are the multijugate, Acacia-like leaves and the red flowers.

28. **Prosopis campestris** Grisebach, Plantae Lorentzianae in Abh. Kön. Ges. Wiss. Göttingen **19**: 84. 1874; Burkart, Darwiniana **4**: 111. *fig. 12, tab. 17.* 1940.

Dwarf, much-branched spiny shrub 10–50 cm. high; taproot and short underground branches woody, the aerial branches with short nodes, flexuous, procumbent-ascending, hard; spines uninodal, axillary, paired, divergent, to 4.5 cm. long. Leaves small, 1–2-jugate; petiole plus rachis 3–13 mm. long; pinnae 0.5–3 cm. long; leaflets 6 to 17 pairs per pinna, imbricate, small, oblong, pubescent, 1.5–6 mm. long × 0.6–1.2 mm.

broad. Spikelike racemes cylindric-ovoid, short, 2–3 cm. long, including the peduncle; florets small; calyx and corolla pubescent outside. Legume linear, nearly straight, compressed, subtorulose, 5–8 cm. long × 0.8–1 cm. broad, with 6 to 11 endocarp segments with oblique divisions, 8 × 6 × 3 mm. long, broad, and thick; fruit pubescent when immature.

DISTRIBUTION. Endemic in central Argentina, especially the Sierra region of Córdoba and San Luis. Its presence in Santiago del Estero is doubtful.

COMMON NAME. Algarrobillo.

NEW SPECIMENS EXAMINED. **Argentina.** CÓRDOBA: S. Francisco del Chañar, *Lorentz 2*, fl. & fruit, 2 XII 1871 (GOET, holotype; CORD, NY, isotypes); Dept. Pocho, Taninga, *Luti 4483, 4530* (SI); Dept. San Alberto, *Stuckert 10388* (CORD); Dept. Tulumba, Puerta de Fierro, *Sayago 2139* (SI); Pampa de Pocho, *Ragonese & Piccinini* (BAB 78374, SI); Río Tercero, *Burkart 13349* (SI); Lago San Roque, *A. T. Hunziker 7084* (TEX). SAN LUIS: San Luis a Saladillo, *Burkart 12078* (SI).

OBSERVATIONS. No better characterization can be given of this plant than its extreme dwarfness, which allows the traveller to walk on it, if he does not fear the spines. In the Río Tercero region it is considered a nuisance when agricultural lands are to be won.

The variety *elata* Burkart, *loc. cit.* 1940, has been transferred to specific rank; see *Prosopis elata* (Burkart) Burkart.

29. **Prosopis pallida** (Humboldt & Bonpland ex Willdenow) H.B.K., Nov. Gen. Sp. Pl. **6**: 309 [folio ed.]. 1823; Sprengel, Linn. Syst. Veg. ed. 16. **2**: 326. 1825; M. C. Johnston, Brittonia **14**: 87, 88 [under *P. limensis*]. 1962; Fosberg, Occ. Pap. Bishop Mus. **23**(8): 132–135. 1966.

Acacia pallida Humboldt & Bonpland ex Willdenow, Sp. Pl. **4**(2): 1059. 1805.
Mimosa pallida (Willdenow) Poiret in Lamarck, Encycl. Meth. Bot., Suppl. **1**: 65. 1810.
Prosopis limensis Bentham in Hooker's Jour. Bot. **4**: 350. 1842; Bentham, Trans. Linn. Soc. London **30**: 378. 1875; Burkart, Darwiniana **4**: 114. 1940; M. C. Johnston, Brittonia **14**: 87. 1962; Svenson, Am. Jour. Bot. **33**: 452. *fig. 3.* 1946; Macbride, Fl. Peru [Legum.], Bot. Ser. Field Mus. Nat. Hist. **13**(3): 110. 1943.

ILLUSTRATIONS. O. Degener, Fl. Hawaiiensis **2**: family 169a, *plate s.n.*, 8 V 1937, sub *Prosopis chilensis* (Mol.) Stuntz; Hosaka & Ripperton, Legumes Hawaiian Ranges, Hawaii Agr. Exp. Stat. Bull. **93**: 55. *fig. 34.* 1944 (also sub *P. chilensis*); Svenson, Am. Jour. Bot. **33**: 452. *fig. 3.* 1946, sub *P. limensis*.

Tree (or shrub on sterile soils) 8–20 m. high, trunk to 60 cm. in diameter, unarmed or spiny, with short, axillary, uninodal, geminate, divergent spines less than 4 cm. long. Leaves medium to small in size,

pallid grayish-green when dry, (1–)2–4-jugate, pubescent, ciliolate to subglabrous; petiole short, with the rachis 0.8–4.5 cm. long, pubescent; pinnae 1.5–6 cm. long, with a sessile, cuplike gland at their junction; leaflets green or gray when dry, 6 to 15 pairs per pinna, approximate without touching or a little distant, pubescent or at least ciliolate, oblong-elliptic to ovate, obtuse or mucronate, firm, pinnatinerved below, 2.5–8.3 mm. long × 1.4–4 mm. broad. Racemes spiciform, much (2 to 3 times) longer than the leaves; rachis and the short peduncle pubescent, together 8–15 cm. long; florets dense (200 to 250 per raceme), short-pedicelled, greenish-yellow; calyx ciliolate, 0.5–1.5 mm. long; petals 2.5–3 mm. long, free, villous within; stamens 5–7 mm. long; ovary stipitate, villous. Legume straight or subfalcate, very similar to that of *P. juliflora* (Sw.) DC., but thicker, straw-yellow when ripe, with parallel margins, fleshy, sweet, edible, subcompressed, long or short stipitate with rounded base, and acuminate, sometimes nearly subquadrate-rectangular in transection, (6–)10–25 cm. long × 1–1.5 cm. broad × 5–9 mm. thick; endocarp segments to 30, broader than long; seeds oblong, brown, 6.5 mm. long.

COMMON NAMES. Algarrobo or algarroba, algarroba paiva, huarango (Peru); algarrobo americano (Puerto Rico); kiawe, algaroba, mesquite (Hawaii); carobier (Marquesas).

DISTRIBUTION. Native to Peru, Colombia, and Ecuador in the drier parts and along the Pacific coast; naturalized in some parts of Puerto Rico, very much so in the Hawaiian Islands, and perhaps elsewhere (Brazil); introduced for cultivation in India and Australia.

MATERIAL EXAMINED. **Colombia:** Intendencia del Meta, Llanos orientales, Cumaral, at 280 m. elev., *García-Barriga 4976* (LIL). **Ecuador:** Prov. Oro, Machala to Puerto Bolívar, *Hitchcock 21114* (NY); Prov. Loja, Puente Boquerón, *Asplund 18078* (NY, R); Catamayo Valley, La Toma, *Wiggins 10950, 10953* (NY); Durán, *Rose & Rose 23587* (NY); Prov. Guayas, Guayaquil to Salinas, at sea level, *Mexía 6739* (NY). **Peru:** Prov. Piura, Paita, *Rose 18511, Williams 2923, 2974* (NY); Pariñas Valley, *Haught 164* (NY); Lima(?), Río Apurimac, *Weberbauer 5901* (NY); Dept. Arequipa, Caravelí, Lomas, *Iltis & Ugent 1586* (NY); Jard. Bot. Lima, *O. Velarde N. 2730* (CORD, SI); Puente de Olmos, *Angulo & López 405* (SI); Dept. Ica, laguna de Orovilca cerca de Ica, *Ferreyra 2498* (SI, US), *O. Velarde N. 1537* (LIL); Prov. Lambayeque, Olmos, *O. Velarde N. 812* (LIL). **Puerto Rico:** Mayaguez, Cabo Rojo, *Stimson 3132* (MO, NY, UC); Distr. Mayaguez, Cabo Rojo, El Combate, *Burch 6678* (MO). **Hawaiian Islands:** Oahu, Honolulu, dry coral plain, *Baker 128* (BISH); Waikiki, *Hastings*, 28 IV 1931, Lower Diamond Head, *St. John & Christophersen 10552* (BISH, SI); Honolulu, *Fosberg 14217* (NY), *Fosberg 42015* (US); University of Hawaii, Manoa Campus, *Solbrig 4225* (GH, SI), *D. Herbst 539* (BISH, SI); Oahu, *Degener 7263, Harris C-242149, Heller 2001* (MO, NY), *Long 1706* (US); Nanakuli, *Degener 9955* (MO, US); Molokai, *Hitchcock 15114* (US). **Marquesas Islands:** Uahuka, *Decker 1908*, introduced from Hawaii (US). **India:** Lahore, Laurence Gardens, fl., fruct., V 1912 (GH). **Australia:** Queensland, Brisbane, cultivated Botanic Gardens, *C. T. White 2390, 8642* (GH).

OBSERVATIONS. I could not find any constant difference between *Proso-*

pis pallida and *P. limensis* and therefore place the latter name into the synonymy of the former. Both species were described originally from Peru, and Bentham, the author of *P. limensis*, neglected to compare it with the much earlier *P. pallida*.

Fosberg (*loc. cit.* 1966, p. 134) distinguishes *Prosopis pallida* forma *pallida*, unarmed, and forma *armata*, with spines. In Hawaii he found that nearly ¼ or ½ of the trees of different forests were spiny and the rest were spineless. No study of this sort has been made in the original home of the species, where it is not yet cultivated. Probably the spiny type dominates. Herbarium specimens are not conclusive in this respect, because not all branchlets of a tree may be spiny.

Previous to M. C. Johnston's discussion of this species (Brittonia, 1962), it had been neglected and, especially in Hawaii, was treated as *P. juliflora* or *P. chilensis*.

In the tropical rainforest of Ecuador, near Santo Domingo de los Colorados, 40 km. from Quevedo, at 570 m. above sea level, there appears an intermediate form, *Prosopis pallida* × *P. juliflora*, with the following characters: trees to 30 feet tall; flowers white; spines rare, geminate, to 2 cm. long; foliage glabrous; leaves bijugate, expanded; leaflets oblong, 8–11 mm. long, glabrous, somewhat distant; pinnae to 6.5 cm. long, as in *P. juliflora*; racemes longer than the leaves, up to 15 cm., as in *P. pallida*. Perhaps this is a form of *P. juliflora* var. *horrida*.

USES. *Prosopis pallida* is a very valuable tree for ornament, for shelter in arid conditions, and for timber, fuel, and forage (fruits). It is highly esteemed by foresters in Hawaii. Its cultivation must be encouraged in other warm and dry countries. See W. L. Hall, The forests of the Hawaiian Islands. U. S. Dept. Agr., Bur. Forestry Bull. **48**: 9, 10. 1904. Washington, D. C. ("Algaroba" forests, sub *Prosopis juliflora*); Hosaka & Ripperton, *loc. cit.*; Degener, Fl. Hawaiiensis 2: 1937 (sub *P. chilensis*).

If Fosberg (Occ. Pap. Bishop Mus. 23(8): 132–135. 1966), following Johnston (1962), is correct that the Hawaiian "algaroba-forests" are formed by *Prosopis pallida*, then the following paper must be considered here: Hosaka & Thistle, Noxious Plants of the Hawaiian Ranges, Ext. Bull. Univ. Hawaii **62**: 23. 1954 (sub *P. chilensis*). The authors do not deny the utility of the tree, but they maintain that it may become an invader and form thickets which are a nuisance.

30. **Prosopis affinis** Sprengel, Linn. Syst. Veg. ed. 16. **2**: 326. 1825. Göttingen.

Prosopis algarobilla Grisebach, Plantae Lorentzianae in Abh. Kön. Ges. Wiss. Göttingen **19**: 83. 1874; Burkart, Darwiniana **4**: 115. *fig. 13.* 1940, and **3**: 28, 40, 114. *tab. 2.* 1937, 1939.

Prosopis nandubey Lorentz ex Grisebach, Symb. Fl. Argent. in Abh. Kön. Ges. Wiss. Göttingen **24**: 117. 1879.

Prosopis algarobilla Grisebach var. *ñandubay* (Lorentz) Hassler, Repert. Sp. Nov. **16**: 154. 1919; Burkart, Darwiniana **4**: 118. *tab. 18.* 1940.



FIGURE 6. **Prosopis.** Lectotype of *P. affinis* (*Sello s.n.*, circa 1825), Montevideo, Uruguay (MO).

Flat-topped, spiny savanna tree of medium or small size, 2–8 m. high, much and irregularly branched; bark persistent, grayish, fissured; trunk short, to 50–60 cm. in diameter; branchlets somewhat flexuous; geminate,

axillary spines short, divergent, 0.3–2.5 cm. long. Leaves persistent, small, 1–3-jugate, petiole (incl. rachis) 0.2–2.2 cm. long; pinnae 1–6 cm. long; leaflets small, glabrous or puberulous, approximate to imbricate, 10 to 30 pairs per pinna, linear-oblong, firm, obtuse to subacute, pinnately reticulate-nerved below and on the margins, greenish when dry, 2–7.5 mm. long × 0.8–1.8 mm. broad. Racemes spiciform, longer than the leaves, short-peduncled; rachis long, pubescent (with peduncle), 5–13 cm. long; florets greenish-yellow; calyx puberulous, 1.5 mm. long; petals 4 mm. long, also pubescent outside, villous within; ovary stipitate, villous; stamens 7–8 mm. long. Legume falcate to annular, rarely straight or S-shaped, linear-oblong, compressed; margins undulate, therefore moniliform, 7–17 cm. long × 0.9–1.6 cm. broad × 6–8 mm. thick; exocarp crustaceous, straw-colored, much tinged with red or violet, sometimes entirely dark-violet; mesocarp thin, pulpy, acidic; endocarp segments 8 to 19, hard, flattened, ovate-rotund to subquadrate, variable, 7–10 mm. long × 7–14 mm. broad × 3–4 mm. thick.

DISTRIBUTION. Bolivia(?), extreme southern part; Paraguay; eastern Argentina, north of Buenos Aires; Brazil, extreme SW of Rio Grande do Sul; western Uruguay. An important campos-tree, forming light forests with herbaceous understory rich in grasses.

COMMON NAMES. Ñandubay; espinillo; algarrobillo; espinillo ñandubay; ibopé-morotí (guaraní name); algarrobo ñandubay.

SELECTED NEW MATERIAL EXAMINED. **Brazil.** RIO GRANDE DO SUL: Uruguaiana, Barra do Quarai, *Rambo 4215*, *26354* (LIL, SI). **Paraguay:** Concepción, Puerto Risso, *Meyer & Schulz* (LIL 471409); Chaco, Estancia Peña, *Rojas 14032* (LIL, MO, SI); Curupaytí, *T. Meyer 15956*, *15957* (LIL); Ypacaray, *Sparre & Vervoorst 2334* (GH, LIL), *Hassler 3490* (GH); Itapé, *Joergensen 4561* (GH, MO), *Hort. Paraguar. 9071* (SI); Chaco, Loma Clavel, *Hassler 2483* (MO); Central Paraguay, *Morong 851* (MO), *Hassler 12392* (MO). **Argentina.** FORMOSA: Clorinda, *Rojas 12302* (GH); Laguna Oca, *Rojas 12227* (SI); Dept. Patiño, *Palacios 333*, *463* (BAFC, SI); Dept. Monteagudo, Dalmacia, *Krapovickas et al. 13826*, *13831* (CTES, SI). CHACO: 25 de Mayo, Napalpí, Campo Largo, *Buratovich 572*, *612* (LIL); Barranqueras cerca de Resistencia, *T. Meyer 16272* (SI); Fontana, *Meyer 3814* (GH, LIL, NY); Las Breñas, *Venturi 9765* (GH, MO, NY). CÓRDOBA: San Justo, costa de Mar Chiquita, *Sayago 3623*; S. Francisco a Devoto, *Sayago 3577*, *3625* (SI); Concepc. del Tío a Mar Chiquita, *Kurtz 12916* (CORD, SI); Río Tercero, Corralito, *Sayago 3681*, *3682* (CORD, SI). SANTIAGO DEL ESTERO: Dept. Moreno, Girardet, *J. Morello* VII 1964 (SI 29956). SANTA FE: Dept. S. Cristóbal, E. Rams a Hersilia, *Krapovickas 693*, *741* (SI); Dept. S. Javier, Alejandra, *G. Martinez Achenbach 992* (SI). CORRIENTES: Capital a Mburucuyá, *Burkart 27822* (SI); Goya, *Boelcke 1535* (SI); Paso de los Libres, *Ibarrola 2222* (NY); Monte Caseros, *Ibarrola 2415* (GH); Empedrado, La Yela, *Pedersen 3071* (MO). ENTRE RÍOS: La Paz, *Burkart & Bacigalupo 21231* (SI); Concepción del Uruguay, *Lorentz 896* (GH, FI, isotypes of *P. ñandubey* Grisebach), *L. Hauman* (BA 51388), *Nicora 3176* (SI); arr. Isletas, *Burkart 21754*, *21756*, *21758* (SI). Gualeguaychú, *Burkart 27699* (SI). BUENOS AIRES: Partido Escobar, B. de Escobar, *Burkart 23903* (SI). **Uruguay:** Paysandú, Chapicuy,

Rosengurtt B-3653 (LIL, SI); Dept. Colonia, Estancia Recreo, *Bartlett 21241* (UC, US); probably western Uruguay, Montevideo, *F. Sellow*, sub *P. affinis*, ex Bernhardi Herb. (MO 1844461, lectotype specimen).

USES. *Prosopis affinis* yields valuable fuel and highly esteemed fence posts of great durability (in fact, it is the most valuable tree for that purpose). In many "estancias" (ranches) its use is rationed; it is cut down after 8 to 10 years and allowed to regenerate in lands of mixed forest/stock-raising industry. In open stands this *Prosopis* allows a vigorous grass-sod to grow among the trees; at the same time it offers shelter and, with the fruits, a concentrated food to cattle (which is welcomed in summer when grass grows more slowly). The flowers serve as an excellent bee-pasture.

This species is to be recommended for reforestation. According to my own experience at the botanical garden of the Faculty of Agronomy, Buenos Aires (1928 to 1943), where the species is cultivated from Chaco seed, it was full-grown and matured fruits for the first time at 7½ years of age (3.5 m. high; trunk 7.5 cm. in diameter). Its growth rate is therefore not as slow as many people believe (Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 135. 1952. Buenos Aires).

In Uruguay it is also important as a forest tree and has been the subject of a special study by Professor Marta Rolfo, Montevideo (ined., in SI).

OBSERVATIONS. The binomial *Prosopis affinis* Sprengel was a taxonomic mystery for a long time, owing to the brevity of the original diagnosis and the impossibility of finding the type specimen. In my earlier paper I had to leave it within the *nomina dubia* (Burkart, Darwiniana 4: 125. 1940). Fortunately, this year I discovered a probable isotype in the herbarium of the Missouri Botanical Garden. It arrived there with the J. J. Bernhardi Herbarium purchase made in Germany by Henry Shaw, founder of the Garden in the year 1857. Bernhardi's herbarium contains specimens collected in Brazil and Uruguay by Friedrich Sellow (or Sello) in the years 1820 to 1831. His specimen is marked "*Prosopis affinis* Spr., Montevideo," but it probably comes not from that city, but from western Uruguay, where the species is common and where Sellow collected (see his travel routes described by Ignatz Urban in Martius's Flora Brasiliensis. Vol. 1. 1906). Bernhardi's specimen may become the lectotype of *P. affinis* Sprengel, a name which must replace the long-known *P. algarobilla* Grisebach.

The specific epithet alludes to the affinity of the species with the preceding one in Sprengel's enumeration, *P. pallida* (Willdenow) Kunth, which indeed is its nearest relative even now.

31. **Prosopis articulata** S. Watson, Proc. Am. Acad. **24**: 375. Jan. 31, 1889; Burkart, Darwiniana **4**: 103, 113. 1940; Johnston, Brittonia **14**: 86. 1962.

Neltuma articulata (S. Watson) Britton & Rose, N. Am. Fl. **23**(3): 187. 1928.

Prosopis juliflora (Swartz) DC. var. *articulata* (S. Watson) Wiggins, Contr. Dudley Herb. **4**(2): 17. 1950; Shreve & Wiggins, Vegetation and Flora of the Sonoran Desert **1**: 604. 1964.

Neltuma pazensis Britton & Rose, N. Am. Fl. **23**(3): 187. 1928.

Prosopis pazensis (Britton & Rose) Wiggins, Contr. Dudley Herb. **4**(2): 18. 1950; Shreve & Wiggins, Vegetation and Flora of the Sonoran Desert **1**: 605. 1964.

Upright polypodial shrub 2–5 m. high or tree with short trunk; bark smooth, brown; branchlets flexuous, greenish; spines axillary, uninodal, paired, rarely solitary, 0.3–3 cm. long; foliage puberulous or glabrous, shorter than the racemes. Leaves unijugate, rarely uni- or bijugate on strong shoots, and then sometimes equalling the racemes, small on brachyblasts; petioles 0.2–2.5 cm. long; pinnae 0.4–6.5 cm. long; leaflets 6 to 20 pairs, linear-elliptic, obtuse, small, 2.5–12 mm. long × 1.2–3.5 mm. broad, approximate on the rachis or a little distant, less than their own width, glabrous or puberulous, enervate, unicostate or reticulate-nerved. Racemes 4–9 cm. long, longer or equalling the leaves; florets small, numerous, yellow, and similar to all those of the *P. juliflora* group; pedicels short; petals free, 3.5–4 mm. long, villous at the apex; ovary stipitate, pubescent. Legume dry, moniliform in outline but very much flattened, yellow or tinged with violet, 10–24 cm. long × 5–8 mm. broad, the segments elliptic-fusiform, longitudinal, 5 to 18; stipe 1–3 cm. long; isthmi narrow, 1–5 mm. broad; pericarp thin (0.2–0.5 mm. thick at maturity); exocarp puberulous or glabrous, striate; mesocarp longitudinally fibrous; endocarp thin, flexible, smooth, whitish, the segments 1–1.8 cm. long. Fruit of bitter taste, not sweet as in common species (*teste* M. Martínez); seeds longitudinal, elliptic, brown, 7–8 mm. long, funicle short, coiled, fixed at the distant angle of the segment.

COMMON NAMES. Mesquite amargo; mesquit; mezquite.

DISTRIBUTION. Northwestern Mexico (Sonora, Baja California) and perhaps Arizona, U.S.A. Flowering and fruit setting in November. Stony and sandy mesas or plains.

MATERIAL EXAMINED. **Mexico.** SONORA: Guaymas, stony mesas at foothills, Sept. 1887, *E. Palmer 197* (GH, holotype; NY, UC, US, isotypes); Guaymas, *Gentry 4689* (GH; MEXU; UC, topotype; US); Guaymas, *J. N. Rose 1224* (MEXU, US); Hermosillo, *Maltby 250* (US); Bacum Station, near Río Yaqui (south of Guaymas), Pacific slope, *Pennell 20204* (GH, NY, US). BAJA CALIFORNIA: Cape District, *Peters 108* (UC); Sierra de la Giganta, *Carter 4135a* (UC); San Nicolás Bay, *I. M. Johnston 3708* (US); Puerto Escondido, *I. M. Johnston 4137* (US); San Evaristo Bay, Gulf of California, *I. M. Johnston 4087* (MO, US); La Paz, *Martínez 26* (US), *J. N. Rose 1324* (GH, isotype of *Neltuma pazensis*); Valle de la Paz, *E. Mayoral Vazquez 3280* (ENCB). **United States(?).** ARIZONA: Phoenix, *H. Hubbard*, 13 IV 1930 (COLO 46104).

OBSERVATIONS. This is, according to M. C. Johnston (Brittonia **14**: 86), "one of the more distinct taxa in a group of indistinct ones." Some specimens, such as those collected by Ivan Johnston in Sonora, have



FIGURE 7. **Prosopis.** Flowering and fruiting branchlet, × ½, of *P. elata* (*Rojas 8323*), from Chaco, Puesto Buenos Aires, sector Pilcomayo, Paraguay (SI).

larger leaves and leaflets than usual, but a typical *articulata*-pod. They may indicate a *Prosopis laevigata* or *P. velutina* introgression.

Hybridization seems to occur with *P. velutina*, a species growing in the same Sonoran regions; for instance, *White 402* is assigned here to *P. velutina*, but has fruit characters tending toward *P. articulata*.

Variation of leaf size shows a dimorphism connected with the existence of long and short shoots. In *Gentry 4689* I measured on the same branchlet:

a) on brachyblasts — petiole 0.5–1 cm. long; pinnae 0.4–1.2 cm. long; leaflets 6 to 13 pairs per pinna, 3.5–5 mm. long.

b) on megablasts — petiole 1–2.5 cm. long; pinnae 3.5–4 cm. long; leaflets 12 to 13 pairs per pinna, 7–9 mm. long.

32. **Prosopis elata** (Burkart) Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 131, 544. 1952.

Prosopis campestris Grisebach var. *elata* Burkart, Darwiniana 4: 112. 1940.

Spiny shrub 0.6–4 m. high, polypodial, arborescent; bark dark; branchlets flexuous, green, knotty, with short internodes; small leaves; spines axillary, uninodal, geminate, smooth, variable, 0.5–8.5(–11.5) cm. long, 3–4 mm. in diameter, the exceptionally long ones to 5 mm. in diameter near the middle, strangled at base, thicker than the supporting branchlet, often perpendicular to it, rarely solitary. Leaves uni- to bijugate; petiole (including rachis) 0.5–3.5 cm. long; pinnae 1.5–3.5 cm. long; leaflets 15 to 26 pairs per pinna, approximate, their margins touching or less distant than their width, puberulous or glabrous with ciliae at the base, elliptic-oblong, obtuse or subacute, pinnatinerved, 2–4.5(–6) mm. long × 0.7–1.2 mm. broad. Racemes spikelike, 2–7 cm. long, laxi- or densiflorous; florets puberulous or glabrous outside, greenish-white to yellow, sometimes reddish; petals villous at apex, 2–3 mm. long. Legume straight, fleshy, compressed, yellow, tinged with violet, 6–9 cm. long × 6–8 mm. broad, puberulous when immature; margins undulate; segments subquadrate, 11–13; pulp acid, not edible, scarce.

DISTRIBUTION. Paraguay, Argentina, Gran Chaco, especially abundant in the central Pilcomayo region, forming open woods of the savanna type.

COMMON NAMES. Algarrobito; algarrobillo; huaschillo; guaschin (Formosa, *teste* J. Morello); quisca-taco (Formosa, *teste* Bordón); guajchillo (Santiago del Estero); ixwinúk (Salta, *teste* Métraux, Mataco Indians).

NEW MATERIAL EXAMINED. **Paraguay:** Sector Pilcomayo, Muñoz, *Rojas 6978* (SI). **Argentina.** SALTA: Dept. Orán, Pichanal, Carmelich, *Devoto & Rial Alberti*, Herb. Forestal *1007* (SI); Salta, chaco, Selva San Andrés, *Métraux*, sterile, 17 IV 1939 (US). LA RIOJA: Dept. Tello, *Ruiz Leal & Roig 17210* (SI). TUCUMÁN: Dept. Leales, Las Herreras, *Monetti 1211* (LIL, SI). FORMOSA: Ing. Juárez, *Burkart 20201*, *Bordón 60* (SI); Fortín Pilcomayo, *Krapovickas 1240* (LIL, SI); Estero Patiño, *Morello & Adámoli* V 1967 (SI). SANTIAGO DEL ESTERO: Dept. Río Hondo, Va. Jiménez, *Venturi 9712* (MO, NY, US); Dept. Giménez, El Charco, *Schreiter 5959* (LIL, SI); Espada, *Argañarás 364* (SI). CÓRDOBA: Dept. Tulumba, Puesto de Fierro, *Sayago 2161* (SI); Dept. S. Justo, Marull, *Sayago 1690*, *1764* (SI); Dept. Río Seco, Villa Candelaria, *Sayago 46* (SI).

USES. According to Métraux, *in schedula*, the wood is used for making bows.

33. **Prosopis tamaulipana** Burkart, nom. nov.

Neltuma palmeri Britton & Rose, N. Am. Fl. 23(3): 185. 1928 (not *Prosopis palmeri* S. Watson, 1889).

Trees of small to medium size, round-topped; trunk short; old bark

rough and gummy; branchlets drooping (as in willows), green, slender, slightly flexuous and knotty, the young ones 2–3 mm. in diameter; spines geminate, axillary, short, 0.5–1.5 cm. long, not present on all nodes. Leaves mostly fascicled, uni- to trijugate, glabrous or puberulous, glaucous-grayish when dry; petiole (plus rachis when present) 0.4–3.5 cm. long, pubescent or glabrous; pinnae 2.5–4 cm. long; leaflets (15 to) 20 to 29 pairs per pinna, approximate on the rachis, oblong, obtuse, grayish-green, glabrous, puberulous or with more or less marginal ciliae, 2.8–5(–7) mm. long × 1–1.8 mm. broad, pinnately reticulate-nerved below. Racemes 5–8 cm. long; flowers small, greenish-white; pedicels 0.5–0.8 mm. long; calyx ca. 1–1.5 mm.; petals 3–3.5 mm.; stamens 5–6 mm. long; ovary villous. Legume straight, 8–13 cm. long × 6–8 mm. broad, linear, compressed-submoniliform, puberulous or glabrous, straw-yellow with longitudinal striae; stipe 6–8 mm.; acumen 2–10 mm. long; margins somewhat constricted between the seeds; mesocarp pulpy, sweet; endocarp segments 10 to 18, hard, coriaceous, closed, ovate-rhombic to obliquely subquadrate, ca. 5.5 × 6–6.5 × 3.5 mm. long, broad, and thick; seeds ovate, compressed, brown, 5–5.5 mm. long.

DISTRIBUTION. Mexico: Tamaulipas and Veracruz.

MATERIAL EXAMINED. **Mexico.** TAMAULIPAS: vicinity of Victoria, at ca. 320 m. alt., *E. Palmer 400*, V VI 1907 (GH, MO, isotypes of *Neltuma palmeri* Britton & Rose; NY); Valle de los mamuts, 10 km. al N de Xicoténcatl, 100–200 m. elev., perfil através de Sierra Madre Oriental, región de Gómez Farías, *Martín & Saravia 1141* (ENCB); Altamira, *Crutchfield & Johnston 5230* (TEX); Ejido Guemez, 300 ft. elev., on alluvial clay flat, very common trees, *Crutchfield & Johnston 5181* (MEXU). VERACRUZ: 9 miles east of Ébano, S.L.P., brush on heavy clay, elev. 50 ft., *Crutchfield & Johnston 5146* (TEX).

Ser. Chilenses Burkart

34. Prosopis chilensis (Molina) Stuntz emend. Burkart

Ceratonia chilensis Molina, Saggio sulla storia naturale del Chili 172. 1782; Hauman, Physis **7**(24): 75. 1923.

Prosopis chilensis (Molina) Stuntz, Invent. Seeds Pl. Import., U. S. Dept. Agr. Bur. Pl. Industr. **31**: 85. 1914 (cf. Index Kew. Suppl. VI; Gray Herb. Index); Burkart, Darwiniana **4**: 105. 1940; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 131. 1952; Benson, Am. Jour. Bot. **28**: 749. 1941; Looser, Rev. Univ. Catól. Chile **47**: 103–116. 1962; Johnston, Brittonia **14**: 88. 1962.

Acacia siliquastrum (Cav.) Lagasca, Gen. Sp. Pl. 16. 1816.

Prosopis siliquastrum (Lagasca) DC. Prodr. **2**: 447. 1825.

Prosopis schinopoma T. Stuckert, Bull. Acad. Geogr. Bot. III. **13**: 87. 1904.

ILLUSTRATION. C. Muñoz P., Sinopsis Flora Chílena 153. *pl. 132*. 1959.

Tree, becoming large in age, with short trunk, 3–10 m. tall, the treetop rounded; branchlets flexuous, knotty, partly spinous; spines on strong shoots, axillary, geminate, uninodal, hard, conic-subulate, up to 6 cm.

long. Leaves deciduous, glabrous, uni- to bi- or trijugate, elongate, but giving only slight shade, mostly fascicled; petiole (rachis when extant included) 1.5–12 cm. long; pinnae 8–24.5 cm. long; leaflets 10 to 29 pairs per pinna, long-linear and distant on the rachis (4–12 mm. apart), glabrous throughout or with some ciliae on the margins at base, 1.1–5.4 cm. long × 1.1–3 mm. broad, pale green, nearly enervate or only the costa prominent, but not of a different color. Racemes spiciform, densiflorous, ca. 7–12 cm. long; flowers as usual, greenish-white to yellowish, ca. 250 per raceme; calyx 1 mm.; petals 3 mm. long, villous within; stamens 5–6 mm. long; ovary pubescent. Legume linear, compressed, with parallel margins, straw-yellow, stipitate and acuminate, nearly straight, falcate or subfalcate, ca. 12–18 cm. long × 1–1.8 cm. broad × 0.6 cm. thick; mesocarp sugary, edible; endocarp segments transverse-rectangular, broader than long, subcoriaceous, easy to open, numbering 20 to 32; seeds ovoid, compressed, brown, 6–7 mm. long.

DISTRIBUTION. A variable species, its natural area extending from Peru and Bolivia to central Chile (type locality: vicinity of Santiago) and northwestern Argentina (the provinces of Salta, Tucumán, Catamarca, La Rioja, San Juan, Mendoza, San Luis, and Córdoba). A detailed account, geographical and historical, on the distribution of this important tree is given by G. Looser, Rev. Univ. Catól. Chile 47: 103–116. 1962, for the province of Santiago, Chile. In southern Peru it is found at elevations of up to 2900 m.

COMMON NAMES. Algarrobo de Chile; algarrobo; algarrobo blanco; algarrobo panta; árbol blanco (Argentina). Algarrobo, tcako, cupesi (Bolivia, *fide* Cárdenas, Not. Prelim. Mat. Medica Boliv. 13. 1943, sub *P. juliflora*).

NEW MATERIAL EXAMINED. **Peru:** Cuzco, Hacienda Potrero, Convención, *César Vargas C. 2041* (MO, SI); Prov. Calca, Hoco, *C. Vargas 709* (MO). **Bolivia:** Dept. Santa Cruz, San Rafael bei San Ignacio and San Ignacio, *Schmidt 102, 136*, Oct. 1951 (SI). **Chile.** COQUIMBO: Dept. Elqui, Algarrobal y Huanta, *Looser 4333, 4483* (SI); Ovalle, Tongay, Quebrada Salina, *C. Jiles 1651* (LIL); Ovalle, *C. Jiles 509* (SI), *Wagenknecht*, Herb. *Looser 4502*, III 1942 (SI); Dept. Elqui, Río Turbio, 1200 m. elev., *Wagenknecht*, Univ. Calif. Andes Exped. II *18477*), Vicuña a La Serena, *Worth & Morrison*, Univ. Calif. Andes Exped. II *16346* (MO, UC); Dept. Illapel, Hacienda Chillepin, *Looser 2224* (GH). ACONCAGUA: Putaendo al N de Los Andes, *Zoellner 4934* (SI); San Felipe, *Killip & Pisano 39781* (SI). SANTIAGO: Tiltil, *Montero 82* (GH), *Senn 4534* (MO, NY, UC); Polpaico, *B. K. Cassels* (SI 26960); Batuco, *Hastings 350* (UC). **Argentina.** TUCUMÁN: Dept. Tafí, Amaicha de Valle, 2300 m. elev., *Burkart 5486* (SI). SANTIAGO DEL ESTERO: Capital, very rare, *Argañarás 466* (SI). CATAMARCA: Belén, *Devoto et al.*, Herb. Forestal *645, 651* (SI); Alpacinche, *Devoto & Rial Alberti 2321* (SI); Capital, *Ulibarri 492, Arturi* (SI 26961); Route 38, 30 km. SW of Catamarca City, *B. S. Vuilleumier 1224* (GH, SI); Pilciao, *Vervoorst 4255* (TEX). LA RIOJA: Gral. Lavalle, Guandacol, 950 m. elev., *T. Meyer 4232* (UC), *Ruiz Leal 18858* (SI), *Herbst 1096* (SI); Chilecito, *T. Meyer 3508* (LIL, UC); Dept. Independencia, Guayapas, *Hayward & Legname 3155* (LIL); San Nicolás,

Ruta 79, *Ruiz Leal 16593* (SI). SAN JUAN: Desamparados, *Rodrigo 2922* (LP, SI); Quebrada de Gualcamayo, El Salto, *Ruiz Leal 18971*, Río de los Piojos, *Ruiz Leal 18870* (SI); Angaco Sud, *Tinto 2003* (SI); Caucete, *Volponi & Zardini 105* (LP, SI); Calingasta, *Covas 527* (SI); Valle Fértil, Río Tumanas, *Piccinini & Leguizamón 1789* (BAB, SI). MENDOZA: Lavalle, *Roig 5932, 5933* (SI), *Ruiz Leal 9805* (SI); Las Heras, Ramblón, *Semper 229* (NY); Punta de las Lajas, *Ruiz Leal 9786* (SI); Dept. Santa Rosa, La Dormida, *Ruiz Leal 9453* (SI). SAN LUIS: Dept. Junín, El Talíta, *Burkart 13986* (SI); Alto Pencoso, *Bruch & Carette*, II 1914 (LP, NY, UC); Bajo de Velis, *Kurtz 8531* (NY); Dept. Junín, Merlo, *T. Meyer 13874* (SI); La Calera, *Burkart 10694*, Capital, *Anderson 1452* (SI); Luján, El Plumerillo, *Báez 15* (SI); Quines, *B. S. Vuilleumier 1013* (GH, SI). CÓRDOBA: Dept. Tulumba, *Sayago 2624*; Intihuasi, *Sayago 3666* (SI); Ischilín, Pajarito a Copacabana, *Sayago 3648, 3650* (CORD, SI); Cosquín, *Sayago 1416* (SI); Ascochinga, *Nicora 1303, Giardelli 956* (SI); La Calera, *J. H. Hunziker 2640, 2641* (SI); Dept. Sobremonte, La Majadilla, *Sayago 1692, 1684* (SI).

OBSERVATIONS. The specimens cited from Bolivia, *Schmidt 102* and *136*, have leaflets 3–4 cm. long × 3 mm. broad, which look like those of var. *catamarcana* var. nov., but the legumes are straight, 20 cm. long, compressed, yellow, 1.2 cm. broad. They may represent a variety, but owing to the great variability in this species, a thorough study *in situ* is necessary to decide the question. *Vargas 2041*, from Peru, is similar in foliage, but the legume is thicker, shorter, and submoniliform.

COMMON NAME. The common name of this form in Bolivia, according to Schmidt, is "Capesi."

Prosopis chilensis var. **riojana** Burkart, Darwiniana 9: 75. 1949.

A tree of the general habit of var. *chilensis*; spines geminate, 1–3.5 cm. long. Leaves unijugate; leaflets somewhat puberulous, linear-unicostate, 1.7–4.5 cm. long × 1.5–4 mm. broad, the distance on the rachis between pairs 5–12 mm. Legume nearly straight, submoniliform, 7–22 cm. long × 1 cm. broad × 5–8 mm. thick, with 7 to 15 subquadrate endocarp segments, straw-yellow or more or less tinged with violet, thicker. Argentina, La Rioja, near Jagüel, type: *Burkart 12355* (SI).

NEW MATERIAL EXAMINED. **Argentina.** LA RIOJA: Famatina, *G. Covas 1313* (LP, NY); Route 9 near Arauco, *B. S. Vuilleumier 1022* (GH, SI). CATAMARCA: Belén, *Sayago 1959, 1483* (SI); Dept. Tinogasta, El. Puesto, *J. Hunziker & O. Caso 4030* (BAB, SI); Quebrada de la Troya, 1700 m. elev., *J. Hunziker & O. Caso 4036* (SI); Andalgalá, *P. Joergensen 1340* (UC).

Prosopis chilensis var. **catamarcana** Burkart, var. nov.

Differt foliolis latioribus, 2–5 mm. latis et leguminibus annularibus, latis, carnosulis.

TYPUS VARIETATIS: Argentina, Prov. Catamarca, Dept. Belén, *Ulibarri 581*, fruct., 26 I 1974 (SI).

The variety *catamarcana* differs from the typical variety in having broader leaflets, 2–5 mm. broad; the foliage of the tree and its twigs are reddish when dry; venation in the leaflets is more visible and tends to be palmate, because of several basal nerves subparallel to the costa. The type specimen has no spines, according to the collector, but similar specimens from the same locality do have spines. Leaves are uni- or bijugate (mostly unijugate), ample. Leaflets are sometimes more than 4 cm. long and there are 7 to 19 pairs per pinna, distant on the rachis. The legume is typical, straw-colored, fleshy, sweet, semicircular to annular, sometimes S-shaped, with parallel margins, 7–8 cm. in diameter of its curvature, ca. 1.3–2 cm. broad, compressed, the endocarp segments rectangular, broader than long, up to 30, the seeds transverse.

OBSERVATIONS. This is a remarkably abundant tree in the Belén region of Catamarca, the area for which it is named.

COMMON NAMES. The same as for var. *chilensis* in Argentina.

MATERIAL EXAMINED. **Argentina.** SALTA: Molinos, 2000 m. elev., *Ruiz Leal 21310* (SI). CATAMARCA: Dept. Belén, Belén, La Banda, Quebrada de Belén or Campo de Londres, *Sayago 1482, 1484, 1487, 1494, 1583, 1910, 1961, 1964, 1965, 1970, 3506* (SI); Andalgalá, Cuesta de la Chilca, 1250 m. elev., *Parodi 14252* (GH); Catamarca, without further locality, *Devoto, Lambois, & Rial Alberti*, Herb. Forestal *641, 650* (SI); Belén, *Ulibarri 574, 581* (SI, typus varietatis); along Río Andalgalá, *Solbrig 4215* (GH, SI), *Joergensen 967* (MO). TUCUMÁN: Tafí, Amaicha al Infiernillo, *T. Meyer 12317* (MO). LA RIOJA: Capital, *Giacomelli 1–3, 15 XI 1927* (SI, LIL); Chilecito, *T. Meyer 3508* (GH, LIL); General Lamadrid, Villa Castelli, *T. Meyer 4073*, 1350 m. elev. (GH); General Lavalle, Guandacol, *T. Meyer 4232* (GH). CÓRDOBA: Dept. San Alberto, Los Cerrillos, *Báez 20* (SI). **South-West Africa.** Namibia, cultivated and subspontaneous, Forest Research Officer, Pretoria, nos. *8*, *9*, and *19* (SI); Ovitoto, 17° 10′ E, 22° 5′ S, *Gibson 13*, common name "omukara kaka," var. dubious (MO).

USES. Important tree locally for shade, timber, fuel, and concentrated forage or food (owing to its sweet, pulpy fruits). The presence of unarmed trees midst the common spiny population opens the possibility of obtaining valuable lines for cultivation. Other aims for selection purposes must be taller trunks and a greater quantity and quality of legumes, which are much eaten (as sweets, "patay") or drunk (as "aloja"), and constitute a staple food for cattle in these arid regions. *Prosopis chilensis* is sometimes cultivated in Argentina and Chile and deserves more attention in reforestation programs. According to the results of preliminary trials, it is one of the fast-growing species under arid conditions in Mendoza, Argentina (F. Roig, unpublished data).

OBSERVATIONS. According to the chemical data on flavonoid distribution in *Prosopis* (Carman), *P. chilensis* has a different array of flavonoids than do the similar Argentine and North American species, except for *P. alba*, which has exactly the same ones.

35. **Prosopis juliflora** (Swartz) DC. Prodr. 2: 447. 1825, Mém. Légumin. 12: 431. 1825; Burkart, Darwiniana 4: 103. *pl. 22.* 1940; Johnston, Brittonia 14: 83. 1962; Svenson, Am. Jour. Bot. 33: 451. *pl. 11, figs. 1, 4, 5.* 1946; Hubbard in Bailey, Stand. Cyclop. Hort. 5: 2811. 1922.

Mimosa juliflora Swartz, Prodr. 85. 1788, Fl. Ind. Occ. 2: 986. 1800 ("piliflora").

Acacia cumanensis Humboldt & Bonpland ex Willdenow, Sp. Pl. 4(2): 1058. 1805.

Prosopis cumanensis (Humboldt & Bonpland ex Willdenow) H.B.K., Nov. Gen. Sp. Pl. 6: 310. 1823; Kunth, Synop. Pl. Aequinoct. 4: 33. 1825.

Neltuma juliflora (Swartz) Rafinesque, Sylva Telluriana 119. 1838; Britton & Rose, N. Am. Fl. 23(3): 184. 1928; Johnston, Brittonia 14: 83. 1962; Britton & Killip, Ann. New York Acad. Sci. 35: 154. 1936.

Mimosa salinarum Vahl, Eclogae Americanae 3: 35. 1807.

Prosopis bracteolata DC. Prodr. 2: 447. 1825.

Prosopis dominguensis DC. Prodr. 2: 447. 1825.

Algarobia juliflora (Swartz) Bentham ex Heynh., Nom. 2: 18. 1840, according to Johnston, Brittonia 14: 83. 1962.

Prosopis vidaliana A. Naves, Descripcion de la especie botánica *Prosopis vidaliana*, *fide* F. Villar, "*P. vidaliana*," 1–19. *pl. 1, 2.* 1877, according to Johnston, Brittonia 14: 83. 1962.

Neltuma occidentalis Britton & Rose, N. Am. Fl. 23(3): 185. 1928.

Neltuma bakeri Britton & Rose, *Ibid.*

Neltuma pallescens Britton & Rose, *Ibid.*

Tree 3–12 m. tall, sometimes shrubby with spreading branches; wood hard; branchlets cylindrical, green, more or less round- or flat-topped, somewhat spiny with persistent, green (sometimes glaucous or grayish, not reddish) foliage, glabrous or somewhat pubescent or ciliate on the leaflets; spines axillary, uninodal, divergent, paired, or solitary and paired on the same branches, sometimes absent, not on all branchlets, measuring 0.5–5 cm. long, being largest on strong, basal shoots. Leaves ample, glabrous or pubescent, 1–4-jugate, commonly 1–3-jugate; petiole plus rachis (when present) 0.5–7.5 cm. long; pinnae 3–11 cm. long; leaflets 6 to 29, generally 11 to 15 pairs per pinna, elliptic-oblong, glabrous or ciliate, rarely pubescent, approximate on the rachis or distant a little more than their own width, herbaceous to submembranous (not subcoriaceous as in more xerophilous species and therefore often corrugated or curved when dried), emarginate or obtuse, mucronulate, pinnate-reticulately nerved; leaflets 6–23 mm. long × 1.6–5.5 mm. wide. Racemes spiciform, cylindric, 7–15 cm. long; rachis puberulent; florets as usual, greenish-white, turning light yellow. Legume straight with incurved apex, sometimes falcate, straw-yellow to brown, compressed, linear with parallel margins, stipitate and acuminate, 8–29 cm. long × 9–17 mm. broad × 4–8 mm. thick; stipe to 2 cm. long; endocarp segments up to 25, rectangular to subquadrate, mostly broader than long; seeds oval, brown, transverse.

DISTRIBUTION. Northern South America (Venezuela, Colombia), Panama, Central America to Mexico and the Antillean Islands; the type specimen from Jamaica, but apparently from introduced material. A neotropical, coastal species. Introduced for cultivation in northern Brazil and other countries in Asia. In the Antilles it seems to be introduced. Ekman (Arkiv Bot. 23A (6): 29. 1930), describes its increase in Haiti, where it is considered a nuisance.

COMMON NAMES. Cashaw (Jamaica, *teste* Fawcett & Rendle); bayahonda, mezquite or cambrón (Santo Domingo, Puerto Rico); baron (Haiti, *teste* B. Simpson, 1973); bayahonde (Haiti; from French, "baie-à-ondes"); algarroba or mezquite (Mexico); mareño (Mexico, Sinaloa, *teste* González Ortega); catzimec (Maya, Yucatán, Guatemala, *teste* Standley & Steyermark); carbón (El Salvador, Standley, *in schedula*); espino ruco (Honduras, Molina, *in schedula*); acacia de Catarina (Nicaragua, *teste* Standley, 1922); aromo, mancacaballo (Panama); algarrobo, cují, cují negro (*teste* García Barriga & Forero González); trupillo, mancacaballo (Colombia, *teste* Britton & Killip, 1936); cují, yaque, cují yaque, yaque blanco, yaque negro, cují negro (Venezuela, *teste* H. Pittier); cují amarillo, maíz criollo (the legumes which fatten cattle) (Guarico, *teste* R. Montillo); algarrobo (Ecuador, *teste* Rimbach, *in schedula*); algaroba (Brazil, northeastern states); aroma (Philippine Islands, *teste* Standley, 1922).

The most generalized names are "algarrobo" in Spanish speaking countries and "mesquite" in the Mexican-Texan area, but both are collective names for *P. juliflora, P. laevigata, P. glandulosa,* etc. in the north, and *P. chilensis, P. alba, P. nigra,* and similar species in the south, where "mesquite" is unknown; the original Quechuan name, now nearly abandoned, was "tacu" or "taco." In Venezuela the names "cují" or "yaque," not known outside, are employed.

"Algarrobo" was orginally the carob tree, *Ceratonia siliqua* L. from the Mediterranean countries, and this name was transferred by the Spaniards to the American trees of the *Prosopis* sect. ALGAROBIA alliance because of the similarity in form and uses of the legumes. "Algarroba" is the fruit of the "algarrobo," but the name is sometimes used to distinguish between nearby species or varieties.

OBSERVATIONS. *Prosopis juliflora* is used here in its original, restricted, and certainly biological sense. It was reestablished by the writer (*op. cit.* 1940) and accepted by L. Benson (1941), M. C. Johnston (1962), and other modern authors against the incorrect, all-embracing, collective *P. juliflora* concept of Bentham (1875, 1876), which was maintained by Standley (1922, 1926) and Standley and Steyermark (Fl. Guatemala, 1946) despite difficulties in definition derived from a tremendous variability within the whole sect. ALGAROBIA species complex. Nobody can deny the existence of these difficulties, and perhaps in no other plant group is the insufficiency of common herbarium material more apparent. The sect. ALGAROBIA species are a challenge for the new, refined taxonomic

techniques of cytogenetical, ecological, biometric, and phytochemical nature elaborated by other authors.

For the traditional taxonomist remains the task of clarifying the synonymy and correctly applying the existing binomials. However, it is already certain that *Prosopis juliflora*, *P. chilensis*, *P. alba*, *P. nigra*, etc. are good species.

Chemical results obtained by Carman on the distribution of different flavonoids in species of sect. ALGAROBIA indicate a complete coincidence in flavonoid content in *Prosopis juliflora*, *P. glandulosa*, *P. laevigata*, and *P. velutina*, all North American species, and differences between them and eight other South American species. These results substantiate the integrity of these taxa as species.

NEW MATERIAL EXAMINED. **Mexico:** Sinaloa, Mazatlan, along the beach, *Rose, Standley, & Russell 13720* (NY, type of *Neltuma occidentalis*); Mazatlan, Santiago Ixciuntla, esteros, *Gonzáles Ortega 6154* (MEXU); Sinaloa, Altata, littoral, *H. S. Gentry 5420* (MO); Michoacán, Cayaco, *Nelson 6961* (NY, type of *Neltuma pallescens*); Nayarit, Tres Marías Isl., *Ferris 5580* (MO); Guerrero, Acapulco, *F. A. Barkley 14140* (MO), *Paray 3045*, Galeana, San Luis, *Hinton 10886* (MEXU, MO); Oaxaca, Tequisistlán, *M. Ulloa Sosa 26* (MEXU). **Guatemala:** San Marcos, Ocós, *Steyermark 37767* (US). **Cuba:** *León & Pierre 3763* (NY), *Shafer 1041* (NY). **Jamaica:** Kingston, *Britton & Hollick 1748* (NY), *A. S. Hitchcock*, Sept.–Nov. 1890 (MO). **Santo Domingo:** Los Matos, *H. von Schrenk 52* (MO); Monte Cristi, Moncion, *Valeur 943* (MO). **Haiti:** Source Matlas to Port au Prince, *B. Simpson 6038–1* (GH, SI). **Curaçao:** Willemstadt, *J. H. Hunziker 4926* (SI); Ascension, *Britton & Shafer 3053* (NY). **Montserrat:** *Shafer*, 21 I 1907 (NY). **El Salvador:** *Standley 20531, 20788, 23232* (US). **Honduras:** *Standley 20739* (US), *Molina 5126* (US). **Nicaragua:** Managua, *Garnier A-667* (US); Tamagasta peninsula, *Maxon et al. 7333* (US); Aserraderos Island, *Baker 188, 2076* (MO, isotype of *Neltuma bakeri*). **Panama:** Bella Vista, *Standley 25391* (US), *P. H. Allen 824* (US); S Darién, La Palma, *Pittier 6616* (US); Isla del Rey, *Duke 9525* (US); Chiriquí Prov., Burica peninsula, *Busey 494* (MO); Darién, Patiño, *Duke 10511(3)* (MO); Los Santos, Chitre, *Tyson et al. 3017* (MO); Panama, without further locality, *Maxon & Valentine 6958* (US), *Macbride 2621* (US). **Colombia:** Dept. El Valle, Cauca Valley, N of Palmira, 1050 m. elev., *H. García Barriga 6348* (SI); Magdalena, Fonseca, *Haught 4062* (SI); Santa Marta, *Fosberg 22119* (NY), *H. H. Smith 40* (NY); Cartagena, *Schott*, 11 III 1838 (NY); Dept. Boyacá, Cord. Oriental, *Cuatrecasas & García B. 9835* (SI); Santa Marta, playas arenosas, *Giacometto, Gutierrez, & Barkley 18 C-015* (LIL); Dept. Atlántico, Puerto Colombia, *Killip & Smith 21073* (NY). **Venezuela:** Lara, Barquisimeto, *Killip 37077* (SI), *Tamayo 2625* (SI); Carabobo, Maracay a Valencia, *Burkart 16131* (SI); Lara, El Tocuyo, *Pittier 13096* (MO, NY); Falcón, Istmo de Médanos, *Torres, Tamayo, & Tamayo* (SI 26929); Maracaibo y Cumanacoa, *Mocquerys*, 1893–94 (NY, SI); Anzoátegui, La Ceiba, *Vera & Vásquez 3832* (SI); Sucre, Carupano a Guaca, *Vera & Vásquez 3835* (SI); N. Venezuela, Isla S. Carlos, *Curran & Hanan 783* (NY). **Ecuador:** Manabí, San Vicente, *Asplund 16596* (NY); Islas Galápagos, *W. von Hagen 63c, Schimpff 175* (NY). **Peru:** loc.(?), *Juana Infantes Vera 2110* (SI). **Brazil:** Ceará, Fortaleza, *Luti 4273* (SI); Paríba, Joao Pessoa, cultivated, *Ducke 2319* (SI); Rio Grande do Norte, cultivated, *G. de Azevedo 1.2* (SI); Mossoró, *Burkart 30326* (SI). **Africa. Senegal:** Dakar, cultivated, *Burkart 24502*, fruct., 10 IX 1963 (SI); Dakar, *Adam*

343 (MO); St. Louis, *Adam 27018* (MO). **Nigeria:** Bornu, Maiduguri, *Vjor, F. H. I. 21943* (MO). **Sudan:** Kharthum, subspontané, *Roberty 5355* (MO). **Asia. Iraq:** Abu Ghraib, saline soil near Tel-Akrakoof, *Abbas al Ani & Jawad 8820* (UC); Abu Ghraib, roadside, *Barkley & Abbas 71* (MO). **Kuwait:** *M. L. Grant 15635* (MO). **Vietnam:** Saigon, *King 5639* (US). **India:** Allahabad, *Panigrahi 5853* (MO). **Sri Lanka:** Ceylon, *R. G. Cooray* 69.121.701 R, on roadside (MO). **Philippines:** Luzón, Bataan, Lamao, *H. M. Curran*, Forest Bureau *15562* (NY); Bataán, along shore, *R. S. Williams 379* (NY, US); Manila, *Merrill 370, 1853* (GH, MO, NY); Oriental Mindoro Prov., *J. Vera Santos 5178* (US); Island of Basilan, *De Vore & Hoover 72* (US); Malate, *J. T. Rosaly* (MO 1017448); Luzón, Zapote, Rizal Province, *Mendoza*, Philippine Nat. Herb. *3840* (MO).

Prosopis juliflora var. **inermis** (H.B.K.) Burkart, comb. et stat. nov.

Prosopis inermis H.B.K., Nov. Gen. Sp. Pl. **6:** 307. 1825; DC. Prodr. **2:** 447. 1825; Svenson, Am. Jour. Bot. **33:** 451 (sub *P. juliflora*). *pl. 1, fig. 4.* 1946.

This variety differs from var. *juliflora* in its finely pubescent leaflets and its lack of spines. It seems abundant in the region of Guayaquil, Ecuador. From herbarium material, even when spines are lacking, it is not aways possible to distinguish it from the typical variety.

MATERIAL EXAMINED. **Ecuador:** Prov. Guayas, Guayaquil, *A. A. de Delgado 47, 56–58, 66* (MO, SI); Guayaquil, "common, dominant tree in savanna," *E. L. Little, Jr. 6560* (NY); Guayaquil, *Asplund 15225* (NY); Santa Cruz, *W. von Hagen 4* (NY), *Valverde 952* (MO).

Prosopis juliflora var. **horrida** (Kunth) Burkart, comb. et stat. nov.

Prosopis horrida Kunth, Mimoses et autres plantes légumineuses. 106. *pl. XXXIII.* 1822; H.B.K., Nov. Gen. Sp. Pl. **6:** 306. 1823; DC. Prodr. **2:** 446. 1825.

Spiny tree 3–8 m. tall, the spines sometimes rare, geminate, axillary, 1.5–7.5 cm. long; branchlets flexuous, grayish or black. Leaves bi- to quadrijugate; petiole plus rachis 2.5–7 cm. long; pinnae 6–10 cm. long; leaflets 10 to 15 pairs per pinna, elliptic, ovate to oblong, ca. 1.5 cm. long × 0.4 cm. broad, distant on the rachis, pubescent, pale, reticulate-nerved, obtuse. Racemes 9–12 cm. long; florets greenish-white. Legume straight or subfalcate, compressed, submoniliform, 18–24 cm. long × 1–1.2 cm. broad (including the stipe, 1.5–2 cm. long, and an acumen of 1.3 cm.), brown, glabrous except for scattered hairs along the margin; seeds numerous, to 26; joints rectangular, broader than long.

COMMON NAME. Algarrobo (northern Peru).

MATERIAL EXAMINED. **Peru:** Dept. Amazonas, Prov. Bagua, 500–600 m. elev., 5° 50′ S lat., entre Bagua Grande (near Jaen) y Chamaya, *Ferreyra 15646* (UC); Prov. Bagua, Bagua Grande, San Julián-hill, *Hutchison 1501* (NY); Dept. Piura, Pariñas Valley(?).

USES. *P. juliflora* is highly esteemed in several tropical countries as a valuable tree for shade, timber, and forage legumes. It is cultivated in

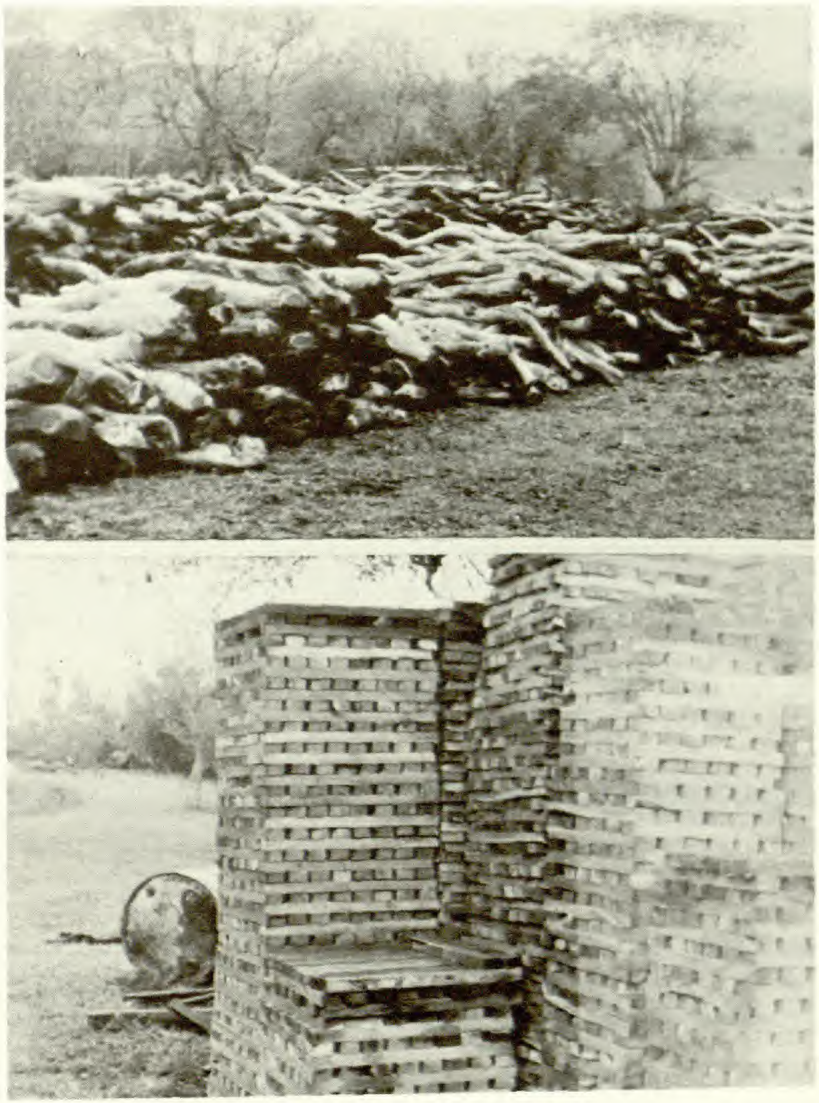


FIGURE 8. **Prosopis.** Photographs showing wood utilization of *P. nigra* and *P. affinis* from natural forests in western Uruguay. Above: Logs cut for fence-posts. Below: Timber cut for parquet floors. *Photos.* Marta Rolfo.

northeastern Brazil and in India. The shrubby forms, however, are sometimes a nuisance, as in Santo Domingo and Pakistan, where they are very aggressive invaders. *P. juliflora*, when in flower, is an excellent bee-pasture.

36. **Prosopis nigra** (Grisebach) Hieronymus, Plantae Diaphoricae, Bol. Acad. Nac. Córdoba **4**: 283. 1882; Burkart, Darwiniana **4**: 122. *fig. 15. tab. 21.* 1940.

Prosopis algarobilla Grisebach var. *nigra* Grisebach, Symb. Fl. Arg. in Abh. Kön. Ges. Wiss. Göttingen **24**: 118. 1879.

Prosopis dulcis Kunth var. *australis* Bentham, Jour. Bot. **4**: 350. 1842.

Round-topped tree 4–10 m. high (to 16 m. high *fide* Tortorelli); trunk with persistent, fissured, dark bark, to 50–80 cm. in diameter; heartwood dark brown; branches flexuous, the erect long shoots spiny, the

slender, downward-arching ultimate branchlets almost unarmed; spines, when present, axillary, geminate, 0.3–3.5 cm. long. Leaves uni- to trijugate, medium-sized, ample; petiole with rachis 4–6 cm. long; pinnae 5–10 cm. long; leaflets ca. 20 to 30 pairs per pinna, distant not more than their own width or approximate, oblong-elliptic, obtuse, pinninerved, glabrous, ciliolate, ca. 4–7 mm. long × 1.2 mm. broad. Spikelike racemes 7–9 cm. long, equalling the leaves; florets small, numerous, fragrant, greenish-white or yellow, nearly glabrous outside; petals 3 mm. long. Legumes straight or slightly subfalcate, thick, somewhat compressed, fleshy, submoniliform, 10–16 cm. long × 0.7–0.9 cm. broad, yellow, tinged with violet when ripe, edible, sweet; endocarp segments obliquely subquadrate, ca. 8 to 27; seeds ovate, 5–7.5 mm. long.

DISTRIBUTION. Southern Bolivia; Argentina; Paraguay; western Uruguay. Very important and abundant tree in the Gran Chaco formation from Córdoba and Buenos Aires provinces to the north; it thrives best on deep clay soils and tolerates alkali.

COMMON NAMES. Algarrobo negro; ibopé-hú (Guaraní); yura-tacu (Quechua).

NEW MATERIAL EXAMINED. **Argentina.** JUJUY: San Pedro a Urbana, *Killip 39632* (SI, US); San Pedro, Río Lavagin, *Eyerdam & Beetle*, Univ. Calif. Andes Exped. II *22534* (MO). SALTA: Coronel Moldes, *Bartlett 19711* (SI); Pichanal, *Carmelich, Devoto, & Rial*, Herb. Forestal *578* (SI). TUCUMÁN: Tapia, *Dawson & Calastremé 1811* (BAB, SI); Dept. Trancas, Vipos, *Schreiter 2253* (LIL, SI); Dept. Tafí, Banda, *Lillo 8730* (SI). CATAMARCA: El Ocho, *Parodi 14095* (SI); Catamarca, without further locality, *B. S. Vuilleumier 1124* (GH, SI). FORMOSA: Dept. Patiño, La Primavera, *Palacios et al. 328* (BAFC, SI); Ing. Juárez, *A. O. Bordón 74* (SI), Bart. de las Casas, 49 km. east, *Solbrig 4267* (GH, SI). CHACO: Zapallar, *T. Meyer 2199* (SI); Resistencia, Colonia Benítez y Saenz Peña, *Martínez et al.* (BAA *9506, 9526, 9628* (SI). SANTIAGO DEL ESTERO: Dept. Robles, Beltrán, *Maldonado 416* (LP, NY, SI); Dept. Choya, Frías, *Sayago 2639* (SI); Ruta 64 de Capital a Cerrillos, *Burkart 20348* (SI); Dept. Moreno, Quimilí, *Krapovickas & Cristóbal 20450* (SI). CÓRDOBA: Dept. San Justo, surroundings of Mar Chiquita, *Sayago 3631, 3634, 3638, 3639* (SI); Río Primero, La Posta, *Sayago 1711* (SI); Córdoba a Calera, *A. T. Hunziker 8123* (SI); Dept. Capital, *Sayago 2014, 2018* (SI); Dept. Sobremonte, *Sayago 1696* (SI); Capital, *Rodrigo 277* (LP, SI); Dept. Colón, Núñez del Prado, *Sayago 1298, 1299* (SI); Pozo del Tigre, *Sayago 1290* (SI). SAN LUIS: Capital, *Andersen 658* (SI). SANTA FE: Dept. Gral. Obligado, Lanteri, *Burkart 5927* (SI). CORRIENTES: Paso de los Libres, *Correa et al. 5230* (SI); Mburucuyá, Santa María, *Pedersen 3754* (MO, NY, SI, UC); San Roque, *Ibarrola 2952* (UC). ENTRE RÍOS: Paraná, *J. R. Báez* (SI 17959), *Burkart et al. 23701* (SI); Nogoyá, *Burkart 10516*, Diamante, *Burkart 22186* (SI). BUENOS AIRES: Partido de Zárate, Las Palmas, *Boelcke 5139* (SI).

USES. *Prosopis nigra* is a very important and valuable timber tree, much used for furniture, barrels, tanning, firewood, forage and food (sweet fruits), bee-pasture, shade, and ornament in dry climates. It reproduces



FIGURE 9. **Prosopis.** Photograph of *P. nigra*, a partial view of an historic specimen growing in the Quebrada de Humahuaca, Purmamarca, Jujuy, Argentina. According to Burkart the age of this tree has been calculated to be at least 400 years.



FIGURE 10. **Prosopis.** Left: Photograph of trunk of a large tree of *P. nigra* in western Uruguay. Right: Wood pile of *P. nigra* prepared for charcoal. *Photos.* Marta Rolfo.

freely and is seldom cultivated, but it is worthy of attention and the selection of the best growth types. Nowhere is it considered an invader.

OBSERVATIONS. *Prosopis nigra* is a somewhat variable species and its limits are not always clear. This fact is probably due to its hybridization with *P. alba* or *P. flexuosa* on the western boundaries of its area.

Type specimens of *Prosopis nigra* are *Hieronymus 486* and *905* (GOET), as stated in my paper of 1940 (*pl. 21*). Photographs 1458 and 1466 of the Field Museum series represent *P. nigra* (not *P. algarobilla* or *P. nandubey*).

Two variants, *Prosopis nigra* var. *ragonesei* and var. *longispina*, merit taxonomic recognition.

Prosopis nigra (Grisebach) Hieronymus var. **ragonesei** Burkart, Darwiniana 7: 518. 1947; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 1. 127. *fig. 16.* 1943, ed. 2. 127 (*fig. 19*), 132. 1952.

Tree unarmed or with very small, axillary spines, of the general habit of var. *nigra*, but characterized by very small, more ovate leaflets 1.5–3.2 mm. long, the legume compressed-moniliform, straight and less sweet;

the heartwood yellow, less durable. The picture cited in *Las Leguminosas Argentinas, silvestres y cultivadas* was drawn from the type specimen.

DISTRIBUTION. Argentina (Prov. Santa Fe, Dept. San Justo, Dept. Vera, etc.).

COMMON NAME. Algarrobo amarillo.

MATERIAL EXAMINED. **Argentina.** SANTA FE: Videla, *A. E. Ragonese*, Herb. Inst. S. Fe *2078* (SI, type); Dept. Vera, arr. del Toba, Herb. Inst. S. Fe *2420* (SI); Vera, *Burkart 5933* (SI).

Prosopis nigra (Grisebach) Hieronymus var. **longispina** Burkart, var. nov.

Differt a var. *nigra* imprimis spinis longis rectis, subulatis tenuibus, haud supra basin dilatatis, circa 0.5–10 cm. longis; arbor valde armatus, ramulis pendulis habitu et alteris characteribus cum var. *nigra* congruit.

TYPUS VARIETATIS: Argentina, Prov. Corrientes, Dept. Capital, *Pedersen 2808*, fl., 23 IX 1954, ripe fr., 15 II 1955 (SI).

This new variety differs from var. *nigra* in its spiniferous branchlets, the axillary spines being geminate, straight, 0.5–10 cm. long × at most 3 mm. in diameter, without suprabasal enlargement (such as that seen in *Prosopis elata*) and much more slender than in *Prosopis pugionata* (which differs moreover by leaflets distant on the rachis). All other characters of the tree are those of var. *nigra*, including the pendulous growth of the slender branchlets, which produces a globose treetop.

The collector of the type specimen, Mr. Pedersen, informs me that this spiny variety is locally common, as is var. *nigra* (nearly spineless or with very small spines), so that natural crossing must be possible.

DISTRIBUTION. Argentina (Prov. Corrientes, Eastern Chaco).

COMMON NAME. Algarrobillo (a diminutive of algarrobo, the common Spanish name for all of the arborescent species of sect. ALGAROBIA).

MATERIAL EXAMINED. **Argentina.** CORRIENTES: Capital, *Pedersen 2808* (SI, isotype; holotype, C). CHACO: Colonia Benítez, not far from Resistencia, *Schulz 1356* (SI).

37. **Prosopis caldenia** Burkart, Darwiniana 3(2): 111. *pl. 1.* 1939, 3(1): *pl. 6* ut "Prosopis" cfr. "fruticosa" Meyen. 1937, 4: 110. 1940; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 132. *pl. 2, fig. 1.* 1952.

Tree with deciduous foliage, medium-sized, round-topped, 4–12 m. high and 15 m. in diameter at top; trunk short, 20–80 cm. in diameter, in old specimens to 1.5 m. in diameter (trees of more than 100 years); bark persistent, fissured, dark; branchlets flexuous, knotty; spines axillary, geminate, uninodal, divergent, not more than 0.5–2.5 cm. long. Leaves small, light, glabrous or puberulous (rachis, leaflet-margins), uni- to

quadrijugate (on long shoots mostly bi- to quadri-jugate, on brachyblasts or axillary fascicles uni- to bijugate); petiole plus rachis 4–25 mm. long; pinnae 2–5.5 cm. long; leaflets ca. 20 to 33 pairs per pinna, linear-oblong, small, enervate or unicostate, obtuse, approximate, glabrous, ciliolate, 2.7–5.4 mm. long × 0.2–1.1 mm. broad. Racemes spikelike, longer than the leaves; peduncle plus rachis 3.5–9 cm. long; pedicels 0.7–1 mm. long; florets greenish-white to yellowish; calyx (1 mm. long) and corolla glabrous outside, the petals 2.5–3 mm. long, villous at the apex; stamens 6 mm. long; ovary stipitate, villous. Legume compressed-linear, falcate, in S- or C-shape or in 1–3 very lax and open spirals 10–20 cm. long × 5–13 mm. broad, stipitate and acuminate (acumen or rostrum 0.5–1.7 cm. long); margins parallel, straw-yellow, violet-tinged; endocarp segments quadrate or transversely rectangular, in one row, up to 35; seeds ovate, 5–7.5 mm. long.

DISTRIBUTION. Endemic to south-central Argentina, forming open unispecific, semixerophytic woods or forests in the plains of the western Pampas region (Prov. La Pampa, San Luis, southern Córdoba, etc.) and very sporadic elsewhere; asociated with *Stipa*-dominated grassland and few shrubs in a continental climate of warm, dry summers and cold winters (rarely with snow), most frequently between 35° and 38° S. latitude, and 65° W. longitude, the rainfall 420–630 mm. mean per year, the mean annual temperature 15–16.5° C. *Prosopis caldenia* does not tolerate saline soils, but rather soils with a good deal of sand in their composition.

COMMON NAME. Calden.

MATERIAL EXAMINED. **Argentina.** CÓRDOBA: V. Dolores, Ruta 146, *Báez 12* (SI); Río Cuarto, *A. T. Hunziker 9369* (CORD, SI); Dept. Gral. Roca, Río Quinto, *Sayago 730* (SI). SAN LUIS: Coronel Pringles, *A. I. Pastore 2070, 2071* (GH); Dept. Junín, Santa Rosa, *Báez 1–3* (SI); Capital, *Burkart 10671* (SI), *Anderson 1486* (SI); Villa Mercedes, *Nicora 4233* (SI). MENDOZA: Dept. La Paz, various places, *Ruiz Leal 9066, 9448, 9507, 9591* (SI); Dept. Santa Rosa, Campo La Dormida, *Ruiz Leal 9867*, General Alvear, *Ruiz Leal 21761* (SI). LA PAMPA: Dept. Rancul, La Maruja, *Burkart 9959* (SI); Dept. Leventue, *B. Vuilleumier 1002–3, 1004–3, 1005–10* (BAA, SI); Catriló, Uriburu, *Fortuna 20* (GH, UC); Santa Rosa a Victorica, *Cabrera 4353* (GH); Sta. Rosa, *Venturi 452* (GH); Realicó, *A. T. Hunziker 9393* (SI); Dept. Utracán, Cuchillo-Có a Epupel, *Solbrig 172* (SI); Dept. Hucal, Villa Alba, *A. T. Hunziker 4240* (SP); Bernasconi, *Bartlett 20006* (GH, SI, US); Rancul a Chamico, *Cabrera & Crisci 19101* (LP, SI); General Acha, *Burkart 15995* (SI); Km. 358, *B. S. Vuilleumier 1001*; Loventuel, *Vuilleumier 1002, 1102*; Telén a Colonia La Pastoril, *B. S. Vuilleumier 1105* (GH, SI); Toay District, Santa Rosa, *Conrad 2370* (MO). BUENOS AIRES: Bahía Blanca a Médanos, *Burkart 25628* (SI); Villarino, *Boelcke et al. 11780* (SI), *Cabrera & Fabris 16438* (LP, SI), *Alsina, Cabrera, & Fabris 14799* (LP, SI); General Villegas, *Schulz 5784* (LIL, NY). RÍO NEGRO: Dept. Pichi Mahuida, Río Colorado, *Ragonese* (SI *26957*).

USES. *Prosopis caldenia*, the "calden," is the only large tree in its range and forms characteristic forests commonly associated with grass-

land and scrub. It furnishes valuable timber, but this is inferior to that of *P. alba* and other "algarrobos"; nevertheless, it is considered good for furniture. The legumes serve as concentrated forage for cattle. Wild life, such as foxes (Dusicyon), guanacos, ostriches, and naturalized wild boars, feed on them.

When the "caldenales" are cleared for agriculture and later abandoned because of the frequent droughts, abundant germination occurs, and in a few years spiny, impenetrable thickets are formed, known locally as "fachinales." They provide an excellent refuge for wild life, but are for years useless to the rancher.

Literature on *Prosopis caldenia*: J. V. Monticelli, Lilloa 3: 348. 1938 (sub *Prosopis calden*, nomen nudum); Koutché & Carmelich, Estudio forestal del Caldén, Bol. Ministr. Agr. Nac. 37(1–4): 1–22. *illustr.* Buenos Aires, 1936 (sub *P. algarobilla* auct., non Grisebach); J. L. Alfonso, in Anal. Soc. Ci. Arg. 159: 37–57. Buenos Aires, 1955; J. C. Lassalle, Política forestal del Caldén, Ingeniería Agronóm. 15(4): 5–15. Buenos Aires, 1957, Rev. Forestal Arg. 10: 15–19. 1966, *Ibid.* 6: 44–50. Buenos Aires, 1962; L. A. Tortorelli, Maderas y Bosques Argentinos 399, 403. Buenos Aires, 1956.

This species grows in a climate with hot summers and cold winters (with snow when not too dry), so that the wood forms clear growth-rings and has been successfully used in dendrochronology (Krebs, C. & G. Fischer, El pluviómetro secular, Circ. Sec. Prop. & Inf. Ministr. Agr. 847: 1–24. Buenos Aires, 1931).

38. **Prosopis laevigata** (Humboldt & Bonpland ex Willdenow) M. C. Johnston, Brittonia 14: 78. 1962; Isely, Madroño 21: 289, 294. 1972.

Acacia laevigata Humboldt & Bonpland ex Willdenow, Sp. Pl. 4(2): 1059. 1805.

Mimosa laevigata (Willdenow) Poiret in Lamarck, Encycl. Méth. Bot. Suppl. 1: 65. 1810.

Neltuma laevigata (Willdenow) Britton & Rose, N. Am. Fl. 23(3): 187. 1928.

Prosopis dulcis Kunth, Mimoses et autres plantes légumineuses. 110. *pl. 34.* 1822; DC. Prodr. 2: 447. 1825; Humboldt, Bonpland, & Kunth, Nov. Gen. Sp. 6: 307. 1823.

Algarobia dulcis (Kunth) Bentham, Plantae Hartwegianae 13. 1839.

Neltuma attenuata Britton & Rose, N. Am. Fl. 23(3): 185. 1928.

Neltuma michoacana Britton & Rose, N. Am. Fl. 23(3): 187. 1928.

Tree, becoming large with age, spiny, to 6–7 m. tall, sometimes a shrub of 3 m.; twigs and leaves glabrous; spines axillary, geminate, 0.5–2.5 cm. long. Leaves uni- to bijugate; petiole (plus rachis when extant) 0.3–2.5 cm. long; pinnae 2.5–12 cm. long. Leaflets numerous, approximate (interval on the rachis smaller than their width), 15 to 44, mostly 20 to 30 pairs per pinna (in topotype material, 15 to 20 pairs), linear-oblong, obtuse, glabrous or scarcely ciliolate on margin, 2.5–15 mm. (mostly 5–10

mm.) long × 1.1–3 mm. broad (2 to 7 times as long as broad (topotype material 3 to 4 times) according to Johnston, 1962), subcoriaceous (flat after desiccation, not corrugated as they commonly are in *P. juliflora*), pallid greenish to grayish, strongly pinnate-veined beneath. Racemes spiciform, 4–10 cm. long, multiflorous; flowers greenish-white; calyx 1 mm.; petals 3–4 mm. long. Legume 9–17 cm. long × 0.7–1.4 cm. broad, linear, glabrous, straight or slightly curved, submoniliform, yellow or violet-sprinkled, compressed; transection rectangular or rounded at maturity; margins undulate; segments rounded-subquadrate, shorter than broad; stipe 0.2–1 cm. long; acumen 0.3–1 cm. long; epicarp veined, crustaceous, yellow or violet-tinged; seeds longitudinal.

DISTRIBUTION. Mexico, especially the central plateau and hillsides (cf. M. C. Johnston, Brittonia **14**: 73. *fig. 1.* 1962); U.S.A., rare in Nueces Co., Texas.

COMMON NAME. Mezquite (from the Nahuatl "mezkitl," masc. noun), applied to this and related species in Mexico and the United States.

MATERIAL EXAMINED. **Mexico:** Tamaulipas, Tampico, *E. Palmer 229* (NY); San Luis Potosi, *Schaffner 593* (NY), *Roe et al. 66* (NY); Zacatecas, Jalpa, *Mahler 5800* (NY); Jalisco, Juanacatlán, 1600 m. elev., *Rzedowski 16339* (US); Hidalgo, Actopan, *King 4197, 4203, 4205* (NY), *Pringle 8350* (NY); Michoacán, Punguato, *Arsène 8297* (GH; NY; MO, type of *Neltuma michoacana*); Morelia *G. Arsène 8447* (GH, isotype of *Neltuma attenuata;* MO, NY); Puebla, Tehuacán a Puebla, *Gentry, Barclay, & Argüelles 20212* (US); Tehuacán area, above Calipán, 1000–1800 m. elev., *C. E. Smith et al. 3746* (US); Guerrero, Coyuca, *Hinton 5471* (NY); Valle de Oaxaca, *Conzatti 5158* (SI); Oaxaca, cerros de Cuicallán, 650 m. elev., *Conzatti 3423* (SI); Oaxaca Valley, *C. L. Smith 341* (NY); Puebla, Tehuacán, *Paray 294*, Michoacán, San José, *Rzedowski 16653*, Hildalgo, Tasquillo, *González Q. 2634* (ENCB); Guanajuato, Silao, *Crutchfield & Johnston 5941-AB* (TEX); Aguascalientes, *C. D. Johnson 50–68* (MO).

USES. Esteemed as a shade tree; cultivated in the central depression of Chiapas (according to Johnston, 1962, p. 79); legumes edible and of value as fodder.

Prosopis laevigata var. **andicola** Burkart, var. nov.

Differt imprimis ramis spinisque validioribus, ramulis valde flexuosis spinis usque ad 4–9 cm. longis × 5–6 mm. diametro, foliolis majoribus, legumine crassiori. Frutices 1–3 m. alti, rarius arborei, folia unijuga, foliola ca. 24 paria per pinna, racemi 10 cm. longi, legumina subfalcata linearia 15–20 cm. longa × 1.2–1.4 cm. lata compressa multiseminata.

TYPUS VARIETATIS: Peru, Cuzco, Prov. Calca, Hacienda Urco, *César Vargas C. 709*, floribus fructibusque ornatus, Januar, 1938 (SI).

Shrubs of 1–3 m. or more, rarely trees to 5–8 m. tall, glabrous; twigs strong, very flexuous; spines geminate, axillary, the most developed 4–9 cm. long × 5–6 mm. broad at base. Leaves unijugate; petiole 0.2–3 cm.

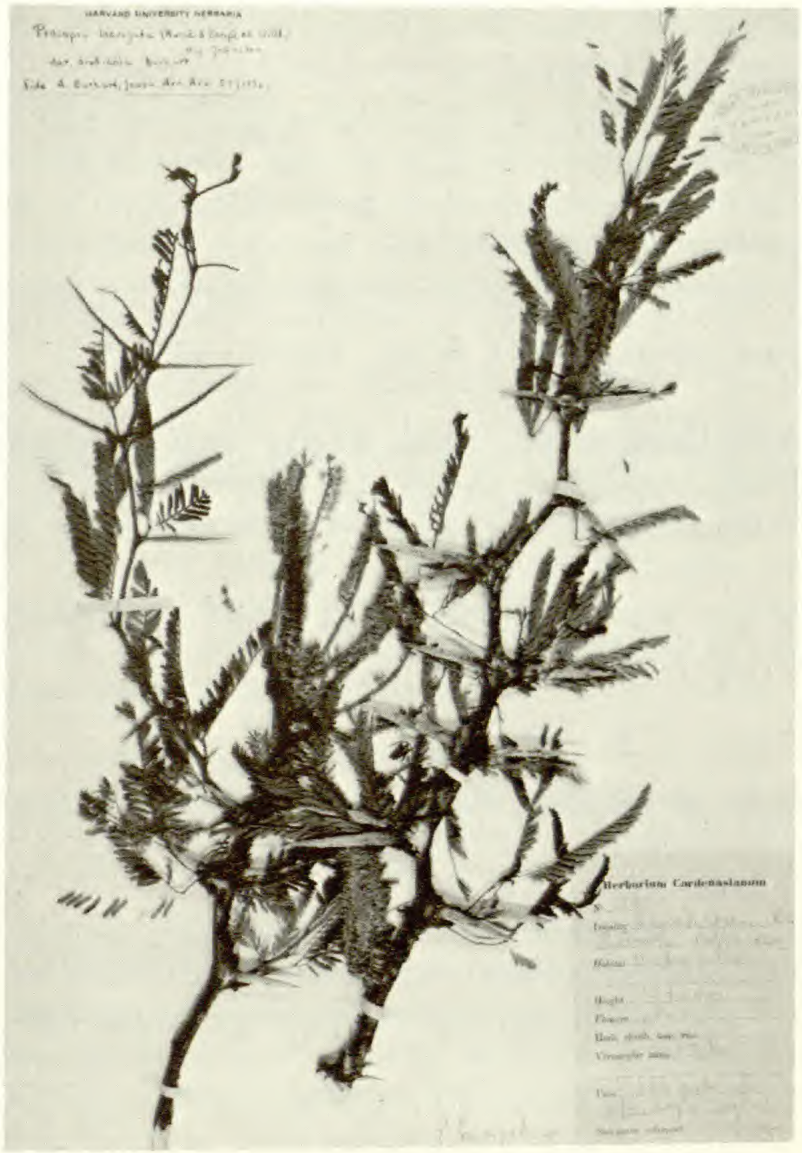


FIGURE 11. **Prosopis.** Flowering specimen of *P. laevigata* var. *andicola* from Cerro de Araní, Cochabamba, Bolivia (*Cardenas 3647*) (GH).

long; pinnae 5–9 cm. long, with ca. 16 to 24 pairs of leaflets, these subcoriaceous, linear-oblong, obtuse to subacute, reticulate-veined, 5–12 mm. long × 1.5–2.2 mm. broad, approximate, nearly touching or less distant than their own width. Racemes 6–10 cm. long, the rachis puberulous; florets glabrous outside. Legume subfalcate, 7–20 cm. long × 1.1–1.4 cm. broad, compressed; margins shallowly undulate to nearly parallel; transection rectangular; exocarp brown-violet.

COMMON NAMES. Algarrobo (Spanish); thako (Quechua).

OBSERVATIONS. A montane type of a variable, subxerophilous, Mexican species, at medium elevations (1900–2900 m.). Formerly sometimes cited as *Prosopis dulcis* Kunth or *P. juliflora* (Sw.) DC. DISTRIBUTION: from southern Peru through the Bolivian Andes to the extreme northwestern corner of Argentina (Jujuy).

MATERIAL EXAMINED. **Peru:** Cuzco, Calca, Hacienda Urco, *C. Vargas C. 709* (SI, type); Arequipa, Tiabaya, rocky slopes 2000–2100 m. elev., *Pennell 13062*, with mature legumes, 8 IV 1925 (GH, NY). **Bolivia:** Cochabamba, Cerro de Araní, 2600 m. elev., *Martín Cárdenas 3647*, flowering, III 1944 (GH, LIL, SI); Cochabamba, 2600 m. elev., *O. Kuntze*, III 1892, sub. *P. juliflora* (NY); Tarija, Prov. Cercado Tarija, 1900 m. elev., *T. Meyer 17965*, fruct., I 1953 (LIL, SI); Sorata, Prov. Larecaja, San Pedro, 2650 m. elev., *Mandon 758* (NY); Tarija, Pinos, *Fiebrig 2492* (SI); Cotaña am Illimani, *Buchtien 280* (NY). **Argentina:** Prov. Jujuy, Tilcara, *Krapovickas & Cristóbal 17593*, fl. and fruct., 8 I 1971 (SI); Huacalera, quebrada a 2700 m. s.m., *Cabrera 12076* (SI).

39. **Prosopis flexuosa** DC. Prodr. 2: 447. 1825; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 131. 1952; Burkart, Leguminosae in Cabrera, Fl. Prov. Buenos Aires 3: 429. 1967; Clos in Gay, Fl. Chilena 2: 248. 1846.

Acacia flexuosa Lagasca, Gen. Sp. 16. 1816 (non *A. flexuosa* Humboldt & Bonpland ex Willdenow, Sp. Pl. 4: 1082. 1805).

Prosopis juliflora (Sw.) DC. forma *arborea* L. Hauman, Anal. Mus. Nac. Buenos Aires 24: 391. 1913.

Prosopis fruticosa F. J. F. Meyen, Reise um die Erde . . . 1830–1832 1: 376, in obs. Berlin. 1834; Vogel, Leguminosae in Meyenii Obs. Bot., Nova Acta Acad. Leop.-Carol. Suppl. 2: 44. 1843.

Trees or large, erect, polypodial shrubs, 3–10 m. tall; hemispherical top with ultimate branchlets bent down, pendulous, flexuous and knotty in age; spines axillary, geminate, commonly small or absent but sometimes, on strong shoots, robust and to 3–4 cm. long; foliage light, deciduous, ample. Leaves uni- to trijugate, glabrous or scarcely puberulous; petiole (plus rachis when extant) 0.6–7.5 cm. long; pinnae 5–13 cm. long; leaflets linear, opposite, distant and medium-sized, 12 to 29 pairs per pinna, the distance between them on the rachis more than their own width or mostly several times larger, obtuse to subacute, cuneate or parallel-margined, 4–15 mm. long × 1–2 mm. broad, subcoriaceous, uninerved below or secondary veins slightly visible. Racemes spiciform, 4–14 cm. long, with ca. 200 flowers each, densiflorous and similar to those of related species, as are the florets. Legume nearly straight or subfalcate, 5–28 cm. long × 0.7–1.2 cm. broad, thick, subcompressed, submoniliform (margins undulate), straw-yellow, tinged with violet to nearly black-violet; joints subquadrate-rotund, hard, closed; pulp sweet, more or less developed.

DISTRIBUTION. Northern Chile (Atacama, Coquimbo) and Argentina, very common in the arid regions of the west, from Tucumán and Catamarca, through La Rioja, western Córdoba, San Juan, San Luis, and Mendoza, to La Pampa, Río Negro, and western Buenos Aires provinces. This area characterizes the species as a typical "Monte" tree, of much importance in the formation of open-desert forests along temporary rivers, with *Larrea* div. sp. (Zygophyllaceae), Cactaceae, etc. The species is sometimes found at elevations of 2200 m. in valleys of the Andes.

COMMON NAMES. Algarrobo, algarrobo dulce, algarrobo negro, algarrobo amarillo, panta negro, árbol negro, lámar, lámaro (Argentina); algarroba (Chile).

OBSERVATIONS. Chemical data on flavonoid content, obtained by Carman, indicate a close affinity of *Prosopis flexuosa* with other Argentine species of the same section (sect. ALGAROBIA), e.g., *P. caldenia* and *P. nigra*, but strong differences from the North American species *P. juliflora* and its allies.

SELECTED SPECIMENS EXAMINED. **Chile:** Dept. Atacama, Copiapó, *Werdermann 455* (GH, LIL, SI), *C. Jiles 2076* (LIL); Atacama, *Morong 1206*, Sept.–Oct. 1890 (NY); Copiapó, *Cabrera 11380* (SI); Dept. Coquimbo, Dept. Elqui, Casablanca, *R. Wagenknecht*, IX 1940, Univ. Calif. Andes Exped. *18564* (UC); Dept. Coquimbo, *Looser 4332, 4336, 4337, 4482* (SI). **Argentina.** TUCUMÁN: Dept. Tafí, Colalao del Valle, *Ruiz Leal 12319* (SI). CATAMARCA: Santa María, *Schulz 7328* (SI); Belén, *Sayago 1480, 1481, 1506, 1565, 1567, 1585, 1632* (SI); Andalgalá 1200 m. elev., *Parodi 14253* (SI); Andalgalá, Route 1, *Solbrig 4219* (GH, SI); Belén, *Ulibarri 583, 589* (SI); Ambato, *B. Vuilleumier 1024–1* (SI); Andalgalá, *Joergensen 1340* (SI); Capital, Choya, *Castillón* (LIL 54659, GH). LA RIOJA: Tello, *Ruiz Leal 17199* (SI); Ileal cerca de Olta, *Castellanos*, II 1940 (BA 33666, SI); Gral. Sarmiento, Cienaguita, Río Bonete, *J. H. Hunziker 2230* (MO); Gob. Gordillo, *Ruiz Leal 16500, 16584, 17141* (SI); R. Vera Peñaloza, *D. L. Anderson 1530* (SI); Villa Unión to Patquía, *B. Vuilleumier 2026–1–3* (TEX); Jagüel a Cortaderas, *Lorentz & Hieronymus 270* (CORD); Chilecito, *Covas 1333* (NY); Gral. Lavalle, Villa Unión, *T. Meyer 4145* (UC). SAN JUAN: Loc. (?), *A. P. Rodrigo* det. (LP, SI); San Agustín del Valle Fértil, *Bartlett 19539* (SI). MENDOZA: Dept. Lavalle, *Ruiz Leal 13838, 13842, 14522, 14533, 14539* (SI); La Paz, *Ruiz Leal 23357* (SI); Las Heras, Jocolí, *Semper 149* (NY); Ñacuñan Reservation, *Roig 5396* (SI); General Alvear, *Ruiz Leal 21744* (SI). SAN LUIS: Dept. Pringles, Trapiche, *Roig 5648, 5666* (SI); Capital, San Gerónimo, *Burkart 10701* (SI), *Anderson 1456* (SI); Margen Río Quinto al NW de Fraga, *F. Pastore 2072* (GH); Bajode de Velis, *Kurtz 8489* (NY), *Kurtz 8450* (CORD). CÓRDOBA: San Javier, *Sayago 1428, 1431, 1453* (SI); Villa Dolores, *Burkart 7578*; Villa Dolores a Chancaní, *A. T. Hunziker 11512, 11519* (SI). LA PAMPA: Parque Luro entre Santa Rosa y General Acha, *Burkart 20467*, *Boelcke & Nicora 7949* (SI); Epupel, *Solbrig 178* (SI); Santa Isabel, *Cabrera 4386* (LP, SI); between Telén and Colonia La Pastoril, *B. S. Vuilleumier 1205* (GH, SI). RÍO NEGRO: De Garay a Choele-Choel, *Burkart 15883* (SI). BUENOS AIRES: Adolfo Alsina, *Cabrera & Fabris 14808*, Carhué, *Burkart 4755*, Guaminí, *Nicora 4175*, Villarino, *Cabrera & Fabris 16429* (SI).

Prosopis flexuosa forma **subinermis** Burkart, forma nova.

Arbor spinis fere totus destitutus.

Trees totally or nearly unarmed. Bark (in the type) glaucous-reddish, smooth. Leaflets distant, 5–13 mm. long.

MATERIAL EXAMINED. **Argentina.** TUCUMÁN: Tafí, Amaicha del Valle, *Burkart 22058* (NY, SI). SAN JUAN: Calingasta a Barreal, entre La Isla y Sorocayense, *J. H. Hunziker 6451* (SI, typus formae). BUENOS AIRES: San Isidro, barranca del Río de la Plata en Acassuso, *Burkart 12735, 25587, 28239* (SI).

OBSERVATIONS. *Prosopis flexuosa* DC. is a variable species but well delimited. From *P. chilensis* it differs in its shorter leaflets, the smaller size of the tree, and the submoniliform legume; from *P. nigra* it differs in its longer and more distant leaflets; from *P. alba* it varies in its obtuse, more distant and less numerous leaflets and the submoniliform legume; and from *P. alpataco* it varies mainly in its tree habit.

Prosopis flexuosa shows affinity with the vicarious *P. laevigata*, *P. velutina*, and *P. glandulosa* in western North America. Again the main differences are found in the leaflets, which in the latter three species are more approximate on the rachis, or pubescent, or larger, respectively, than in *P. flexuosa*, as well as in legume differences and variation in other minor characters.

Nomenclaturally *Prosopis flexuosa* has to be considered as a species founded by De Candolle and not as a combination based on Lagasca's *Acacia flexuosa*, which, in spite of being based on the same plant, was a later homonym preoccupied by *Acacia flexuosa* Humboldt & Bonpland ex Willdenow.

Prosopis fruticosa Meyen is included here in the synonymy of *P. flexuosa* DC. for the first time. It is impossible to find any significant difference between them. Topotype material of Meyen's species (from Copiapó, Chile) has been examined.

USES. As in similar species, an important tree for shade, timber, firewood, food, and forage in semidesert conditions such as the Monte formation, where rainfall ranges from 50 mm. to 100 mm. per year.

40. **Prosopis glandulosa** Torrey, Ann. Lyceum Nat. Hist. New York 2: 192. *pl. 2*. 1827; Cocks, Leguminosae of Louisiana, Bull. Nat. Hist. Surv. Louisiana State Mus. 1: 1–26. *illustr.* New Orleans. 1910; Johnston, Brittonia 14: 82. 1962; Isely, Madroño 21: 290. 1972.

Algarobia glandulosa (Torrey) Cooper, "The Mezquite Bean" in The Scientific Press, San Francisco, Calif. 4 Nov. 1871.

Prosopis juliflora (Swartz) DC. var. *glandulosa* (Torrey) Cockerell, Bull. Agr. Exp. Sta. New Mexico **15**: 58. 1895; Jepson, Flora of California 2: 239. 1936; Benson, Am. Jour. Bot. **28**: 752. 1941; Standley, Contr. U. S. Natl. Herb. **23**(2): 353. 1922.

Prosopis juliflora (Swartz) DC. var. *constricta* Sargent, Trees & Shrubs 2: 249. *pl. 193*. 1913.

Prosopis chilensis (Molina) Stuntz var. *glandulosa* (Torrey) Standley, Contr. U. S. Natl. Herb. **23**(5): 1658. 1926.

Neltuma glandulosa (Torrey) Britton & Rose, N. Am. Fl. **23**(3): 186. 1928.

Neltuma constricta (Sargent) Britton & Rose, *Ibid.*

Neltuma neomexicana Britton, *Ibid. teste* Isely, Madroño **21**: 292. 1972; Benson, Am. Jour. Bot. **28**: 752. 1941.

ILLUSTRATIONS. C. S. Sargent, Silva N. Am. **3**: 101 (text, in part). *tab 136, 137*. New York, 1947. (sub *P. juliflora*); Svenson, Am. Jour. Bot. **33**: 453. *pl. 11, fig. 2*. 1946.

Tall shrub or tree of 3–9 m.; foliage deciduous; spines axillary, uninodal, 1–4.5 cm. long, mostly solitary, sometimes very few, or solitary and geminate alternately on different nodes of the same twig. Leaves glabrous, uni- or bijugate; petiole (with rachis when extant) 2–15 cm. long; pinnae 6–17 cm. long; leaflets 6 to 17 pairs, ca. 7–18 mm. distant on the rachis, linear or oblong, obtuse, glabrous, subcoriaceous, prominently veined below, costa frequently of lighter color, (1.5–)2–6.3 cm. long × 1.5–4.5 mm. broad, 5 to 15 times as long as broad. Racemes spiciform as usual, ca. 5–14 cm. long, multiflorous; petals 2.5–3.5 mm. long; ovary stipitate, villous. Legume straight, 8–20 cm. long × 0.7–1.3 cm. broad, rarely subfalcate, compressed to subterete, submoniliform, glabrous, straw-yellow or tinged with violet, short-stiped, with strong, short, or elongate acumen, ca. 5–18-seeded; joints subquadrate to oval; seeds oblique to longitudinal.

DISTRIBUTION. Southwestern United States and Mexico.

COMMON NAMES. Honey mesquite; mesquite. In India: bilayati kikar (Punjab).

SELECTED MATERIAL EXAMINED. **U.S.A.** CALIFORNIA: Inyo Co., Furnace Range, *Train 653* (SI). OKLAHOMA: Major Co., *Goodman & Waterfall 4212* (NY); Woods Co., *S. Stephens 21639* (NY), *G. W. Stevens 580* (MO); Wichita Mountain, *Robbins 2854* (NY); Cimarron Co., Kenton, *Rogers 5936* (US). KANSAS: Stokes Hill, *L. F. W.*, 15 IX 1897 (US); Comanche Co., *R. S. Kellogg*, 27 VII 1903 (US). NEVADA: Las Vegas, *Arsène 18892* (R). NEW MEXICO: Dog Springs, *Mearns 2325* (NY, type of *Neltuma neomexicana*); Logan, *Bailey 498, 499* (US); Western Plains to El Paso, *Wright 155* (US); Socorro Co., Truth, *B. Vogel*, 8 VI 1962 (COLO). TEXAS: *Lindheimer II-233, III-382* (MO, US); *M. A. Carleton*, 1891 (SI 5472, US); Laredo, *Heddle 2794* (SI), *Lundell 13801* (US), *Guerra et al. 613*, *Botello & Ayala 32*, *Ramos & Murillo 96* (COLO); Reeves Co., Pecos City, *H. Eggert*, 5 VII 1900 (MO); Hood Co., Granbury, *E. J. Palmer 6514* (MO); Taylor Co., NW of Abilene, *Mahler 3619* (MO); Grayson Co., Denison, *E. J. Palmer 14274* (MO); Dallas, *Stephenson 240*, *Reverchon 4331* (US), *Lundell & Lundell 85* (US), *8571* (TEX); Presidio Co., *Hinckley 1509* (NY); Pecos Co., *Cory 51939* (US), *Tharp 43610* (SI, US), *43660* (SI); Childvess, *Coville 1851* (US); Brownsville, *H. S. Barber* (US); *H. S. Gentry 6683* (US); Tom Green Co., *Tweedy 87* (US); Austin, *Tharp 8520* (US), Standley, *A. Ruth 16* (SI); Calhoun Co., Port Lavaca, *Cory 51122* (US), *Fisher 41081* (LIL, SI); Willacy Co., *M. C. Johnston 54542*, Winckler Co., *Stuessy 150* (TEX); Kleberg Co., *M. C. Johnston 54360* (COLO); Laredo, *C. J. Lundell 13801* (TEX); Uvalde Co., *C. W. Johnson 50–126* (LIL); San Antonio, *Burr 318* (LIL); Laredo, *Chute M-3* (MEXU); Dallas Co., *Wagner 77* (TEX); Uvalde Co., *Johnston & Muller 2* (TEX); Texas, without further locality, *Ledingham 466* (NY). **Mexico:** Coahuila, Saltillo, *E. Palmer 26* (UC); Saltillo, road to Torreón, *S. S. White 1668* (SI); Coahuila, *Gentry et al. 20041*, *Rose & Hay 5250* (US), *Wynd 741* (US); Coahuila, Sabinas, *M. C. Johnston 5886* (MEXU); Tamaulipas, *Goldman 729* (US); Chihuahua, Santa Eulalia, *Wilkinson*, 11 VII 1885 (US); Vera Cruz, Pueblo Viejo, *E. Palmer 550, pro parte* (US); Yucatán, Progreso, *Goldman 605* (US); Nuevo León, S of Monterrey, *M. C. Johnston 5301* (MEXU). **Puerto Rico:** planted, *Britton & Britton 9056*

(NY). **South Arabia:** Aden, *Mearns 9* (US). **Burma:** Mandalay, cultivated, *O. E. White 388* (UC, US). **India:** Punjab, salt range, Camp Kusah, *Bis Ram 838* (GH). **Pakistan:** Karachi University, cultivated, *S. M. Ashra Fridi 80* (MO). **Australia:** Queensland, Darling Downs District, Yandilla, *S. L. Everist*, 28 V 1953 (GH, US).

USES. Similar to those of related species; according to Howes (Vegetable Gums and Resins 65. *fig. 11.* 1949 (sub *P. juliflora*)), the most important gum-producing plant in North America.

Prosopis glandulosa var. **torreyana** (Benson) Johnston, Brittonia **14**: 82. 1962; Isely, Madroño **21**: 293. 1972.

Prosopis juliflora (Sw.) DC. var. *torreyana* Benson, Am. Jour. Bot. **28**: 751. *fig. 4.* 1941.

General habit like that of var. *glandulosa*; spines equal, solitary or paired on the same branchlet; flowering twigs often without spines. Leaves glabrous, unijugate, rarely bijugate; petiole (including rachis when extant) 1–8 cm. long; pinnae elongate, 8 to 24 pairs, 5–8 mm. distant on the rachis, but often less than in the type variety; leaflets linear, mucronulate, glabrous, 0.7–2.5 cm. long (mostly 1.5–2.5 cm.) × 1.5–6 mm. broad, 5 to 9 times as long as broad, prominently veined below. Racemes and flowers as usual; rachis to 12 cm. long. Legume straight, compressed, thickly submoniliform or subtorulose, 7–18 cm. long × 0.7–1.1 cm. broad, glabrous, yellow, often violet-tinged; seeds oval, 6–7 mm. long.

DISTRIBUTION. Southwestern United States, Mexico. See discussions by Johnston (1962) and Isely (1972), cited above.

COMMON NAMES. Western honey mesquite; mesquite.

MATERIAL EXAMINED. **United States.** NEVADA: Clark Co., Lees Canyon, *Balls & Straw 19298* (LIL); Nevada, without further locality, *Clokey 8396* (LIL, MO). CALIFORNIA: S. Bernardino Co., *Munz 15552*; Imperial Co., Colorado Desert, *Johansen & Ewan 7135* (SI); Death Valley, *Solbrig 2304* (SI). ARIZONA: Apache Junction, *Gillespie 8441*, Mohave Co., Vulcans Throne, *Cottam 13017*, Yuma, *E. O. Wooton*, fl., 21 IV 1913, Chiricahua Mts., *Blumer 1255*, Cochise Co., Portal, *Eggleston 10958* (COLO). ARIZONA: Coconino Co., *Clover 5085* (SI). NEW MEXICO: 34 miles E of Engle, *Cutler 2018* (MO, SI). TEXAS: Presidio Co., *Hinckley 1476*, *Cory 53581* (SI); Rio Grande, 6 miles E of Castolon, Brewster Co., *Cutler 1874* (SI), *Thompson 52–225* (LIL); Pecos Co., Fort Stockton, *Cory 51939* (SI). **Mexico:** Baja California, *Wiggins & Gillespie 4051*, Cabo S. Lucas, *Shreve 7259*, La Ventana a S. Antonio, *Carter 2642* (US); Vera Cruz, Pueblo Viejo, *E. Palmer 550, pro parte* (US); Coahuila, La Ventana, *Nelson 3931* (US); Sonora, Las Bocas, coastal, sandy flat xerophytic tree-cactus forest, *Solbrig 4402 & Ornduff* (SI).

Prosopis glandulosa var. **prostrata** Burkart, var. nov.

A var. *glandulosa* differt solummodo habitu prostrato, caulibus subterraneis horizontalibus validis longaevis, ramis aereis prostratis, haud vel rarius tarde arboreis.

TYPUS VARIETATIS: Texas, Kleberg County, western part of Laureles Division of King Ranch, black clay, prairie with much "running mesquite," *M. C. Johnston 54359*, fl., 15 IV 1954 (COLO).

Similar to var. *glandulosa*, but prostrate with strong underground, horizontal branches; aerial branching prostrate, never or only seldom and slowly becoming arborescent; spines seen 0.7–2 cm. long; solitary twigs reddish. Leaves unijugate, as in var. *glandulosa*.

COMMON NAMES. Running mesquite; in Spanish (Mexico), mesquite rastrero.

DISTRIBUTION. U.S.A. (Texas); Mexico (Tamaulipas).

OBSERVATIONS. Already well characterized, but not described, by M. C. Johnston in his important paper on North American Algarobiae (Brittonia 14: 76, 77. 1962). A parallel variation exists in *Prosopis laevigata*, according to Johnston, but I have not seen such material.

This is an impressive case of an arborescent *versus* shrubby habit in very closely related species, exemplified in South America by the similar, vicarious species-pair *Prosopis flexuosa* (arboreous) and *P. alpataco* (shrubby).

In the specimen *H. von Schrenk 45* (MO), from Marathon, Brewster Co., Texas, of var. *glandulosa*, there are visible transitions between the normal axillary spines and lateral shoots, as I found earlier in Argentine species of sect. ALGAROBIA, ser. Chilenses (Burkart, Darwiniana, 1937).

41. **Prosopis alpataco** R. A. Philippi, Sertum Mendocinum, Anal. Univ. Chile 21: 394. 1862; Philippi, Linnaea 33: 62. 1864; Burkart, Darwiniana 4: 108. *pl. 23*. 1940; Burkart, in Cabrera, Fl. Prov. Buenos Aires 3: 430. *fig. 134, A–B*. 1967.

Prosopis stenoloba Philippi, Catal, praev. plant. Tarapacá, Anal. Mus. Nac. Chile, 2nd. sect. Bot. 20. 1891.

Prosopis juliflora (Swartz) DC. forma *fruticosa* Hauman, Anal. Mus. Nac. Buenos Aires 24: 391. 1913.

Prosopis alba Grisebach forma *fruticosa* (Hauman) Monticelli, Lilloa 3: 347. 1938.

Shrub, spiny, glabrous, 20 cm.–3 m. tall; aerial shoots commonly thin, erect, flexuous, dispersed over a round surface up to 10 m. in diameter, starting from thick, horizontal, subterranean branches which do not develop adventitious roots but spread from a central, primary, axonomorphic, vertical tap root; spines axillary, geminate, uninodal, 0.3–6 cm. long, sometimes solitary or members of an unlike pair (one spine smaller). Leaves uni- to rarely bijugate, lax, deciduous; petiole (including rachis when extant) 0.7–9.5 cm. long; pinnae 3–14 cm. long, often arched when dry; leaflets linear, distant, 9–17(–25) pairs per pinna, opposite, mostly glabrous, obtuse or subacute, 0.5–1.7(–3) cm. long (1–1.1 cm. in the type specimen) × 0.9–1.5(–3.5) mm. broad, subcoriaceous; veins little de-

veloped below. Racemes dense, ca. 6–14 cm. long; peduncle short. Legume linear, compressed, straight, subfalcate or rarely subannular or S-shaped, with parallel sutures, or undulate and submoniliform; stipe and acumen very short, straw-yellow in the typical form but frequently violet-tinged, 7–17 cm. long × 0.6–1.2 cm. broad × ca. 0.5 cm. thick; pulp scarce, bitter or sometimes sweet; endocarp articles 8 to 18, indehiscent, hard, subquadrate to ovoid, ca. 8.5–11 mm. long × 9–10 mm. broad.

DISTRIBUTION. West-central Argentina, especially in the arid so-called "Monte" Province, characterized by *Larrea* species.

COMMON NAME. Alpataco, from the Indian alpa (earth) and taku (carob tree), indicating the subterranean growth of the main branches; sometimes lámaro (San Juan, Mendoza), used more often for *P. flexuosa*.

NEW MATERIAL EXAMINED. **Argentina.** LA RIOJA: Rosario vera Peñaloza, *Piccinini & Leguizamón 1710* (BAB, SI), Salinas de Macasín, *Sayago 2428* (SI). SAN JUAN: Calingasta, La Isla, *Mireya Vila 6*, Angaco Sud, *J. C. Tinto*, Herb. Forestal *2011* (SI); S. Juan a Calingasta, *Sayago 2440* (SI); Dept. Iglesia, *J. H. Hunziker & O. Caso 4675, 4682, 4683, 4692* (SI); Camino S. Juan a Mendoza, Media Agua, *Nicora 4297* (SI). MENDOZA: Cerro de la Gloria, *Mexía 4374* (GH, MO); Luján de Cuyo, *Semper 133* (NY), *Biloni M-105* (SI); Maipú, médanos, *Ruiz Leal 9930* (SI), *Bartlett 19360* (GH); Las Heras, *Semper 214* (NY); Uspallata, *Covas 15060, 15108* (SI); Borbollón, *J. H. Hunziker 3159* (BAB, SI), *Krapovickas & Cristóbal 14606* (CTES, SI); Río Atuel, *Kurtz 7448* (CORD, R); Rivadavia, *Ruiz Leal 10592* (SI); San Rafael, El Cerrito, *Bartlett 19445* (GH); Volcán Diamante, *Ruiz Leal 17006* (SI), *Martínez Crovetto & Piccinini 6269* (BAB, SI), *Boelcke et al. 15524* (BAB, SI); La Paz, *Ruiz Leal 9451, 11825* (SI); Dept. Lavalle, *Ruiz Leal 13840, 14523* (SI); Malargüe, *Ancibor, Cano, & Crespo* (BAB 90122, SI), *Burkart, Troncoso, & Nicora 14144–14146* (LIL, SI); Las Heras a Lavalle, *Ruiz Leal 9796* (LIL); Mendoza, without further locality, *Semper 239* (NY). NEUQUÉN: Plaza Huincul, *Cabrera 11006, 11059* (LP, SI); Añelo, *Morello 10, 12* (SI); Buta Ranquil, 1100 m. elev., *Ruiz Leal 22391* (SI); Confluencia, *O'Donell 1874* (GH). CÓRDOBA: General Roca, Huinca Renancó, *A. T. Hunziker 9383* (SI); General Roca, Villa Huidobro, Cañada Verde, *Schulz 6005* (LIL). SAN LUIS: sierra, *A. T. Hunziker 9304* (SI); Nueva Escocia, médanos, *Burkart 10850* (SI); San Luis, without further locality, *Covas 1087* (NY). LA PAMPA: Limay Mahuida La Reforma sobre el Río Salado, *Solbrig 189*, General Acha, *Solbrig 180* (SI); Realicó, *Schulz 5860* (LIL, NY, SI); Laguna La Amarga, *Burkart 15952* (SI); Río Colorado frente a J. de Garay, *Burkart 15860* (SI). RÍO NEGRO: Valcheta, *T. Meyer 7194* (LIL), *7220*, Nihuel Niyén, *T. Meyer 7258* (SI); Chelforó, orillas Río Negro, *Mroginski & Fernández 22575* (SI); San Antonio Oeste, Correo, *Movia & Mendonza 2565* (SI); Choele-Choel, *Cabrera 18619* (SI); General Roca, *Soriano 1240* (SI); Oeste de Río Colorado, *Burkart 15845* (SI); Pichi Mahuida Río Colorado, *O'Donell 1535* (NY). CHUBUT: Puerto Madryn, *Crespo & Troncoso 1588, 1593* (SI); Travesía de Rawson a la Cordillera, *Illín 188* (UC). BUENOS AIRES: Bahía Blanca, *Grünbein, Fabris, & Schwabe 4835* (SI); L. Rosales, Pehuen-Co., dunas, *Burkart 25629*, *Cabrera & Fabris 14915*, *Boelcke et al. 11939* (SI); Villarino, Médanos, *Boelcke et al. 11774, 11794*, *Burkart 25650* (SI); Pedro Luro, *Bartlett 19925, 19926* (SI); Patagones, La Pantanosa, *Krapovickas 1979* (LIL, SI); Carmen de Patagones, *T. Meyer 6989* (GH, LIL, SI), *Boelcke 1673*, *Soriano 1568* (SI).

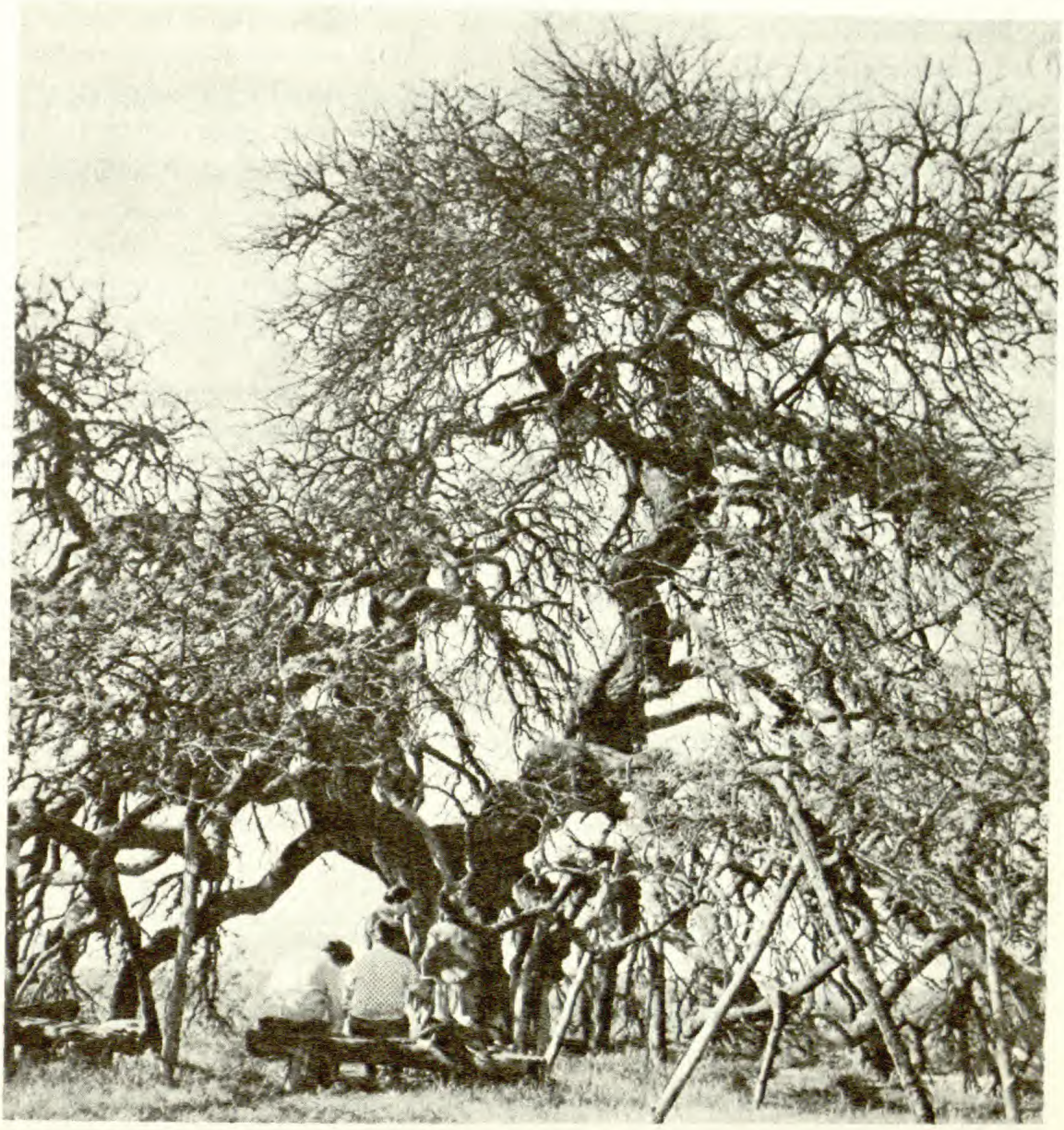


FIGURE 12. **Prosopis.** A specimen tree of *P. alba*, approximately 200 years old and probably a relic of the primitive forest. This tree, growing in the Quinta Pueyrredón, barranca of San Isidro, Prov. Buenos Aires, Argentina, has been named a national monument. It was under this tree that the generals San Martín and Pueyrredón conferred in 1816 to formulate a plan for liberating the country. *Photo.* from the newspaper *La Prensa* of Buenos Aires, March 26, 1961.

OBSERVATIONS. *Prosopis alpataco* is a widespread and characteristic endemic in western Argentina, mainly recognizable by its shrubby habit with underground branches, otherwise very close to *P. flexuosa* DC., which grows in the same Monte region, but is arboreal. *Prosopis alpataco* is somewhat variable in its fruit and foliage, but it does not seem rewarding to distinguish varieties.

C. Muñoz Pizarro, Syn. Fl. Chile 153. *pl. 133.* 1959, mentions *Prosopis alpataco* from northern Chile, giving a good illustration. I venture to think

that this material is *P. flexuosa* DC. (formerly described from that region as *P. fruticosa* Meyen).

Some large-leaved forms of *Prosopis alpataco* show great similarity with *P. glandulosa* from western North America, but with herbarium material it is difficult to ascertain identity in habit and fruit characters, which seem to mark the differences. This similarity is the reason why authors repeatedly cited *P. juliflora* for both regions; see P. C. Standley, Jour. Washington Acad. Sci. 6: 239. 1916, where *P. juliflora* is mentioned doubtfully for Río Negro, Argentina, and is compared with *P. glandulosa* Torrey from New Mexico.

42. **Prosopis alba** Grisebach, Plantae Lorentzianae in Abh. Kön. Ges. Wiss. Göttingen 19: 83. 1874; Grisebach, Symb. Fl. Arg. *Ibid.* 24: 118. 1879; Hieronymus, Icones et Descript. Plant. R. Argent., Actas Acad. Ci. Córdoba 2(1): 5. *pl. 1.* 1886; Burkart, Darwiniana 4: 119. *fig. 14, pl. 19.* 1940; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 132 *et passim.* 1952; Tortorelli, Maderas y Bosques Argentinos 392. Buenos Aires. 1956; Burkart in Cabrera, Fl. Prov. Buenos Aires 3: 429. 1967.

Prosopis siliquastrum (Cav.) DC. var. *longisiliqua* Philippi, Catalog. praev. plant. Tarapacá, Anal. Mus. Nac. Chile, 2nd sect. Bot. 20. 1891.

Prosopis atacamensis Philippi, Anal. Univ. Santiago (Chile) 84: 444. 1894; Burkart, Darwiniana 4: 119. 1940.

Tree 5–15 m. tall, in age the short trunk possibly reaching 1 m. in diameter; treetop rounded; branchlets drooping; spines scarce and small, only on strong shoots, 2–4 cm. long, geminate. Leaves rather large, uni- to trijugate, glabrous; petiole (including the rachis) 0.5–8 cm. long; pinnae 6–14 cm. long, with 25 to 50 pairs of leaflets, these linear, acute or subacute, in some forms nearly obtuse, 0.5–1.7 cm. long × 1–2 mm. broad, scarcely nerved below, approximate, 1.5–6 mm. between pairs. Racemes spikelike as in similar species, 7–11 cm. long; florets greenish-white to yellowish, small; calyx 1 mm. long, puberulous; corolla 3–3.2 mm.; stamens 4.5 mm.; pistil 5 mm. long. Legume falcate to ring-shaped (ring ca. 7 cm. in diameter), linear, compressed with parallel margins, straw-yellow, stipitate and acuminate, 12–25 cm. long × 11–20 mm. broad × 4–5 mm. thick, with 12 to 30 subquadrate endocarp segments broader than long, ca. 0.6 × 1 cm.

DISTRIBUTION. Plains of subtropical Argentina to Uruguay, Paraguay, southern Bolivia, to Peru.

COMMON NAMES. Algarrobo blanco; igopé or ibopé-pará (Guaraní).

NEW MATERIAL EXAMINED. **Bolivia:** La Paz, Río Abajo, *Buchtien 3187*, 2700 m. elev. (NY). **Argentina.** JUJUY: Yuto, *Carmelich, Devoto, & Rial Alberti*, Herb. Forestal *584* (SI); San Pedro, *Devoto & Rial Alberti*, Herb. Forestal *565* (SI). SALTA: Saucelito, *Ragonese & Cozzo*, Herb. Forestal *2630*; Jaquiasmé, *Devoto & Rial Alberti*, Herb. Forestal *1137*, *1143* (SI); El Fraile a Alemanía,

Schulz 11480, Hickmann, Pozo El Milagro, *Maruñak et al. 544* (SI); Rosario de la Frontera, *Burkart 20371* (SI); Dept. S. Carlos, Angastaco, *Krapovickas & Cristóbal 20640* (SI); Ruta 9, Río Juramento, *T. Meyer 22644* (SI); Curtiembre a Peña de Testa, 1300 m. elev., *Meyer & Legname 23137* (LIL, NY). SANTIAGO DEL ESTERO: Dept. Robles, Beltrán, *Maldonado 476*, *B. Vuilleumier 1031–1*, Beltrán, *B. Vuilleumier 1031–5* (SI); Colonia Giménez, *Lima 1387* (LIL); Capital, *T. Meyer 6883* (GH); La Banda, *García 815* (UC); Parque Aguirre, *López 1* (SI). CÓRDOBA: Dept. Río Seco, Villa Candelaria, *Sayago 54*; Calamuchita, *Sayago 3674*, *3675* (SI); Capital, *Báez 29*, Observatorio, *J. H. Hunziker 2648* (SI); Dept. Río I., La Posta, *Sayago 1706* (SI); San Justo, Vacas Blancas, *Sayago 3635–37* (SI); S. Francisco del Chañar, *Balegno 333* (NY); Villa María, *B. S. Simpson 1039* (GH, SI, TEX). SAN LUIS: Quines, *J. R. Báez*, I 1941, Aguada de Pueyrredón, *Báez 17* (SI); Bajo de Velis, *Kurtz 8450* (R). FORMOSA: E. del Campo, *Maradona 2*, *51* (SI); Dept. Patiño, *Palacios 314*, *315*, *317*, *323*, *329*, *330*, *464*, *488* (SI); Pirané, *Morel 327* (SI); Mojón de Fierro, *Krapovickas 1088* (SI); Formosa, without further locality, *Rojas 12258* (NY). CHACO: Resistencia y Colonia Benítez, *Schulz 1339*, *1346*, *11320* (SI), *Martínez et al.* (BAA 9418, 9596). SANTA FE: Vera, *Burkart 5929*; Videla, *Courault & Ragonese 2074*, Malabrigo, *Burkart 5928*, *5936*, Reconquista, *Burkart 5932* (SI). CORRIENTES: Dept. Saladas, Río S. Lorenzo, *Schwarz 9095* (SI); Empedrado, *Pedersen 3051* (NY). ENTRE RÍOS: Paraná, *T. Meyer 10028* (LIL); La Paz, *Burkart et al. 23355* (SI); Victoria, barrancas, *Burkart 8603*, *8672*, *17719*, *17673*, *17686* (SI). BUENOS AIRES: Partido Baradero, Alsina, *Krapovickas 3311* (LIL, SI, SP). **Uruguay:** Montevideo, cultivated(?), *Fruchard*, X 1876 (NY).

Prosopis alba var. **panta** Grisebach, Symb. Fl. Arg. in Abh. Kön. Ges. Wiss. Göttingen **24**: 118. 1879; Burkart, Darwiniana **4**: 121. *lám. 20*. 1940.

Prosopis panta (Grisebach) Hieronymus, Bol. Acad. Nac. Ci. Córdoba **4**: 284. 1882.

Prosopis alba var. *panta* is distinguished from var. *alba* mainly by the nearly straight legumes, but there is a marked variation in foliage, so that with better studies another variety may be established, characterized by larger and more obtuse leaflets, reddish branchlets and sometimes very large legumes. This form predominates in northwestern Argentina and enters southern Bolivia; in the eastern Gran Chaco and Paraguay a form with smaller leaflets is common.

Legumes up to 30 cm. long × 1.8 cm. broad, fleshy, sweet, of the best kind for food or forage.

COMMON NAMES. Algarrobo panta; algarrobo impanta.

MATERIAL EXAMINED. **Peru:** Dept. Huancavelica, Prov. Tayacaja, Mayocc, *Tovar 4835* (SI). **Bolivia:** Tarija, Cercado, 1900 m. elev., *T. Meyer 17964* (LIL, SI). Tarija a Padcaya, 2000 m. elev., *Meyer, Legname & Cuezzo 22960*, *22962* (LIL); Songo, *Bang 823* (NY, MO); Bolivia, loc(?), *Weddell 1848*, *Bois* no. *VIII*, *Catal. 4814* (P, SI). **Argentina:** JUJUY: Yuto, *Carmelich & Rial Alberti*, Herb. Forestal *580* (SI). SALTA: Lomas de Olmedo, *Devoto & Rial Alberti 2367* (SI); La Zorra, *Carmelich et al. 1012*; Montealto, Orán, *Rodríguez 1152* (SI); Coronel Moldes, *T. Meyer 3548* (GH, UC); Hickmann, Pozo El Milagro, *Maru-*

ñak et al. 547, Coronel Cornejo, *Maruñak et al. 581* (SI); Valle de Lerma, Cerrillos, *Parodi 13521* (SI). TUCUMÁN: Tiopunco, 2000 m. elev., *R. Schreiter* (LIL 54713/14 in SI, form with blackish pods called "panta negra"). CÓRDOBA: Dept. San Justo, Marull, *Sayago 1691* (SI); San Luis, Quines, *J. R. Báez*, I 1941 (SI 26984). CHACO: Colonia Benítez near Resistencia, *A. G. Schulz 1340–1344, 1347* (SI). CORRIENTES: Dept. Concepción, *Cano & Cámara 751* (BAA), *Cano 2131* (BAB); San Luis del Palmar, *Quarin et al. 537* (ENCB, SI); Mburucuyá, *Pedersen 1412* (MO). SANTE FE: northern part, Vera and Malabrigo, *Burkart 5904, 5930, 5937* (SI). ENTRE RÍOS: Paraná, Parque San Martín, *Báez 7, 8, Doello Jurado*, IV 1939 (BA 32039, SI). **Paraguay:** Sector Puerto Casado, Km. 160, *Rojas 8452* (SI); Sector Lopez de Filippis, Chaco paraguayo, *Rojas 8407, 8314a, 8418, 8437* (SI).

USES. A very important tree in arid lands, similar in value to *Prosopis chilensis*, *P. nigra*, or *P. pallida*. In northeastern Argentina native people frequently call it "el árbol," the tree, because of its usefulness and abundance. It is cultivated to a limited extent. (For Argentina, see Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 135. 1952 (Ing. Castañeda Vega in the plains of Prov. Córdoba); for northern Chile, see H. Medina, Rev. Arg. Agron. **8**: 25–48. 1941.) In the Chaco it furnishes timber of high value for construction, doors, premanufactured houses, etc. Trees with straight trunks 8 to 10 m. tall occur, but these are becoming extremely rare, from being cut in preference to the other shorter ones. Thus a negative, artificial selection is taking place, which shoud be counteracted by genetic up-building of the best lines in experimental plots. (Information on uses in the Chaco was furnished by Dr. Augusto C. Schulz, Colonia Benítez, Chaco).

43. **Prosopis velutina** Wooton, Bull. Torrey Bot. Club **25**: 456. 1898; Johnston, Brittonia **14**: 86. 1962; Isely, Madroño **21**: 295. 1972.

Prosopis juliflora (Sw.) DC. var. *velutina* (Wooton) Sargent, Silva N. Am. **13**: 15. 1902; Standley, Trees and Shrubs of Mexico, Contr. U. S. Natl. Herb. **23**(2): 353. 1922; Benson, Am. Jour. Bot. **28**: 750. 1941.

Prosopis chilensis (Mol.) Stuntz var. *velutina* (Wooton) Standley, Additions and Corrections, Trees and Shrubs of Mexico, Contr. U. S. Natl. Herb. **23**(5): 1658. 1926.

Neltuma velutina (Wooton) Britton & Rose, N. Am. Fl. **23**(3): 186. 1928.

Tree up to 15 m. high; trunk short; spines axillary, geminate, 1–2 cm. long, all vegetative parts more or less pubescent. Leaves uni- to bi- (or tri-)jugate, puberulous; petiole plus rachis, when extant, 0.6–6 cm. long × 0.8–1.2 mm. in diameter; pinnae 2–9 cm. long; leaflets oblong, pubescent, ciliolate, 12 to 30 pairs per pinna, approximate, obtuse, nervate below, coriaceous, 4–13 mm. long × 2–4 mm. broad (3.5 to 4 times as long as broad). Racemes spikelike, 5–15 cm. long; florets short-pedicelled, somewhat pubescent outside, especially on the calyx; petals 2.5 mm. long, the tip villous within. Legume linear, 8–16 cm. long × 6–10 mm. broad, flattened, straight or falcate; margins shallowly undulate, the stipe 2–10 mm., the beak 2–11 mm. long, legume "very velutinous when young and

pubescent even in age"; endocarp segments ca. 10 to 17, ovoid-subquadrate, about as long as broad; seeds ovate, 5–7 mm. long; sometimes the legume smaller, compressed-moniliform, and reddish, in what may be a variety or a *P. articulata* introgression (*White 402*, GH).

DISTRIBUTION. Mexico, NW states (Sonora); rare in neighboring United States (Arizona).

COMMON NAMES. Velvet mesquite; mesquite.

MATERIAL EXAMINED. **Mexico:** Sonora, Mexican Boundary Survey 300*a*, between Colorado and Santa Cruz rivers, *Schott* (NY); Hermosillo a Tastiota, El Zapo, *Wiggins & Rollins 277* (LIL, NY); NE Sonora, Monctezuma, *S. S. White 402* (GH); Sonora, Pesqueira, *Maltby 247* (TEX). **United States.** ARIZONA: Cochise Co., *B. Vuilleumier 2228–1* (TEX); Fort Huachuca, *Wilcox*, V 1892, Hallup, *Pringle*, 3 VIII 1894 (NY); Pima Co., Pantano Wash, N of Vail, *Venrick 549* (MO); Tucson, Pima Co., *Warren & Turner 68–157* (ENCB); Tucson, *Ehlers & Ehlers 6396* (MEXU); Coconino Co., *Demaree 44311* (NY); Ajo, S. Maricopa Co., *Rossbach 5046* (R); valley near Camp Lowell, *Pringle*, May 13, 1883, sub *P. juliflora* (SGO); Arizona, without further locality, *Pringle 13665*, 23 IV 1881, lectotype selected by Britton and Rose (Mimosaceae in N. Am. Fl. 23(3): 186. 1928) (MO, NY). **Australia** (cultivated plants): N. S. Wales, Broken Hill S., *Garvick 4* (US); Queensland, Warrego District, Comougin, *Everist 5902* (US); N. S. Wales, Trangie Exp. Farm, *Whittet 10581* (US).

44. **Prosopis pugionata** Burkart, Darwiniana 9: 70. *figs. 1–3*. 1949; Burkart, Las Leguminosas Argentinas, silvestres y cultivadas. ed. 2. 131. 1952.

Tree 2–8 m. high, glabrous, very spiny; trunk 1.5–2 m. long, ca. 20–30 cm. in diameter; bark dark, rugose; top rounded; branchlets flexuous; spines axillary, uninodal, geminate, conic-subulate, strong, smooth, on vigorous shoots 2–9.5 cm. long × 7 mm. in basal diameter without strangulation at base, on weak shoots much smaller or absent; foliage light, deciduous. Leaves uni- or bijugate, ample, mostly fascicled; petiole 0.5–2 cm.; pinnae 1.5–6.5 cm. long; leaflets linear, glabrous, opposite, 11 to 25 pairs per pinna, distant on the rachis (1–6 mm.), 3.5–8(–10) mm. long × 0.6–1 mm. broad, obtuse or subacute, unicostate; lateral nerves not visible. Racemes as in similar species of sect. ALGAROBIA, 8–9 cm. long; florets nearly glabrous outside; petals 3 mm. long, their tips villous within; ovary villous. Legume linear, compressed, submoniliform, tinged with violet, straight, 9–11.5 cm. long × 8–10 mm. broad, edible, with 12 to 16 subquadrate to ovate endocarp segments.

DISTRIBUTION. West-central Argentina, especially in the region around the Salinas Grandes.

COMMON NAMES. Algarrobo de las Salinas; alpataco; algarrobo.

MATERIAL EXAMINED. **Argentina.** CÓRDOBA: Dept. Tulumba, La Majadilla a La Esperanza, *Sayago 1685* (CORD, SI); San José, *Sayago 2626, 2627* (SI); Dept. Pocho, Sierra de Pocho frente a Chancaní, *Sayago 1442, 1443* (SI); Chan-

caní, *Ragonese 9331* (BAA, SI); Dept. Pocho o San Alberto, camino de Villa Dolores a Chancaní, *A. T. Hunziker 12930, 11510* (CORD, SI); Dept. Tulumba, N of Quilino, Ruta 60, Km. 880, *B. Timmermann*, 30 IX 1972 (TEX). LA RIOJA: Dept. Rivadavia, estancia La Esperanza, *C. D. Ocampo*, VIII 1955 (CORD); Dept. R. Vera Peñaloza, de Chepes hacia San Juan, *A. T. Hunziker 12255* (SI). CATAMARCA: Dept. Capital, *E. A. Ulibarri 493* (SI). SAN JUAN: Dept. Iglesia, SW of Rodeo, *Bartlett 20541* (SI). SAN LUIS: Dept. Belgrano, Hualtarán, *Anderson 1399* (SI).

OBSERVATIONS. This species is closely related to *Prosopis flexuosa* DC., which has short spines and broader leaflets; *P. alpataco* Philippi, with shrubby habit and underground branching; and *P. horrida* Kunth, with bi- or trijugate leaves and broad leaflets, characters which separate *P. pugionata* also from *P. nigra* (Grisebach) Hieronymus.

NAMES OF SPECIES EXCLUDED FROM PROSOPIS

Prosopis adstringens Steudel = **Acacia atramentaria** Bentham
P. benthami Chodat & Wilczek = **Prosopidastrum globosum** (Hooker & Arnott) Burkart
P. bonplandiana (Kunth) Sprengel = **Entada polystachya** DC.
P. dubia Guillemin & Perrottet = **Acacia sieberiana** DC.
P. dubia H.B.K. = **Enterolobium cyclocarpum** Grisebach
P. elegans Sprengel = **Piptadenia** spp., **P. rigida** Bentham vel **P. trisperma** Bentham
P. elephantorrhiza Sprengel = **Elephantorrhiza burchelli** Bentham
P. ephedroides Gillies ex Hooker & Arnott = **Mimosa ephedroides** Bentham
P. esquirolii H. Léveillé = **Pterolobium punctatum** Hemsley
P. faeculifera Desvaux = **Parkia africana** R. Brown
P. gilliesii Mackloskie = **Caesalpinia gilliesii** Wallich ex Hooker
P. globosa Gillies ex Hooker & Arnott = **Prosopidastrum globosum** (Hooker & Arnott) Burkart
P. globosa var. *mexicana* Dressler = **Prosopidastrum mexicanum** (Dressler) Burkart
P. herzogii Harms = **Parapiptadenia** cf. **excelsa** (Grisebach) Burkart
P. heterophylla Bentham = **Acacia willardiana** Rose
P. insularum (Guillemin) Breteler, Acta Bot. Neerl. **9**: 397–403. 1960 = **Schleinitzia insularum** (Guillemin) Burkart, comb. nov., based on *Acacia insularum* Guillemin, Ann. Sci. Nat. Paris II. **7**: 360. 1837.
P. fischeri Taubert = **Pseudoprosopis fischeri** (Taubert) Harms
P. kirkii Oliver = **Acacia albida** Delile
P. microphylla H.B.K. = **Acacia tortuosa** Willdenow
P. odorata Torrey & Fremont, 1845. The type material was a mixture of flowering twigs of *P. glandulosa* (so *P. odorata* becomes its synonym) with added legumes of *P. pubescens* Bentham. See Benson, Madroño **15**: 53. 1959.[4]

[4] Professor Burkart seems to have accepted the statement of Torrey concerning the composition of Fremont's collection and its identification. Benson's 1959 conclusions and Isley's statement of 1972 (Madroño **21**: 295) seem, however, to be more appropriate. *Prosopis odorata* becomes a synonym of *P. glandulosa* var. *torreyana*. *Prosopis odorata* was lectotypified by Isely. *Prosopis pubescens* was published a year after *P. odorata* and may be identified easily from its description. BGS.

P. scandens Stokes = **Entada scandens** Bentham
P. striata Bentham = **Prosopidastrum globosum** (Hooker & Arnott) Burkart
P. tamariscina Sprengel = **Gagnebina tamariscina** DC.

RESUMEN

Monografía del género *Prosopis* Linn., emend. Bentham y emend. Burkart (Leguminosas–Mimosóideas). Basándose en sus estudios anteriores (véase Darwiniana 4. 1940) y contribuciones varias, el autor presenta una revisión completa de las especies de *Prosopis* (algarrobos americanos, mesquites y afines) en su distribución mundial. Se lo considera un grupo filogenéticamente antiguo dentro de la subfamilia, con distribución vasta a través de tres continentes: desde Asia sudoccidental y Africa a América occidental cálida, desde Estados Unidos sudoeste hasta Patagonia. Se distinguen 44 especies, de las cuales sólo 4 pertenecen al viejo mundo, siendo las demás americanas, con dos centros principales en las regiones áridas y semiáridas de México y de la Argentina, siendo éste último el país con mayor número de especies (28 en total, de ellas 13 endémicas).

Se traza la historia taxonómica del género, se discute su morfología y filogenia, su subdivisión en secciones y series, su distribución por países y centros de polimorfismo a escala universal, su importancia ecológica y económica, mencionando las múltiples utilidades que presta en regiones de clima cálido-seco y se propicia su mayor estudio desde el punto de vista biológico y ecológico, tal como el que se lleva a cabo en colaboración, entre botánicos de Harvard University, la Smithsonian Institution y la Universidad de Buenos Aires. Como meta final se aconseja la inclusión de las mejores especies y razas seleccionadas de estos valiosos árboles en programas de reforestación en zonas áridas.

La parte principal del trabajo está destinada a aclarar la taxonomía del género, a distinguir sus 44 especies mediante una clave dicotómica y descripciones complementarias, algunas ilustraciones, y a dilucidar su nomenclatura correcta y sinonimia. Aparte de una sección nueva, se crean nuevas series, una nueva especie de Irán, un nuevo nombre para una especie mexicana y diversas variedades nuevas. La exacta distribución geográfica queda fijada con la citación de ejemplares de herbario seleccionados. Se incorporan resultados de recientes investigaciones citogenéticas, palinológicas, quimiotaxonómicas y serológicas.