THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

A TAXONOMIC STUDY OF THE GENUS PHYSALIS IN NORTH AMERICA NORTH OF MEXICO

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF PHILOSOPHY

BY

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Norman, Oklahoma

1956

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APPROVED BY

Dissertation Committee

ACKNOWLEDGEMENTS

The author is deeply indebted to Dr. George J. Goodman, Professor of Plant Sciences, University of Oklahoma, under whose guidance this study was accomplished during the two years it was in progress, and to the members of his committee for their valuable suggestions.

He is also very grateful to the curators of the several herbaria whose loans of all, or selected parts, of their valuable collections of North American Physalis made this study possible. They have loaned 7731 sheets of Physalis and related genera. Of this total there are 5354 sheets of Physalis included in the present study. Many of the remainder were collections from other areas which aided materially in the formation of specific concepts. These herbaria are listed below together with the symbols used in this work for purposes of specimen-citation. They are the standardized abbreviations published by Lanjouw and Stafleu.[1]

ARIZ Herbarium of the University of Arizona

COLO Herbarium of the University of Colorado

DUKE Duke University Herbarium

GH Gray Herbarium of Harvard University

[1] J. Lanjouw and F. A. Stafleu, Index Herbariorum, Part 1, The Herbaria of the World, Regnum Vegetabile, (Utrecht, Netherlands: The International Bureau for Plant Taxonomy and Nomenclature, 1954), 2:131-144.

KANU	Herbarium of the University of Kansas
LIL	Instituto Miguel Lillo
MICH	Herbarium of the University of Michigan
MO	Herbarium of the Missouri Botanical Garden
NY	Herbarium of the New York Botanical Garden
OKL	Bebb Herbarium of the University of Oklahoma
OKLA	Herbarium of Oklahoma Agricultural and Mechanical College
P	Museum National d'Histoire Naturelle, Phanerogamie
PH	Herbarium of the Philadelphia Academy of Natural Sciences
RM	Rocky Mountain Herbarium, University of Wyoming
SMU	Southern Methodist University
TEX	Herbarium of the University of Texas
UARK	Herbarium of the University of Arkansas
UC	Herbarium of the University of California
US	National Museum, Smithsonian Institution

Thanks are also due the librarians of both the University of Oklahoma and Oklahoma Agricultural and Mechanical College for securing photostats of publications unavailable locally, and the Arnold Arboretum of Harvard University for the loan of photographs of Linnean types, as well as to Dr. Albert Delisle of the University of Notre Dame for photographing certain Greenean types.

The George F. Cram Company kindly permitted the use of their outline map COR 1 for Maps 7 and 14. Rand McNally and Company generously granted permission for using their outline map OA 100 for maps 8, 9, 12 and 13.

The author is also grateful to his wife, LaClida, who assisted in

the making of indices and the assembling of distributional data.

This study was made possible in part by a grant from the Southern Fellowships Fund. The author, however, is responsible for all phases of the investigation and all conclusions derived therefrom.

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A TAXONOMIC STUDY OF THE GENUS PHYSALIS IN NORTH AMERICA NORTH OF MEXICO

CHAPTER I

HISTORY OF THE GENUS

The following brief account outlines the taxonomic history of Physalis as it pertains to the area under consideration.

Linnaeus[1] founded the genus in 1753 with nine species, two of which are now usually referred to Withania. Five of the remaining seven are found in the area of this study, although one, P. Alkekengi, is known only as a horticultural species, or as an escape from cultivation. In the second edition of Species Plantarum[2] Linnaeus added two more species, P. pensylvanica and P. peruviana. The former does not occur in Pennsylvania, perhaps is not found in the area studied, and, in any event, is considered a synonym of P. viscosa. The second species is sometimes cultivated. Perhaps it escapes, but it is rarely collected. Pre-Linnean authors were familiar with the genus under the names Physalis, Solanum and Alkekengi as indicated in the Linnean references. Philip

[1]Carolus Linneaus, Species Plantarum (Holmiae: Laurentii Salvii, 1753), 1:182-184.

[2]Ibid., ed. 2:1670-1671. 1762.

Miller[1] in 1768 described two species pertinent to this study. One of them, P. virginiana, is interpreted as it has been for the last sixty years, although the application of the name is by no means positive.

Michaux[2] in 1803 described P. lanceolata and P. obscura consisting of var. glabra and var. viscidopubescens. Nees[3] in his treatment of the genus in 1831 described P. heterophylla, P. lanceifolia and P. Linkiana.

P. crassifolia, the common species of southwestern desert regions, was described by Bentham[4] in 1844. Thomas Nuttall, in publications hereinafter enumerated under the species concerned, described P. angustifolia, P. longifolia, P. mollis, P. pumila and P. Walteri. Dunal[5] described P. nyctaginea, now generally referred to P. heterophylla.

In his study of the North American species, Asa Gray described P. Fendleri, P. hederaefolia and P. Wrightii. Rydberg, in the last general study of the genus, described the following species: P. ciliosa,

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[1]Philip Miller, The Gardener's Dictionary (London: Privately printed, 1768), ed. 8.

[2]Andre Michaux, Flora Boreali-americana (Parisiis et Argentorati apud fratres Levrault, 1803).

[3]D. C. G. Nees (von Esenbeck), Versuch einer Verstandigung uber die Arten der Gattung Physalis, Linnaea 6:431-483. 1831.

[4]George Bentham, Botany of the Voyage of the Sulphur (London: Smith and Elder, 1844).

[5]Felix Dunal, Solanaceae in De Candolle's Prodromus Systematis naturalis (Paris: Victor Masson, 1852), 13(1).

[6]Asa Gray, Synopsis of North American Species of Physalis, Proc. Am. Acad. Arts and Sciences 10:62-68. 1875.

[7]Per Axel Rydberg, The North American Species of Physalis and and Related Genera, Mem. Torr. Bot. Cl. 4:297-374. 1896.

P. comata, P. macrophysa, P. neomexicana, P. rotundata and P. versicolor.

Following this, as a result of increased botanical activity, Mohr[1] described P. monticola; P. rigida was described by Pollard and Ball,[2] and P. polyphylla by Greene[3] in 1900. P. missouriensis and P. subglabrata were proposed by Mackenzie and Bush[4] in 1902. Rydberg[5] added P. floridana, P. pendula and P. simuata in Small's Manual in 1903. Aven Nelson[6] proposed Quincula lepidota and P. genucaulis in 1909. P. caudella, described by Standley[7] from Chihuahua in 1937, has been found in southern Arizona, usually identified as P. lanceolata.

Margaret Y. Menzel[8] has published a report of an exploratory survey of the cytology and the genetics of many of the species of our area, as they are interpreted by Rydberg and various collectors following that author's treatment. Her work is valuable in showing that the observed variability may indeed have a cytologic and genetic basis.

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[1]Charles Mohr, Notes on Some New and Little Known Plants of the Alabama Flora, Bull. Torr. Bot. Cl. 26:119-120. 1899.

[2]Pollard and Ball, Noteworthy Louisiana Plants, Proc. Biol. Soc. Wash. 13:134-145. 1900.

[3]Edward L. Greene, New or Noteworthy Species, Pittonia 4:150-151. 1900.

[4]Kenneth Kent Mackenzie and Benjamin Franklin Bush, New Plants from Missouri, Trans. Acad. Sci. St. Louis 12:79-89. 1902.

[5]Per Axel Rydberg, Physalis in Small's Flora of the Southeastern United States (New York: published by the author, 1903), 981-987.

[6]Aven Nelson, Plantae Goodingianae, Bot. Gaz. 47:430-431. 1909.

[7]Paul Carpenter Standley, Studies in American Plants, VIII, Field Mus. Publ. Bot. 17:273-274. 1937.

[8]Margaret Y. Menzel, The Cytotaxonomy and Genetics of Physalis, Proc. Amer. Phil. Soc. 95:132-168. 1951.

CHAPTER II

TAXONOMIC CHARACTERISTICS

The stability of taxonomic characteristics apparently has been much disturbed by the long-continued distribution of various species by man as esculents. Some of the species, such as P. ixocarpa and P. peruviana, are still so used. No doubt many of the species have been used by aborigines of many parts of the world at one time or another. This introduces the possibility of gene interchange between taxa that would otherwise not be contiguous. Furthermore, man's activities in producing disclimaxes provides habitats in which individual plants, or populations, of narrow ecological amplitude may survive. Such ecological niches might not have existed otherwise. It may be significant that many collections of Physalis are made in such disturbed habitats. Somewhat similar situations are admirably discussed by Edgar Anderson.[1]

The following discussion concerns the principal morphological characteristics which have been used in the taxonomy of the genus.

Roots. Both annual and perennial species occur in the genus. The former have fibrous root systems, or sometimes taproots. The latter are usually perennial from rhizomes. The annual vs. perennial characteristic has been used much in the past, beginning with Linneaus, to divide

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[1] Edgar Anderson, Ir. rogressive Hybridization (New York: Wiley and Sons, 1949).

the genus in two main divisions. Since most herbarium specimens do not show the underground parts, this system is not a particularly convenient one. More dependence has been placed on other structures in the following treatment.

Stems. All of our species have herbaceous stems, although in Mexico and Central America shrubby ones may occur. They may perennate from a woody caudex in such species as P. crassifolia of the desert areas of southwestern United States. Several of them grow from rhizomes, which may be cord-like and near the surface, often present in herbarium collections, as in P. arenicola of sandy areas of Georgia and Florida, or thick, deeply buried and seldom collected, as in the wide-ranging P. heterophylla and P. virginiana. The stems may be erect to prostrate and from simple to much branched. An extreme in branching is found in P. crassifolia which forms plants "1-3 ft. broad and $\frac{1}{2}$-1 ft. high."[1]

Leaves. The leaf blades are usually ovate to ovate-lanceolate, but they may be reniform, as are rarely some of the lower leaves of P. hederaefolia, or narrowly linear as in P. angustifolia. Petioles may be longer than the blade, or the blades may taper into short, winged petioles. The leaves are normally alternate, but sometimes two appear to be at a node as in P. viscosa var. Elliottii. This variety often has two leaves at a node, particularly in the upper part of the stem.

Leaf shape has often been used as a basis for establishing, or characterizing, taxa, as is indicated by such names as latifolia,

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[1]Willis Linn Jepson, A Manual of the Flowering Plants of California (Berkeley: Associated Student's Store, University of California, 1925).

hederaefolia, angustifolia, heterophylla, lanceifolia, integrifolia, crassifolia, spathulaefolia and longifolia. No doubt in some instances, as in P. angustifolia with its long linear leaves, such a procedure is justified. However, the size, shape and margins of leaves are extremely variable characteristics in groups that appear to be natural populations. One approach to the understanding of this variability is to study a species that is well-delimited otherwise. An excellent example is P. lobata, a species so distinct that it has been considered a separate genus by such taxonomists as Rafinesque and Rydberg. Here the leaf shape may vary from narrowly ovate to linear-oblong, and the margins from pinnatifid to entire. Although the variation in leaf margins appears to be at an extreme here, the variability of leaf shape can be duplicated, and that in margins approached, in several other natural populations.

Under these conditions it would seem hazardous to establish species or varieties based on these characteristics, and that such a procedure should be followed only when these features are correlated with other morphological characteristics, or with geographic distribution. The author has utilized these criteria in maintaining P. viscosa var. spathulaefolia of the Texas gulf, and P. viscosa var. maritima of the southeastern seacoast. Here the extremes are distinct, but variation makes some individual collections difficult to place. Measurement of many specimens shows the leaves of the former to be narrower than the latter, as is indicated later in the keys to the species. However, if these features are used with the idea of either matching specimens, or describing new species, only confusion can result.

Vestiture. The indument varies from hairs that are stellate or

variously branched, through long jointed hairs to short hairs, capitate or sessile glands, or small crystalline vesicles as in P. lobata. Even the seemingly glabrous species usually have a few trichomes of some kind at least on the younger parts. Frequently two or more kinds of trichomes are intermixed.

Such names as viscosa, mollis, comata, pubescens, hirsuta, cinerascens, ciliosa, villosa, pruinosa and subglabrata indicate the consideration that authors have given to indument in the past. The procedure seems to be partly justified. Surely the "stellate" populations are related. But if one attempts to distinguish taxa on the basis of the density or the size of the stellae, caution should be exercised. In this study P. viscosa var. mollis has been set aside from var. cinerascens partly by this characteristic, but the latter taxon is extremely variable within itself in this respect. In P. heterophylla many of the variations in vestiture seem to be so little correlated, either with other characteristics, or with geographic distribution, as to be unusable to distinguish even varieties. On the other hand, in P. virginiana, sen. lat., the correlations are such that they are of value in helping to establish geographic varieties. In the P. angulata-P. pubescens series indument is also of taxonomic significance, P. pubescens usually having abundant multi-cellular villous hairs, P. angulata having few short ones.

Corollas. The shape, color and spotting of the corollas have been considered of taxonomic significance. The shape varies from funnelform-campanulate to rotate with the limb reflexed. The corolla is plicate, and is truncate with the exception of P. Alkekengi in which the lobes are separated by short sinuses. The shape of the corollas may be

of taxonomic significance. Since the characteristic shape is attained for only a short time in the full sun, the application of this criterion is of limited value. Several species such as P. lobata, P. Wrightii, P. hederaefolia and P. crassifolia have corollas that are either rotate, or have a reflexed limb when fully open. Since the corollas are seldom fully open, the author has usually used a length measurement for comparative purposes where such usage seemed desirable.

Color of the corolla has been used to help characterize P. lobata, which is our only species with a bluish, or violet, corolla. Otherwise the presence, and sometimes the color, of five spots on the limb of the yellowish corolla near its base has been found useful. The majority of the species either have distinct, dark spots present, or they have none that are noticeable in herbarium specimens. A few taxa such as P. hederaefolia var. Fendleri and some of the maritime varieties of P. viscosa have spots which are only a little darker than the rest of the corolla.

Stamens. Size and color of the anthers are of taxonomic value. With a few exceptions, large anther size (measurements given in the keys) and thick filaments are correlated with our perennials. Small anther size and slender filaments are usually found in our annual species. In some taxa anther color is of significance. So many of the annual species have blue anthers that the yellow anthers of P. missouriensis attract attention. In others, such as P. heterophylla and P. virginiana var. virginiana, yellow or bluish tinged anthers seem to occur without much significance. However, P. virginiana var. subglabrata and var. sonorae may be distinguished by the bluish anthers of the former and the yellow

anthers of the latter even when their other characteristics overlap.

A peculiarity of P. crassifolia and its var. versicolor is the presence of a few long jointed hairs on the filaments.

Flowering calyx. The relative depth to which the calyx lobes are divided may be of value, as it is in helping separate P. angulata var. angulata from var. pendula.

Peduncle. The length of the peduncle, both flowering and fruiting, may be of taxonomic significance. In fruiting material of P. ixocarpa and P. virginiana var. subglabrata, some specimens of which may resemble each other, the very short fruiting peduncle of the former will serve to separate the two. Among the southwestern desert species, P. hederaefolia and its relatives may be separated from P. crassifolia and its relatives by the short flowering peduncle of the former. Although of lesser significance in the P. angulata complex, it may be used, in conjunction with the size of the fruiting calyx, to help separate P. angulata var. angulata from var. pendula and var. lanceifolia.

Fruiting calyx. The calyx greatly enlarges with the maturing fruit, usually being much inflated around it. In some populations the size and shape seem to be constant, and characteristic enough to be taxonomically useable. In P. pubescens and its relatives there is present a distinctly five-angled fruiting calyx. A population in southern Arizona is proposed as a new species, easily recognized by its unusually broad, sharply angled fruiting calyx. In the P. angulata series, P. angulata var. angulata has a larger fruiting calyx than either var. pendula or var. lanceifolia.

In other populations the size and shape of the fruiting calyx

seems to be either quite variable, or the extremes occur sporadically. The present author believes that the large-calyxed form described as P. macrophysa is a more or less sporadically occurring form of P. virginiana var. subglabrata, although it also may be found in intergrades with var. sonorae (P. longifolia). Specimens with large fruiting calyces also appear in P. virginiana var. virginiana and in some phases of P. viscosa.

The length of the lobes of the fruiting calyx was considered characteristic enough by Standley (l.c.) to call a new species P. caudella.

The writer has not found the indentation at the base of the fruiting calyx to be of much taxonomic value. Considerable variation may occur on the same plant. Of course if the calyx is nearly filled by the berry, it will be little invaginated.

Others. The style has not been used to any extent. In P. lobata it is distinctively curved near the base and bent to one side. The more or less reniform, punctate to reticulate seeds are very similar in most of the species. Differences that seem to exist when first examined appear to be bridged by many intermediates when a large series is examined. The backs of the seed of P. lobata are rather crenate or rugose.

CHAPTER III

GENERIC RELATIONSHIPS

The genus Physalis is studied here in its more or less conventional conception, including those members of the Solanaceae having a funnelform or campanulate to rotate, or rotate-reflexed corolla, longitudinally dehiscing anthers, and a berry, or berry-like fruit, enclosed in an enlarged and usually inflated calyx. It excludes both Margaranthus, with its urceolate corollas and very Physalis-like fruiting calyces, and also Chamaesaracha with a corolla very similar to some species of Physalis, but with a fruit very closely invested by the enlarging calyx.

When not in flower, Margaranthus could hardly be distinguished from moderately small-fruited Physalis species. The rather tightly investing fruiting calyx of Chamaesaracha can be matched, or is approached, in some specimens of certain species of Physalis such as P. ixocarpa. A peculiar situation in Chamaesaracha is that C. grandiflora, originally described as Physalis by Hooker, and a related species, C. nana, have seed very similar to the punctate or minutely reticulate seeds of Physalis, while the other species of the genus have rather strongly alveolate surfaces.

Possibly both genera should be included in Physalis. This would make Physalis an inclusive genus, similar in its concept to Oenothera as

delimited by Munz and other conservative taxonomists. In that genus a number of subgenera, regarded as genera by some authors, are bound together by flower similarities despite their differently shaped fruits. In Physalis, under this broad concept, the distinctive fruiting calyx would hold together subgenera differing in corolla structure. In Chamaesaracha the distinctiveness of the fruiting calyx becomes progressively less evident. The difficulty here would be in finding a stopping place short of including the whole genus. The author prefers making a more intensive study of the problem before proceeding with such action.

Since there is the possibility of creating distinctive subgenera as outlined in the preceding paragraph, it seems preferable not to formally divide the species now treated into subgenera or sections, but to defer this action until not only Physalis species from other areas, but also related taxa can be studied.

CHAPTER IV

TAXONOMY

PHYSALIS L., Species Plantarum 1:182. 1735; ALKEKENGI Tourn. ex Hall, Enum. Stirp. Helv. 2:508. 1742; HERSCHELLIA Bowdich, Excurs. Mader. 159. 1825; QUINCULA Raf. Atl. Journ. 145. 1832; ALICABON Raf., Sylva Tellur. 56. 1838; PENTAPHILTRUM Reichb., Das Herbarienbuch 121. 1841; BOBERELLA Krause, in Sturm, Fl. Deutschl. ed. 2 (10):54. 1903.

Plants annual or perennial with herbaceous stems, some having woody caudices, others with short to elongated rhizomes; leaves usually broadly ovate to linear, alternate or sometimes two at a node; vestiture various in kind and quantity including short hairs, long jointed hairs, stipitate or sessile glands, or with hairs variously branched to stellate; corollas plicate, campanulate to rotate with the limb reflexed; corolla color usually some shade of yellow with, or without, five darker spots near the base of its limb, sometimes blue; flowers usually solitary in the axils of the leaves, sometimes on foreshortened axillary branches causing them to appear to be in axillary fascicles; calyx united, its lobes distinct for a little over one-half to about one-fourth of its length; calyx lobes ovate-deltoid to narrowly lanceolate, sometimes acuminate; calyx enlarging with, and usually inflated around, the maturing fruit; fruit a two-carpellate many- to few-seeded berry, sometimes

rather dry; style more or less filiform, usually expanding somewhat at its summit into a slightly capitate, but sometimes nearly truncate, stigma; stamens five, their filaments attached near the base of the corolla tube; anthers ovate-oblong to linear-oblong, dehiscing by lateral slits, yellow or bluish in color; filaments varying from nearly as wide as the anthers, and sometimes clavate, to slender and filiform.

KEY TO GROUPS OF SPECIES OR TO UNIQUE SPECIES

1. Corolla yellow, yellowish green or white, with or without darker spots; plant surfaces without crystalline vesicles; enlarging ovules all of one kind

2. Corolla with broad shallow simuses between the lobes; fruiting calyx reddish — 1. P. Alkekengi

2. Corolla truncate; fruiting calyces not red

3. Plants covered with stellate or variously branched trichomes, or glabrous with a few stellate hairs on the sepals or sometimes the leaf margins — Group I

3. Plants nearly glabrous, or variously hairy, but branched hairs, if present, very small and inconspicuous and usually much less numerous than the short unbranched hairs mixed with them

4. Anthers (2) 3-5 mm. long; perennials excepting P. ixocarpa and P. Wrightii — Group II

4. Anthers (.5) 1-2.3 (2.8) mm. long; annuals

5. Plants nearly glabrous, usually with a few short curved or appressed hairs on the sepals or young parts — Group III

5. Plants long hairy, sometimes with shorter hairs or glands intermixed — Group IV

1.Corolla blue to purple, or yellow and with plump seed-like corky bodies mixed with the reniform seeds

6.Corolla blue to purple, rotate; herbage with few to many crystalline vesicles, sometimes giving it a scurfy look 21. P. lobata

6.Corolla yellowish, funnelform; plump, rounded, corky seed-like bodies mixed with the reniform seeds 22. P. Carpenteri

GROUP I

1.Hairs stellate, each ray sometimes rebranched, the verticls sometimes in more than one series, and sometimes the branches irregularly arranged; or plant with a coat of short stellate hairs, plus either long-stiped branched hairs, or simple hairs

2.Leaves ovate to narrowly linear, their blades mostly 2.5-6 times longer than the petiole, sometimes decurrent on it; corolla usually not dark spotted, or with spots not very prominent in herbarium specimens (rarely with prominent dark spots and more or less spathulate leaves); maritime plants extending from southeastern Va. to the gulf coast of Texas

3.Leaf blades ovate, spathulate, lanceolate or linear-lanceolate (sometimes linear in intergrades with P. angustifolia); mostly stellate-vestite, but nearly glabrous in one form of var. Elliottii

4.Leaf blades ovate to spathulate

5.Leaves with definite petioles usually about one-third to one-fourth the length of the blade; whole leaf (1.7) 2-3 (3.4) times longer than wide; se. Va. to Fla.

6.Leaf blades usually 2-4 (5) cm. wide

2a. P. viscosa, var. maritima, forma maritima

6.Leaf blades usually 5-7 cm. wide

2a. P. viscosa, var. maritima, forma latifolia

5.Leaves tapering to the base, or extending gradually into winged petioles; whole leaf (2) 2.5-4 (4.7) times longer than wide; gulf coast of Texas

2c. P. viscosa, var. spathulaefolia

4.Leaf blades lanceolate to linear-lanceolate; leaves mostly 2.5-10 times longer than wide

7.Plants stellate-vestite

2b. P. viscosa, var. Elliottii, forma Elliottii

7.Plants glabrous excepting on the margins or the tips of the sepals, and sometimes on the leaf margins

2b. P. viscosa, var. Elliottii, forma glabra

3.Leaves linear, often ca. 8, but sometimes from 1-20 times longer than wide; plant glabrous excepting the tips or margins of the sepals 3. P. angustifolia

2.Leaves mostly ovate, sometimes reniform, ovate-deltoid, or ovate-lanceolate, their blades mostly (1.2) 1.5-2 (3) times as long as their petioles; corolla dark-spotted; mostly plants of the south central plains, but extending to the gulf coast of Texas

8.Hairs 1-4 mm. long on at least the calyx or the base of the stem, in addition to stellate hairs covering herbage

4. P. variovestita

8.Plants without hairs 1-4 mm. long intermingled with shorter stellate ones

9.Flowering calyces (6) 7-10 mm. long; vestiture forming a dense mat, at least beneath the leaves; leaves dentate

2d. P. viscosa, var. mollis

9.Flowering calyces mostly (3) 5-7 (9) mm. long; vestiture usually sparse; leaf margins dentate, undulate or entire

2e. P. viscosa var. cinerascens

1.Hairs jointed, those of the stem mostly 1-2 mm. long and spreading at right angles to the stem giving it a bristly appearance; hairs 2- or 3-branched; not having a second coat of short stella

5. P. pumila

GROUP II

1.Long cord-like rhizomes present near surface; hairs short and antrorse, sometimes viscid; plants sometimes ciliate with long jointed hairs; plants of sands in Fla. and adjacent areas

2.Plants without long, jointed hairs

6a. P. arenicola, var. arenicola

2.Plants ciliate with jointed hairs 1.5-2 mm. long

6b. P. arenicola, var. ciliosa

1.Not as above

3.Anthers blue, ca. 3 mm. long; corolla blue- or purple-spotted; leaves lanceolate; perennials of s. Ariz. and adjacent Mexico

11. P. caudella

3.Not as above

4.Corolla usually dark-spotted near the base of its limb; flowering peduncles usually 3-15 mm. long; if corolla not noticeably dark-

spotted, then flowering peduncles ca. 3-8 mm. long

5.Flowering peduncles usually 10-15 mm. long; corolla limb usually not reflexed when fully open; plants primarily of the eastern and northern U. S.

6.Long, jointed, villous hairs present

7.Filaments as wide as the anthers to about one-third as wide, sometimes clavate; leaves blunt to pointed; anthers yellow to light blue

8. Anthers (3) 3.5-4.5 mm. long; filaments often clavate

9.Bases of stems not thickened and subligneous

10.Vestiture of stems various, but not of abundant villi 2-4 mm. long

7a. P. heterophylla, var. heterophylla

10.Vestiture of abundant villi 2-4 mm. long; Ala. and Fla. 7c. P. heterophylla, var. villosa

9.Bases of stems thickened and subligneous; se. Va.

7b. P. heterophylla, var. clavipes

8.Anthers (2) 2.5 (3) mm. long; filaments not clavate

9a. P. virginiana, var. virginiana

7.Filaments slender; leaves acuminate; corolla spots and anthers deep blue-purple; introd. 8. P. peruviana

6.Vestiture without long villous hairs

11. Flowering calyx campanulate, the lobes spreading, 4-5 mm. wide at base and 15-20 mm. wide at tips

9g. P. virginiana, var. campaniforma

11.Flowering calyx not as above

12. Hairs of stem short, retrorse

9a. P. virginiana, var. virginiana

12.Hairs not short and retrorse, often antrorse

13.Anthers light blue, or tinged with light blue

14.Fruiting calyx 2.5-3.5 cm. long and 2-3 cm. wide

9b.P. virginiana, var. subglabrata, f. subglabrata

14.Fruiting calyx 4-5 cm. long and 3-4 cm. wide

9b. P. virginiana, var. subglabrata, f. macrophysa

13.Anthers yellow

15.At least a few stiff spreading hairs about 1 mm. long on the flower buds, leaf margins or stems; thick-leaved plants of the prairie region westward, usually in sand

9e. P. virginiana, var. hispida

15.Plants without stiff spreading hairs

16.Principal leaves ovate; plants nearly glabrous, usually several-branched from the base, and spreading; s. Tex.

9c. P. virginiana, var. texana

16.Principal leaves usually lanceolate to linear, if ovate then plant not with several spreading branches from near the base

17.Plants usually single-stemmed, erect; larger basal leaves usually 5-10 cm. long

9d. P. virginiana, var. sonorae

17.Plants usually branched from the base; larger basal leaves usually 4-5 cm. long; s. Colo. 9f. P. virginiana, var. polyphylla

5.Flowering peduncles usually 3-8 mm. long; corolla limb often reflexed when fully open; plants primarily of the southern Rocky Mts. and westward

18.Plants with long jointed hairs mixed with shorter hairs, or with glandular ones, or with only long jointed hairs

19.Flowering calyx 8-11 mm. wide; anthers 1.5-3 mm. long; leaf blades frequently rotund; mostly in the north central prairies extending west into the Rockies

10b. P. hederaefolia, var. comata

19.Flowering calyx 4-8 mm. wide; anthers 3-4 mm. long; sw. Tex. to Colo. and west

10a. P. hederaefolia, var. hederaefolia

18.Plants without long jointed hairs; short hairs, or glandular ones present

20.Anthers yellow, not prominently twisted after dehiscence; perennials

21.A few short stiff branched hairs with a spread of ca. 1 mm. present at least on the calyces, sometimes abundant; leaves ovate to lanceolate

10b. P. hederaefolia, var. cordifolia

21.Small branched hairs not present; leaves mostly ovate

10a. P. hederaefolia, var. hederaefolia

20.Anthers blue, 3 mm. long; strongly twisted after dehiscing; annuals 13. P. ixocarpa

4.Corolla not dark spotted, or with slightly darkened spots which hardly show when dry, sometimes turning blue when dry

22.Flowering peduncles 3-8 (10) mm. long, shorter than the flowers, or about equalling them

23.At least some of the hairs short, stiff and branched

10b. P. hederaefolia, var. cordifolia

23.None of the hairs short stiff and branched

10a. P. hederaefolia, var. hederaefolia

22.Flowering peduncles (10) 12-20 (50) mm. long, somewhat longer than the flowers to several times their length

24.Corolla rotate, with 5 hairy pads exposed on its limb near the short tube; anthers blue, usually 2.5-3mm. long; annuals

14. P. Wrightii

24.Corolla not rotate with 5 hairy pads exposed on its limb; anthers not blue and 3 mm. long; perennials

25.Corolla remaining yellow when dried; leaves thick, often entire; flowering calyces usually 4-6 mm. long on peduncles from little longer to 6 or 7 times their length

12a. P. crassifolia, var. crassifolia

25.Corolla often drying with a blue tinge; leaves thin, often toothed; flowering calyces usually 3-4 mm. long on peduncles 5-10 times their length

12b. P. crassifolia, var. versicolor

GROUP IVII

1.Fruiting calyx rather rounded, or 10-ribbed, but not strongly 5-angled

2.Leaves ovate to ovate-lanceolate; corollas usually 6-10 mm. long

3.Flowering peduncles usually 5-15 mm. long (as much as 3 times the

length of the calyx); fruiting peduncles usually 20-30 mm. long, shorter than to equalling the fruiting calyces which are 25-35 mm. long; flowering calyces usually 4-5 mm. long with teeth 2-2.5 mm. long; s. U. S. 15a. P. angulata, var. angulata

3.Flowering peduncles usually 15-40 mm. long (3-13 times the length of the calyces); fruiting peduncles usually 20-40 mm. long, equalling to 3 times as long as the shorter fruiting calyces which are 20-25 mm. long; flowering calyces usually ca. 3 (4) mm. long with teeth ca. 1 mm. long; s. cent. U. S.

15b. P. angulata, var. pendula

2.Leaves lanceolate to linear-lanceolate; corollas usually 4-5 mm. long; sw. U. S. 15c. P. angulata, var. lanceifolia

1.Fruiting calyx sharply and strongly 5-angled; corolla with 5 evident dark spots 16b. P. pubescens, var. obscura

GROUP IV

1.Corolla dark spotted; anthers usually some shade of blue or purple

2.Fruiting calyces 1.5-2.5 (3) cm. wide

3.Anthers (1.2) 1.5-2 mm. long; plants without capitate-glandular hairs, but may be viscid-glandular or with sessile glands

4.Leaves having a greyish surface, often with "mealy" or sessile glands; leaf blades usually toothed nearly to the base; mostly northeastern U. S. 16d. P. pubescens, var. grisea

4.Leaves not greyish, not having sessile glands

5.Leaves usually toothed nearly to the base with 5-8 teeth on each side of the seldom translucent blade; widespread

16a. P. pubescens, var. pubescens

5.Leaves with few teeth, 3-4 on each side, or entire; blades mostly flaccid and translucent

16c. P. pubescens, var. integra

3.Anthers (.3) 1-1.5 mm. long; capitate-glandular hairs usually mixed with long jointed ones 17. P. foetens, var. neomexicana

2.Fruiting calyces (2.5) 3-4 cm. wide; s. Ariz.

18. P. latiphysa

1.Corolla yellow, unspotted, or sometimes slightly dark-tinged

6.Flowering peduncles 2-5 mm. long, about equalling to twice as long as the calyces 19. P. missouriensis

6.Flowering peduncles mostly 15-20 (30) mm. long, 4-5 (7) times the length of the calyces 20. P. Greenei

THE SPECIES

1. Physalis Alkekengi L., Species Plantarum 183. 1735; incl. P. Francheti Mast. in Gard. Chron. 2:434 and 441. 1894.

Plants perennial, erect, usually unbranched, 30-60 cm. tall, glabrous or with a few scattered long hairs; leaves broadly ovate, or ovate-rhombic, the blades usually 5-12 cm. long and 4-9 cm. wide on petioles 2-4 cm. long; margins of the leaf blades from entire to irregularly few-toothed or undulate-dentate; flowers white, slightly 5-lobed with broad shallow sinuses about 2 mm. deep between the apices of the lobes; corollas 10-15 mm. long and 15-25 mm. wide; anthers 2.5-3 mm. long on slender filaments; flowering calyces 4-7 mm. long and 4-5 mm. wide, densely hairy with jointed trichomes about 1-1.5 mm. long; fruiting calyces reddish, 3-5 cm. long and 2.5-4 cm. wide, pendent on peduncles

2-3 cm. long.

Type: "In Italia."

Habitat distribution and flowering time: Cultivated or escaped, in northeastern U. S.; flowering in June.

Selected from 16 sheets of 15 collections: CONNECTICUT: Fairfield Co.: Eames 11654 (GH); Litchfield Co.: Eames and Austin 8304 (NEBC); DELAWARE: Newcastle Co.: Commons 2213 (GH); MASSACHUSETTS: Essex Co.: Harris 740 (NEBC); Worcester Co.: Dodge June 30, 1936; NEW JERSEY: Union Co.: Moldenke 11823 (NY); NEW YORK: Columbia Co.: McVaugh 934 (GH); Westchester Co.: Gleason June 2, 1948 (NY); PENNSYLVANIA: Luzerne Co.: Glowenke 1055 (GH); Northampton Co.: Schaeffer 19069 (GH); Philadelphia Co.: O'Neill Oct. 12, 1938 (GH); VIRGINIA: Arlington Co.: Hermann 10501 (NY, PH).

2. Physalis viscosa L., Species Plantarum 183. 1753; other synonymy under the varieties to which the names are referred.

Perennials covered with stellate, or several-branched hairs, or nearly glabrous and having stellate hairs only on the calyces; leaves from ovate to linear-lanceolate, petiolate or with blade tapering to the stem; corolla yellowish, funnelform, with or without darker spots on the limb near its base, 8-20 mm. long; anthers yellow, about 3 mm. long; flowering calyx 3-10 mm. long on peduncles 10-20 mm. long; fruiting calyx 2-5 cm. long and 1.5-4 cm. wide on peduncles 1-4 cm. long.

ssp. VISCOSA

P. viscosa L., loc. cit. supra, as limited to the South American plants. Linnaeus cited P. viscosa from "Virginia, Bonaria." Since

(1) only one element of this species, the part described by Chapman as P. maritima, barely extends into southeastern Virginia, since (2) it hardly matches the photographs of the Linnean types, and since (3) previous authors have restricted the application of the specific name, in its strictest sense, to the plants of South America, the present author believes that it is best to so delimit it.

South American material is usually more sparsely vestite and with finer stellae than most of ours, and has corollas slightly spotted to unspotted.

Occasionally in our populations of P. viscosa, sen. lat., there appears a specimen which can hardly be distinguished from South American collections. If these are introductions from that continent, or if they represent gene combinations from within our population which produce phenotypes similar to the South American plants, it is impossible for the author to determine.

Some examples are: ALABAMA: Alabama Co.: Mohr 26 (NY); TEXAS: Brazoria Co.: Young Apr. 22, 1918 (TEX); Houston Co.: Fisher July 25, 1914 (UC); Walker Co.: Warner 29 (NY). P. fuscomaculata, at least as to our few collections, is included here.

ssp. MARITIMA (M. A. Curtis) Waterfall, comb. et stat. nov., P. maritima M. A. Curtis, Am. Journ. Sci. ser. 2, I:407. 1849. Here are included the maritime varieties listed below.

2a. Physalis viscosa L., var. maritima; P. Walteri Nuttall, Journ. Acad. Nat. Sci. Philad. 7:112. 1834; type from "South Carolina" (PH); P. maritima M. A. Curtis, loc. cit. supra; P. viscosa L., var.

maritima (Curtis) Rydberg, Mem. Torr. Bot. Club 4:357. 1896. The varietal name is used above as a tautonym of ssp. maritima.

Leaves ovate to spathulate, especially the upper ones; whole leaf (1.7) 2-3 (3.4) times longer than wide; from sparsely to usually densely vestite.

Type: M. A. Curtis, seacoast, North Carolina (GH); probable isotype, "sandy seacoasts" (NY).

Habitat distribution and flowering time: Sandy seacoast, southeastern Va. to Fla.; usually flowering in March, April and May, but sometimes in winter in the southern part of its range.

Selected from 120 sheets of 93 collections: ALABAMA: Mobile Co.: Bush 392 (NY); Mackenzie 4090 (NY); FLORIDA: Brevard Co.: McFarlin 3862 (MICH); Broward Co.: Small and Carter 936 (PH); Dade Co.: Meredith Feb. 21, 1917 (PH); DeSota Co.: Small and Dewinkler 9079 (NY); Duval Co.: Curtiss 4847 (GH, NY, UC); Indian River Co.: Palmer 375 (GH, NY); Lake Co.: Nash 1049 (GH, MICH, NY, UC); Monroe Co.: Simpson 563 (GH, NY); Osceola Co.: Singletary 62 (DUKE); Palm Beach Co.: Small and Carter 949 (NY, PH); Pasco Co.: Lang Aug. 8, 1909 (PH); St. Johns Co.: Smith Mar. 21, 1884 (NY); Volusia Co.: Moldenke 177 (DUKE, NY); GEORGIA: Chatham Co.: Small 8476; NORTH CAROLINA: Beaufort Co.: Lewis 235 (NY); Brunswick Co.: Blomquist 4814 (DUKE); Carteret Co.: Randolph 917 (GH); Currituck Co.: Fernald, Griscom and Long 4696 (GH); Dare Co.: Dobbin 1818 (NY); Hyde Co.: Wells and Shelbourne 4780 (GH); New Hanover Co.: Bartlett 2547 (MICH, TEX); Onslow Co.: Fox 3750 (NY, UC); Pender Co.: Fox and Boyce 3792 (PH); SOUTH CAROLINA: Beaufort Co.: Churchill 715 (GH); Charleston Co.: Godfrey and Tryon 1575 (GH, UC); Georgetown Co.: Godfrey and Tryon

319 (DUKE, GH, NY); Sullivans Co.: Gibbs Oct. 20, 1856 (NY); VIRGINIA: Albemerle Co.: July 1889 (MICH); Princess Anne Co.: Fernald and Griscom 2885 (GH).

Occasional is a large, broad-leaved form with leaf blades about 5-7 cm. wide as contrasted to the usual width of 2-4 (5) cm. in forma maritima (supra). It may be described as forma LATIFOLIA Waterfall, f. nov., laminis 5-7 cm. latis. The TYPE is Small, Mosier and DeWinkeler 10892 (NY). An ISOTYPE is in the Gray Herbarium. The collection was made from the north part of Jupiter Island, Florida. Also seen from FLORIDA were: Dade Co.: Moldenke 384 (DUKE), Small 2116 (NY).

2b. Physalis viscosa L., var. ELLIOTTII (Kunze) Waterfall, comb. et stat. nov. P. Elliottii Kunze, Linnaea 20:33. 1847.

Leaf blades lanceolate to linear-lanceolate; leaves mostly 2.5-10 times longer than wide; plants covered with stellae, or nearly glabrous; corollas yellow, not dark-spotted.

Type: Rugel June 1843, "Ad ostium fluvii St. Marks in Florida" (NY). The type belongs to the vestite phase, although it is only sparingly stellate on the leaf-surfaces and the stem.

Habitat distribution and flowering time: Growing in sands, Florida; apparently flowering throughout the year.

Forma Elliottii, Selected from 73 sheets of 58 collections: FLORIDA: Broward Co.: Moldenke 479 (DUKE, NY); Clay Co.: Williamson Aug. 1893 (PH); Dade Co.: Small and Moiser 5944 (DUKE, GH, NY); Dale Co.: Moldenke 715 (NY); Hermando Co.: McFarlin 6079 (MICH); Highlands Co.: Correll and McFarlin 6219 (DUKE); Hillsboro Co.: Churchill Mar. 21, 1923 (GH, PH); Indian River Co.: Small 8894 (NY); Lee Co.: Moiser

July 1928 (DUKE, NY); Manatee Co.: Tracy 7577 (GH, NY); Monroe Co.: Sargent 6417 (ARIZ); Pinelas Co.: McFarlin 3653 (MICH); St. John Co.: Meredith Feb. 4, 1899 (PH); Sarasota Co.: McFarlin July 1931 (MICH).

Forma GLABRA Waterfall, f. nov., foliis glabris, sepalis stellato-vestitis. Stellae are found on the flowering sepals, or at least on their margins; a few are rarely present on the margins of the leaves. The TYPE is Tracy 7608, Sanibel Island, Lee County, Florida (NY). ISOTYPES are found in the Gray Herbarium and, as a duplicate sheet, in the herbarium of the New York Botanical Garden.

Selected from 40 sheets of 32 collections: FLORIDA: Collier Co.: Deam 60785 (DUKE); Dade Co.: Small 7410 (NY); Hillsborough Co.: McFarlin 5525 (MICH); Lee Co.: Hitchcock 237 (GH, NY); Monroe Co.: Palmer 376 (GH); Pinellas Co.: Deam 1948 (UC); Sarasota Co.: McFarlin 6091 (MICH).

An unusual, compacted short-leaved phase is sometimes found. It is represented by the following: Small, Britton and DeWinkeler 2328, pineland-prairie, Tamiami trail west of Miami, Dade Co., Dec. 19, 1919; Small 8894, pinelands near Felsmere, Indian River Co., May 17, 1918; Small and DeWinkeler 9979, Ancient sand dunes near Kuhiman, April 25, 1921, all in Florida. If there proves to be a population in this area, similar to the cited collections, it will probably justify nomenclatural recognition.

2d. P. viscosa L., var. spathulaefolia (Torr.) Gray, Proc. Amer. Acad. Arts and Sci. 10:67. 1875. P. lanceolata Michx., var. spathulaefolia Torr., Bot. Mex. Bound. 153. 1859.

Leaf blades ovate to lanceolate to spathulate, tapering at

base, or extending gradually into winged petioles; whole leaf (2) 2.5-4 (4.7) times longer than wide; corolla varying from apparently unspotted to having prominent dark spots; gulf coast of Texas.

Type: Schott 30, seabeaches, Rio Bravo (?), Texas.

Flowering time: Irregularly throughout the year.

Selected from 65 sheets of 54 collections: LOUISIANA: Calcasieu Co.: Palmer 7707 (PH); TEXAS: Aransas Co.: Tharp 1620 (OKLA, TEX); Austin Co.: Pennell 10271 (NY, PH); Brazoria Co.: Cory 51057 (GH); Cameron Co.: Clover 1724 (MICH); Galveston Co.: Nelson Mar. 20, 1942 (TEX); Harris Co.: Fisher July 25, 1914 (NY); Jefferson Co.: McVaugh 6880 (MICH); Kenedy Co.: Tharp 48333 (OKLA, TEX); Matagorda Co.: Wright (GH); Nueces Co.: Tharp, Johnson and Webster Dec. 3, 1948 (TEX); San Patricio Co.: Cory 51249 (GH, UC); Victoria Co.: Tharp 2515 (TEX, UC).

The following collections have prominently dark-spotted corollas: TEXAS: Austin Co.: Tharp Apr. 8, 1939 (TEX); Brazoria Co.: Celerier 51-41 (OKLA); Cameron Co.: Lundell 1073 (TEX); Kenedy Co.: Lundell 8714 (GH, MICH, NY, UC); Willacy Co.: Johnston 54169 (TEX).

ssp. MOLLIS (Nuttall) Waterfall, comb. et stat. nov. P. mollis Nutt., Trans. Am. Phil. Soc. 5 (n.s.) 194. 1837. This is an inland population, here divided into two varieties, as compared with ssp. maritima, a maritime population divided above into three varieties.

2d. Physalis viscosa L., var. mollis. The varietal name is used here as a tautonym of ssp. mollis, hence it is listed without author-citation. However, the present author believes that the varietal

category is best used as the principal division of a species, and that the subspecific category is most significantly used as a means of grouping varieties, just as a section may be utilized to group species within a genus.

Type: On the sandy banks of the Arkansas. The label on the type only says "Arkansa." It is in the Herbarium of the Academy of Natural Sciences of Philadelphia; an Isotype is in the Herbarium of the New York Botanical Garden.

Leaves densely stellate-tomentose, at least beneath, dentate; plant usually erect; flowering calyces (6) 7-10 mm. long.

Habitat, distribution and flowering time: In open woods, sandy areas and disturbed areas, western Arkansas, eastern Oklahoma and eastern Texas. There are many intermediates with var. cinerascens. Usually flowering in May and June, but specimens in flower have been collected in July and August.

Selected from 41 sheets of 32 collections: ARKANSAS: Franklin Co.: Pennell 10621 (NY, PH); Pulaski Co.: Merrill 1861 (UARK, OKLA); Sebastian Co.: Bigelow in 1853-54; LOUISIANA: Bossier Co.: Correll 10058 (GH, DUKE, NY, PH); Jefferson Davis Co.: Palmer 7629 (PH); OKLAHOMA: Choctaw Co.: Houghton 4037 (GH, NY); Comanche Co.: Clements 11767 (GH); Love Co. Hopkins 3429 (OKL); Marshall Co.: Basler Aug. 5, 1950 (OKL); Muskogee Co.: Little 1515 (OKL); TEXAS: Denton Co.: Whitehouse 15780 (MICH); Grayson Co.: Gentry 51-392 (OKLA); Wilson Co.: Rogers, Albers and Webster 6849 (TEX).

2e. Physalis viscosa L. var. CINERASCENS (Dunal) Waterfall, comb. nov., P. pensylvanica L. var. cinerascens Dunal, in De Candolle,

Prodromus 13(1):435. 1852; P. mollis Nutt., var. cinerascens (Dunal) Gray, Proc. Amer. Acad. Arts and Sci. 10:66. 1875; incl. P. mollis Nutt., var. parvifolia Rydb., Mem. Torr. Bot. Cl. 4:355. 1896.

Leaves dentate to entire, varying in size, probably due, at least in part, to seasonal heteromorphy; plants erect to spreading, or nearly procumbent; more or less densely covered with stellae, but not tomentose; flowering calyx (3) 5-7 (9) mm. long; small leaved forms have been segregated as var. parvifolia.

Type: Dunal cited "n. 83 et 2316 Berland. pl. exs. Mex." when he described var. cinerascens. Since he indicated no holotype, Berlandier 2316, circa Matomoros urbem, April 1831 (GH) is designated as LECTOTYPE.

Habitat, distribution and flowering time: Prairies, plains and in disturbed habitats, primarily in Oklahoma and Texas, extending into Mexico; often flowering in May and June, but to some extent any time during the growing season, which may be most of the year in southern Texas.

Selected from 421 sheets of 361 collections: ARKANSAS: Fulton Co.: Bush 2518 (GH); KANSAS: Barber Co.: Rydberg and Imler 640 (NY); NEW MEXICO: Chaves Co.: Earle 283 (NY); Lea Co.: Waterfall 7836 (GH, OKL); OKLAHOMA: Alfalfa Co.: Stevens 627 (GH, OKL, OKLA); Blaine Co.: Waterfall 9027 (OKLA); Caddo Co.: Van Vleet June 21, 1903 (OKL); Cleveland Co.: Little 460 (OKL); Custer Co.: Mericle 922 (OKL); Dewey Co.: Stevens 887 (GH); Garvin Co.: Andrews 19 (OKL); Grady Co.: Albers 37 (OKL); Greer Co.: Bull 341 (OKL); Harmon Co.: Waterfall 8989 (OKL, OKLA); Jackson Co.: Bishop 107 (OKL); Kingfisher Co.: Grace 262 (OKL); Logan Co.: Smith 739 (OKL); Murray Co.: Merrill 450 (NY); Noble Co.: Harding 133 (OKLA);

Oklahoma Co.: Waterfall 2255 (GH, OKL); Payne Co.: Graumann 53 (OKLA); Pottawatomie Co.: McLean 204 (OKLA); Tulsa Co.: Rees 255 (OKLA); Woods Co.: Stevens 726 (GH, OKLA); TEXAS: Andrews Co.: Cory 13827 (GH); Archer Co.: McDaniel Oct. 15, 1934 (OKLA, TEX); Armstrong Co.: Whitehouse 17250 (SMU); Bexar Co.: Pennell 10354 (NY); Blanco Co.: Cory 15657 (GH); Bowie Co.: Heller 4252 (GH, NY, PH); Brazos Co.: Shinners 16627 (OKLA); Brewster Co.: Warnock 10881 (SMU); Brooks Co.: Beck May 8, 1951 (OKLA); Burleson Co.: Giesenschlag 7239 (OKLA, TEX); Cladwell Co.: McBryde 1931 (NY, TEX); Calhoun Co.: Tharp 1429 (TEX); Cameron Co.: Tharp 1206; Childress Co.: Iltis, Moore and Barkley 730 (UARK); Colorado Co.: Bush 1302 (NY); Comal Co.: Dapprich 7824 (SMU); Concho Co.: Whitehouse Aug. 31 1929 (NY, TEX); Dallas Co.: Reverchon (MICH, NY, PH); Denton Co.: Harris 1926 (TEX); DeWitt Co.: Tharp 1942 (TEX); Dimmitt Co.: Cory 29424 (GH); Duval Co.: Craft 11, (NY); Edwards Co.: Cory 35688 (GH); Ellis Co.: Lundell 9365 (MICH); El Paso Co.: Whitehouse 1931 (NY, TEX); Erath Co.: Gough May 5, 1921 (TEX); Fayette Co.: Ripple 51-635 (TEX); Galveston Co.: Ruth 1292 (MICH); Garza Co.: Pennell 10523 (NY, PH); Goliad Co.: Williams 100 (PH) Grayson Co.: Shinners 7811 (GH, SMU); Hall Co.: Reverchon 4312 (GH); Hardeman Co.: Small and Wherry 12179 (NY, TEX); Harris Co.: Hall 502 (GH, NY); Hays Co.: Johnson 420 (TEX); Hidalgo Co.: Cory 36293 (GH); Howard Co.: Cory 28788 (GH); Jeff Davis Co.: Cory 9601 (GH); Jim Hogg Co.: Johnston 54134 (TEX); Karnes Co.: Johnston 1098 (TEX); Kenedy Co.: Tharp 49238 (OKLA, TEX); Kerr Co.: Cory 19356 (GH); Kinney Co.: Cory 695 (GH); Kleberg Co. Reed 75 (NY); Lampasas Co.: Tharp May 3, 1934 (UC); Liveoak Co.: Tharp Mar. 22, 1931 (TEX); Lubbock Co.: Reed 4176 (COLO); Matagorda Co.: Cory 11559 (GH); Maverick Co.: Johnston,

Tharp and Turner 3584 (TEX); McLennan Co.: York 46114 (TEX); Medina Co.: Cory 11719 (GH); Menard Co.: Mahoney May 1, 1933; Midland Co.: Cory 39656 (TEX); Montgomery Co.: Dixon 501 (GH, NY); Nolan Co.: Stanfield Mar. 20, 1928 (TEX); Nueces Co.: Heller 1453 (GH, NY, UC); Palo Pinto Co.: Parks 7 (TEX); Parker Co.: Nicholson May 16, 1940 (TEX); Presidio Co.: Plank June 9, 1895 (NY); Recos Co.: Tharp 8822 (TEX); San Saba Co.: Palmer 11842 (TEX, UC); Schleicher Co.: Cory 32708 (TEX); Scurry Co.: Cory 49320 (SMU); Starr Co.: Tharp, Johnson and Webster 48-63 (TEX); Stephens Co.: Tharp June 13, 1941 (TEX); Sutton Co.: Cory 2386 (GH); Tarrant Co.: Ruth 99 (GH, NY, PH); Taylor Co.: Tolstead 5717 (GH, MICH, TEX); Tom Green Co.: Smith 116, (OKL); Travis Co.: Tharp 45-53 (COLO, NY, UC); Uvalde Co.: Cory 9924 (GH); Willacy Co.: Davis and Johnston 5325.16 (TEX); Wilbarger Co.: Ball 982 (NY); Wichita Co.: Small 561 (NY, TEX); Wheeler Co.: Tharp and Miller 51-340 (TEX); Webb Co.: Mackenzie 21 (NY); Walker Co.: Warner 27 (TEX); Zapata Co.: Clover 1688 (NY, MICH).

P. pensylvanica L., Species Plantarum, ed 2, 1670, 1762, is not accounted for in the above synonymy. A tracing from the Linnean herbarium on a Canby sheet of P. viscosa in the Gray Herbarium bears the annotation "pubescence very short stellular - same as in P. viscosa Hb. Linn." No stellate species is known from Pennsylvania. No disposition of it can be made from the photograph of the species from the Linnean Herbarium, other than to say that if it is indeed from North America, it might be a small, rotund-leafed phase of P. viscosa, var. maritima.

3. Physalis angustifolia Nuttall, Journ. Acad. Nat. Sci. Philad. 7:113.1834.

Perennial from a thick woody taproot, often with many branches;

leaves linear, (8) 10-20 times longer than wide; plants glabrous excepting on the tips or margins of the sepals; corolla yellow, unspotted to apparently spotted, but only lightly so, 8-20 mm. long; flowering calyx 5-10 mm. long, on peduncles 10-20 mm. long; fruiting calyx 2-3 cm. long on peduncles 1-3 cm. long.

Type: N. A. Ware "west Florida." It is in the Herbarium of the Philadelphia Academy of Natural Sciences. Its larger leaves are 6-8 cm. long and about 2-3 mm. wide.

Habitat, flowering time and distribution: Coastal sands, coral soil, or pine woods, Alabama to Mississippi with one collection from Louisiana; usually flowering from May to August, but a number of collections, particularly from Florida taken in flower in December, January and February.

Selected from 85 sheets of 64 collections: ALABAMA: Baldwin Co.: Mohr March 20, 1883 (GH, UARK); Mobile Co.: Mohr 1878 (NY, PH); FLORIDA: Bay Co.: Banker 3670, 3679 (NY); Collier Co.: Moldenke 1006 (DUKE, NY); Dade Co.: Moldenke 852 (DUKE, NY); Gulf Co.: Correll and Oosting 5630 (DUKE); Monroe Co.: Curtiss 114 (GH, MICH, NY, PH, UARK); Wakulla Co.: Griscom 21478 (GH); LOUISIANA: "seashore": Carpenter, July (PH); MISSISSIPPI: Jackson Co.: Baker July 25, 1897 (NY); Harrison Co.: Demaree 21911 (OKL, OKLA, TEX); Tracy May 8, 1898 (NY, MICH).

4. Physalis VARIOVESTITA Waterfall, sp. nov. Planta bivestita, pilis elongatis, 1-4 mm. longis, articulatis, simplicbus vel furcatis, et brevo-stellatis; caulibus erectis; foliis petiolatis; laminis ovatis dentatis vel subsimuato-dentatis; pedunculis petiolis longioribus; corollis luteis, fundo-maculatis; antheris luteis ca. 3 mm. longis.

The presence of abundant jointed hairs, 1-4 mm. long, in addition to a covering of stellate hairs, is the most obvious characteristic of this species. The long hairs are sometimes branched, sometimes simple. The plant is a perennial, 12-25 cm. tall, from a rhizome. The leaf blades are ovate, dentate to more or less sinuate-dentate, 2.5-3.5 cm. long and 2-3 cm. wide on petioles 1.5-2.3 cm. long. The nodding flowers are on peduncles 2-3 cm. long. The corollas are 1.5-2 cm. long and 2-3 cm. wide, with large dark markings on its limb near its junction with the tube. The flowering calyx is about 1 cm. long divided about one-third to one-half of the way into ovate-lanceolate, or lanceolate lobes. The anthers are yellow, ovate to ovate-oblong, about 3 mm. long.

Type: Eula Whitehouse 18179, back of Rockport Tourist cottages in sandy soil, live-oak belt, Rockport, Aransas Co., Texas, April 21, 1947 (MICH).

A number of collections radiating northward from this area have long articulated hairs present to a greater or lesser extent. These are found in specimens resembling both var. mollis and var. cinerascens, with a degree of variability in leaf size, margins, and stellate vestiture similar to that found in these two taxa.

Sheets approaching the type in vestiture are: Kenedy Co.: Cory 28408 (GH); Medina Co.: Johnston, Tharp and Turner 3401 (OKLA, TEX).

Collections more widely diverging from P. variovestita, but with several to few long jointed trichomes present in addition to the short stellae are: Austin Co.: Pennell 10300 (NY, PH); Bexar Co.: Metz 477 (UC); Caldwell Co.: Coll. unknown (J. B. McB.) 1931 (TEX); Cameron Co.: Tharp 1206 (TEX); DeWitt Co.: Riedel Apr. 5, 1942 (GH, OKLA);

Tharp and Turner 3584 (TEX); McLennan Co.: York 46114 (TEX); Medina Co.: Cory 11719 (GH); Menard Co.: Mahoney May 1, 1933; Midland Co.: Cory 39656 (TEX); Montgomery Co.: Dixon 501 (GH, NY); Nolan Co.: Stanfield Mar. 20, 1928 (TEX); Nueces Co.: Heller 1453 (GH, NY, UC); Palo Pinto Co.: Parks 7 (TEX); Parker Co.: Nicholson May 16, 1940 (TEX); Presidio Co.: Plank June 9, 1895 (NY); Recos Co.: Tharp 8822 (TEX); San Saba Co.: Palmer 11842 (TEX, UC); Schleicher Co.: Cory 32708 (TEX); Scurry Co.: Cory 49320 (SMU); Starr Co.: Tharp, Johnson and Webster 48-63 (TEX); Stephens Co.: Tharp June 13, 1941 (TEX); Sutton Co.: Cory 2386 (GH); Tarrant Co.: Ruth 99 (GH, NY, PH); Taylor Co.: Tolstead 5717 (GH, MICH, TEX); Tom Green Co.: Smith 116, (OKL); Travis Co.: Tharp 45-53 (COLO, NY, UC); Uvalde Co.: Cory 9924 (GH); Willacy Co.: Davis and Johnston 5325.16 (TEX); Wilbarger Co.: Ball 982 (NY); Wichita Co.: Small 561 (NY, TEX); Wheeler Co.: Tharp and Miller 51-340 (TEX); Webb Co.: Mackenzie 21 (NY); Walker Co.: Warner 27 (TEX); Zapata Co.: Clover 1688 (NY, MICH).

P. pensylvanica L., Species Plantarum, ed 2, 1670, 1762, is not accounted for in the above synonymy. A tracing from the Linnean herbarium on a Canby sheet of P. viscosa in the Gray Herbarium bears the annotation "pubescence very short stellular - same as in P. viscosa Hb. Linn." No stellate species is known from Pennsylvania. No disposition of it can be made from the photograph of the species from the Linnean Herbarium, other than to say that if it is indeed from North America, it might be a small, rotund-leafed phase of P. viscosa, var. maritima.

3. Physalis angustifolia Nuttall, Journ. Acad. Nat. Sci. Philad. 7:113.1834.

Perennial from a thick woody taproot, often with many branches;

leaves linear, (8) 10-20 times longer than wide; plants glabrous excepting on the tips or margins of the sepals; corolla yellow, unspotted to apparently spotted, but only lightly so, 8-20 mm. long; flowering calyx 5-10 mm. long, on peduncles 10-20 mm. long; fruiting calyx 2-3 cm. long on peduncles 1-3 cm. long.

Type: N. A. Ware "west Florida." It is in the Herbarium of the Philadelphia Academy of Natural Sciences. Its larger leaves are 6-8 cm. long and about 2-3 mm. wide.

Habitat, flowering time and distribution: Coastal sands, coral soil, or pine woods, Alabama to Mississippi with one collection from Louisiana; usually flowering from May to August, but a number of collections, particularly from Florida taken in flower in December, January and February.

Selected from 85 sheets of 64 collections: ALABAMA: Baldwin Co.: Mohr March 20, 1883 (GH, UARK); Mobile Co.: Mohr 1878 (NY, PH); FLORIDA: Bay Co.: Banker 3670, 3679 (NY); Collier Co.: Moldenke 1006 (DUKE, NY); Dade Co.: Moldenke 852 (DUKE, NY); Gulf Co.: Correll and Oosting 5630 (DUKE); Monroe Co.: Curtiss 114 (GH, MICH, NY, PH, UARK); Wakulla Co.: Griscom 21478 (GH); LOUISIANA: "seashore": Carpenter, July (PH); MISSISSIPPI: Jackson Co.: Baker July 25, 1897 (NY); Harrison Co.: Demaree 21911 (OKL, OKLA, TEX); Tracy May 8, 1898 (NY, MICH).

4. Physalis VARIOVESTITA Waterfall, sp. nov. Planta bivestita, pilis elongatis, 1-4 mm. longis, articulatis, simplicbus vel furcatis, et brevo-stellatis; caulibus erectis; foliis petiolatis; laminis ovatis dentatis vel subsinuato-dentatis; pedunculis petiolis longioribus; corollis luteis, fundo-maculatis; antheris luteis ca. 3 mm. longis.

The presence of abundant jointed hairs, 1-4 mm. long, in addition to a covering of stellate hairs, is the most obvious characteristic of this species. The long hairs are sometimes branched, sometimes simple. The plant is a perennial, 12-25 cm. tall, from a rhizome. The leaf blades are ovate, dentate to more or less sinuate-dentate, 2.5-3.5 cm. long and 2-3 cm. wide on petioles 1.5-2.3 cm. long. The nodding flowers are on peduncles 2-3 cm. long. The corollas are 1.5-2 cm. long and 2-3 cm. wide, with large dark markings on its limb near its junction with the tube. The flowering calyx is about 1 cm. long divided about one-third to one-half of the way into ovate-lanceolate, or lanceolate lobes. The anthers are yellow, ovate to ovate-oblong, about 3 mm. long.

Type: Eula Whitehouse 18179, back of Rockport Tourist cottages in sandy soil, live-oak belt, Rockport, Aransas Co., Texas, April 21, 1947 (MICH).

A number of collections radiating northward from this area have long articulated hairs present to a greater or lesser extent. These are found in specimens resembling both var. mollis and var. cinerascens, with a degree of variability in leaf size, margins, and stellate vestiture similar to that found in these two taxa.

Sheets approaching the type in vestiture are: Kenedy Co.: Cory 28408 (GH); Medina Co.: Johnston, Tharp and Turner 3401 (OKLA, TEX).

Collections more widely diverging from P. variovestita, but with several to few long jointed trichomes present in addition to the short stellae are: Austin Co.: Pennell 10300 (NY, PH); Bexar Co.: Metz 477 (UC); Caldwell Co.: Coll. unknown (J. B. McB.) 1931 (TEX); Cameron Co.: Tharp 1206 (TEX); DeWitt Co.: Riedel Apr. 5, 1942 (GH, OKLA);

Gillespie Co.: Bray 293 (TEX); Gonzales Co.: Bogusch 1868 (TEX); Cory 8366 (GH); Turner 3706 (TEX); Jim Hogg Co.: Tharp June 17, 1928 (TEX); Hidalgo Co.: Cameron 269 (TEX); Kenedy Co.: Johnston 53256.19 (TEX); Lundell 8715 (GH); Upshur Co.: Reverchon 3237 (NY); Victoria Co.: Coll. unknown Mar. 29, 1930 (TEX); Waller Co.: Hall 500 (GH, NY); Wilson Co.: Cory 7795 (GH); Parks 29530 (GH); Wood Co.: McMullen June 10, 1927 (TEX).

It is postulated that a population such as described above, and exemplified by the type collection, must exist in the area indicated in southern Texas, and that gene interchange has diluted its characteristics with those of P. viscosa var. mollis and var. cinerascens in an area radiating northward. Probably Edgar Anderson's method of extrapolated correlates[1] could have been used to predict the occurrence of P. variovestita on the basis of the intergrades found in approaching the area in which it grows.

5. Physalis pumila Nuttall, Trans. Am. Phil. Soc. 5(n.s.);193, 1836; P. lanceolata Michx., var. hirta Gray, Proc. Amer. Acad. Arts and Sci. 10:68. 1875.

Plants perennial, 15-45 cm. tall, often branched, usually covered with jointed hairs 1-2 mm. long, some of which are 1- to rarely 3-branched, and which spread at right angles from the stem. Leaf blades ovate to ovate-lanceolate, or rarely lanceolate, some times somewhat rhombic, tapering to a more or less winged petiole; larger blades (4) 6-9 cm. long and (2.5) 3-5 cm. broad, on petioles 1-3 cm. long; leaf margins usually entire, but sometimes slightly and irregularly simuate-

[1]Edgar Anderson, Introgressive Hybridigation, (New York: John Wiley and Sons, 1949), 92-93.

or repand-dentate; corolla 12-20 mm. long, and about 15-25 mm. wide at the top; anthers usually 2.5-3 mm. long, yellow; flowering calyx usually 10-15 mm. long with free lanceolate-deltoid sepal tips about one-third as long; flowering peduncles 15-30 mm. long; fruiting calyx usually 15-20 mm. wide and 3-4 cm. long, much inflated around the fruit, on reflexed peduncles 25-40 mm. long.

Type: Nuttall, Arkansas. The type is representative of the extreme having few branched hairs. It was collected at, or near, the eastern limit of its range in this area. It is in the Herbarium of the Academy of Natural Sciences of Philadelphia.

Habitat, distribution and flowering time: Growing in prairies, open woods and disturbed habitats, primarily in western Missouri, eastern Kansas, eastern Oklahoma and adjacent Texas; usually flowering in May, June, July and August, perhaps flowering earlier in the southern part of its range, as fruiting specimens have been collected in May in Texas.

Selected from 164 sheets of 142 collections: ARKANSAS: Sebastian Co.: Armstrong 186 (TEX, UARK); Washington Co.: Hill 23 (UARK); ILLINOIS: Peoria Co.: Chase 3570 (NY, UC); KANSAS: Butler Co.: Chase 2033 (NY); Cowley Co.: White June 1898 (NY); Douglas Co.: McGregor 9661 (KANU); Geary Co.: Imler May 24, 1929 (KANU); Greenwood Co.: Horr June 28, 1930 (KANU) Jefferson Co.: Horr #77 (DUKE); Linn Co.: Rydberg and Imler 91 (KANU, NY); Marion Co.: Pringle June 18, 1855 (GH); McPherson Co.: Waugh Aug. 20, 1893 (NY); Montgomery Co.: McGregor 10220 (KANU); Osage Co.: McGregor 1544 (KANU); Sedgwick Co.: Poole 277 (GH); Wabaunee Co.: McGregor 9148 (KANU); MISSOURI: Barry Co.: Palmer 30429 (PH); Cedar Co.:

Steyermark 74337 (SMU); Clay Co.: Mackenzie July 16, 1899 (NY); Dickinson Co.: Imler June 4, 1929 (KANU); Green Co.: Bush 264A (GH); Jackson Co.: Bush 264 (NY, UC); Jasper Co.: Palmer 32405 (NY); Lafayette Co.: Demetrio 115 (GH); Mason Co.: Bush 7598 (GH, NY); Polk Co.: Steyermark 23944 (NY); Pottawatomie Co.: Imler June 10, 1929 (KANU); St. Louis Co.: Letterman July 20, 1894 (NY, PH, TEX); Vernon Co.: Palmer 42142 (NY); OKLAHOMA: Cherokee Co.: Wallis 620 (OKLA); Choctaw Co.: Waterfall 11282 (OKLA, TEX); Cleveland Co.: Bebb 4075 (OKL); Comanche Co.: Waterfall 9132 (OKL, OKLA); Garvin Co.: Andrews 167 (OKL); Kay Co.: Byler 296 (OKLA); Kingfisher Co.: Grace 262 (GH); Latimer Co.: Butler June 21, 1877 (NY); Logan Co.: Keyser 6035 (NY); McCurtain Co.: Sears 1439a (OKL); McIntosh Co.: Bebb 4281 (OKL); Murray Co.: Hopkins 3953 (OKL, OKLA); Muskogee Co.: Bebb 4281 (OKL); Oklahoma Co.: Waterfall 1949 (OKL); Payne Co.: Coryell 288 (OKLA); Pittsburg Co.: Simmons 77 (SMU); Pontotoc Co.: McCoy 2929 (OKLA); Tulsa Co.: McLean 200 (OKLA); Wagoner Co.: Pennell 10612 (NY, PH); TEXAS: Dallas Co.: Reverchon 381 (GH); Grayson Co.: Bebb 2706 (OKL); Harris Co.: Hall 501 (GH, NY); Henderson Co.: Lundell 9560 (GH, MICH); Van Zandt Co.: Reverchon May 21, 1900 (NY); Wood Co.: Lundell 9426 (MICH).

6. Physalis arenicola Kearney, Bull. Torr. Bot. Club 21:485. 1894.

Plants perennial from cord-like rhizomes which are near the surface, usually 15-30 cm. tall, simple or branched; hairs short and antrorse, sometimes viscid, in var. ciliosa 1-2 mm. long, jointed, spreading and more or less abundant; leaf blades ovate to ovate-rhombic, the larger ones usually 2-6 cm. long and 2-4 cm. wide on petioles 1-3 cm.

long; leaf margins irregularly dentate to sinuate or entire; corollas 10-20 mm. long, yellow with slightly darker spots on the limb near its base; flowering calyx 7-11 mm. long, its lobes 2-4 mm. long; flowering peduncle 10-25 mm. long; fruiting calyx 20-30 mm. long and 15-25 mm. wide, much inflated around the fruit.

Type: Kearney cited several collections of Nash's when he described P. arenicola. Since no holotype was designated, the author selects the following from among the cited collections: George V. Nash 1170, dry sandy soil, high pine land, vicinity of Eustis, Lake County, Florida, July 1-15, 1894 as the LECTOTYPE. Iso-lectotypes are to be found in the herbaria of the University of California and the New York Botanical Garden.

Habitat, distribution and flowering time: Sand dunes, ridges, sandy oak woods, pine woods and disturbed sandy areas, primarily in Florida, but also in adjacent Georgia and Mississippi; flowering March through August.

6a. Physalis arenicola, var. arenicola, cited above.

Selected from 28 sheets of collections: FLORIDA: Alachua Co.: Wiegand and Manning 2810 (GH); Brevard Co.: Curtiss 5713 (GH, UC); Duval Co.: Curtiss 6644 (GH, NY, UC); Lake Co.: Nash 1170 (GH, UC); Levy Co.: Garber Nov. 1877 (GH); Marion Co.: Moldenke 1090 (DUKE); Palm Beach Co.: Small 8514 (DUKE, GH); Sumter Co.: Curtiss 6634 (GH); Volusia Co.: Small 8692 (DUKE, GH); GEORGIA: Lowndes Co.: Harper 1594 (GH, NY).

6b. Physalis arenicola Kearney, var. CILIOSA (Rydb.) Waterfall, comb. et stat. nov., P. ciliosa Rydb., Mem. Torr. Bot. Club 4:346. 1898.

Type: In describing P. ciliosa Rydberg stated "Chapman (in

Herb. J. Donnell Smith, Harvard University, Columbia College, and A. W. Chapman, type)." As LECTOTYPE the author chocses a sheet (GH) showing both flowering and fruiting plants. Iso-lectotypes are: GH, a second sheet, NY and OKL.

Selected from 35 sheets of 33 collections: FLORIDA: Alachua Co.: Walker 1917 (OKLA); Brevard Co.: Small and DeWinkeler 2468 (NY); Gadsden Co.: Berg (NY); Hendry Co.: Moldenke 1018 (DUKE, NY); Highlands Co.: Small, Mosier and DeWinkeler 10906 (NY); Lee Co.: Moldenke 946 (DUKE, NY); Levy Co.: Oosting 139 (DUKE); Osceola Co.: Singletary Apr. 28, 1938 (DUKE); Polk Co.: McFarlane 5021 (MICH); Santa Rosa Co.: McFarlane and Goertz June 17, 1905 (DUKE); Sarasota Co.: Rusby April 1935 (NY); Sumter Co.: Curtiss 6634 (UC); GEORGIA: Calhoun Co.: Thorne 3321 (GH); Chatham Co.: Gay (GH); Charlton Co.: Small June 12-15, 1895; MISSISSIPPI: Jackson Co.: Skehan May 10, 1895 (GH).

The following specimens, all from Florida, seem to be intermediate between var. arenicola and var. ciliosa: Collier Co.: Small 10477 (NY); Dade Co.: Small and Small 6825 (GH, NY); Volusia Co.: Small 8692 (GH, DUKE).

7. Physalis heterophylla Nees, Linnaea 6:463. 1831; synonomy cited under the varieties.

Stems usually erect from a deeply buried rhizome, 15-90 cm. tall, simple or branched; herbage densely to sparsely covered with varying proportions of short usually viscid hairs and glandular hairs, together with long jointed hairs which are usually 1-2 mm. long; sometimes only a few long hairs are present; rarely, as in var. villosa, the stems are villous with long multicellular hairs; leaf blades usually broadly to

narrowly ovate, or ovate-rhombic, the principal ones usually 5-10 cm. long and 3.5 to 6 cm. wide on petioles 3-6 cm. long; corollas 10-18 mm. long, yellow with brownish, sordid or blue-tinged spots on the limb near its base; flowering calyx 7-12 mm. long, its lobes 3-5 mm. long, lanceolate-triangular, sometimes acuminate; anthers usually 3-4.5 mm. long, yellow, sometimes tinged with blue; filaments thickened, often as wide as the anthers, frequently clavate; fruiting calyx usually 2.5-3 cm. long and 2-3 cm. wide, much inflated around the fruit, borne on peduncles 1.5-4 cm. long.

7a. Physalis heterophylla Nees, var. heterophylla, loc. cit. supra; P. virginiana Mill., var. ambigua Gray, Proc. Amer. Acad. Arts and Sciences 10:65. 1875; P. nyctaginea Dunal, DeCandolle, Prodromus 13(1):440-441. 1852; P. ambigua (Gray) Britton, Mem. Torr. Bot. Club 5:287. 1894; P. heterophylla, var. umbrosa Rydberg, Contr. U. S. Natl. Herb. 3:172. 1895; P. heterophylla, var. ambigua (Gray) Rydberg, Mem. Torr. Bot. Club 4:349. 1896; P. sinuata Rydb., in Small's Flora:986. 1913.

This is an extremely variable assemblage as indicated in the preceding description, which, with stated exceptions, covers var. heterophylla, only two localized varieties being recognized. Formas (the species or varieties of earlier authors) might be distinguished on the basis of dentation of leaves, or of vestiture, but many specimens would be assignable only on an arbitrary basis, even if some of the extremes seem quite striking. An example is the densely stiff-haired form often found on sands at various localities in the range of the species.

Type: "In collibus argillosis Pennsylvanicae Poeppig legit."

Habitat, range and flowering time: Open woods, prairies, hillsides, fields and other disturbed habitats, principally in the eastern United States and adjacent Canada, the prairie and plain region westward into the central and northern rockies and the Great Basin; flowering from June to August in Canada and from April to September in Texas.

Selected from 637 sheets of 576 collections: CANADA: ONTARIO: Cameron July 4, 1901, Niagra (GH, NY); Dodge July 11, 1911, Pt. Edward (TEX); Grassl 3762 (MICH, NY); Jacque, Marie-Victorin and Rolland-Germain 49238, Points Pelle (GH); Macoun 5813, Chatham (GH); Senn and Soper 414, Long Point (GH, NY); White 2, Snelgrove (GH); OTTAWA: Minshall 239 (NY); Rolland 13020, Ile Lemieux (GH); Victorin 10119, Ottawa (NY); QUEBEC: Gerard 1628, Granby (NY); Victorin 4304, Longeuil (GH); Victorin 18430 (GH); Victorin, Germaine and Jacques 43403, Baie-de-Pontiac (GH); UNITED STATES: ALABAMA: Jackson Co.: Earle June 30, 1899 (NY); Tuscaloosa Co.: Harper 3967 (NY); ARIZONA: San Francisco Mts.: Toumey 410 (UC); ARKANSAS: Chesterfield Co.: Iltis June 27, 1941 (UARK); Drew Co.: Demaree 21138 (NY, OKL, OKLA, UARK); Garland Co.: Chase 9960 (TEX); Hot Springs Co.: Demaree 17464 (NY); Lincoln Co.: Demaree 20826 (NY); Newton Co.: Moore 430238 (UARK); Sebastian Co.: Armstrong 185 (UARK); Washington Co.: French 521 (UARK); COLORADO: Boulder Co.: Tweedy 5229 (NY); Denver Co.: Payson Aug. 21, 1919 (COLO); El Paso Co.: Barnhart 489 (NY); Jefferson Co.: Ewan 14555 (COLO); Larimer Co.: Osterhout 3633 (NY); Weld Co.: Johnston 653 (NY); CONNECTICUT: Fairfield Co.: Eames 8530 (GH); Hartford Co.: Andrews 807 (NEBC); Litchfield Co.: Evans July 1922 (NEBC); Middlesex Co.: Wright July 12, 1882 (GH); New Haven Co.: Harger Aug. 22, 1896 (GH, NEBC); New London Co.: Woodward Aug. 2, 1906 (NEBC); Tolland Co.:

Pease 1165 (NEBC); Windham Co.: Weatherby 5353 (NEBC); DELAWARE: Newcastle Co.: Morong Sept. 1, 1873 (NY); Randolph 99 (GH); FLORIDA: Chapman (GH); GEORGIA: Chatham Co.: Eyles 4370 (DUKE); Clarke Co.: Perry 1012 (GH); IDAHO: Allen 1873; ILLINOIS: Adams Co.: Seymore July 25, 1876; Champaign Co.: Pease 13035 (GH); Cook Co.: Greenman 2044 (GH); Du Page Co.: Umbach 3202 (GH); Henry Co.: Dobbs 19, (GH); Jackson Co.: Gleason 1838 (GH); Mason Co.: Gleason 9203 (NY); McHenry Co.: Vasey (NY, UC); Peoria Co.: McDonald Aug. 1904 (GH); Piatt Co.: Seymore June 8, 1906 (DUKE); Stark Co.: Eaton 140 (GH); INDIANA: Cass Co.: Ek Aug. 22, 1942 (OKLA); Clarke Co.: Umbach July 12, 1898 (GH); Greene Co.: Umbach 8100 (OKLA); Hamilton Co.: Friesener 17235 (NY, TEX); Lagrange Co.: Deam 14944 (NY); Laporte Co.: Friesener 17448 (OKLA); Lawrence Co.: Kriebel 3285 (DUKE, GH); Marshall Co.: Deam 7559 (NY); Monroe Co.: Foley July 21, 1946 (TEX); Noble Co.: Deam 57846 (OKL); Porter Co.: Peattie Aug. 10, 1920 (GH); Tippecanoe Co.: Friesener 19362 (OKL, TEX); IOWA: Benton Co.: Davis 1877 (OKLA); Dickinson Co.: Hayden 3064 (TEX); Fayette Co.: Fink July 2, 1894 (GH); Muscatine Co.: Shimek June 23, 1925 (UARK); Palo Alto Co.: Hayden 2055 (GH); Story Co.: Pammell and Ball 81 (GH, NY); Warren Co.: Pammell, Doty and Pammell Sept. 26, 1924 (OKL); Worth Co.: Wallis Aug. 21, 1950 (OKLA); KANSAS: Boubon Co.: Thompson 631 (KANU); Brown Co.: Agrelina, Hall and Lovejoy Aug. 23, 1913 (KANU); Douglas Co.: McGregor 606 (KANU); Geary Co.: Gayle 601 (NY); Lyon Co.: Horr June 20, 1930 (KANU); Osborne Co.: Shear 159 (GH); McPherson Co.: McGregor 10736 (KANU); Riley Co.: Hitchcock 209 (GH); Shawnee Co.: Volle 606 (KANU); Woodson Co.: Horr July 11, 1930; KENTUCKY: Lyon Co.: Eggleston 4543 (NY); Paducah Co.: Eggleston 4451 (NY); Wayne Co.: Smith and Hodgdon 3969 (GH); LOUISIANA:

Ouachita Co.: Smith May 11, 1941 (COLO, OKL); St. Martin Co.: Langlois 2 (NY); MAINE: Androscoggin Co.: Furbish 1893 (NEBC); Cumberland Co.: Chamberlain 121 (NEBC); Franklin Co.: Knowlton 531 (NEBC); Kennebec Co.: Fernald Sept. 25, 1893 (NEBC); Oxford Co.: Parlin Aug. 1893 (NEBC); Piscataquis Co.: Fernald Aug. 31, 1897 (NEBC); Waldo Co.: Rossbach 716 (NEBC); York Co.: Perkins 1893 (GH); MARYLAND: Baltimore Co.: Iltis 1113 (UARK); Comico Co.: Canby 1865 (NY); MASSACHUSETTS: Barnstable Co.: Collins 2743 (NEBC); Berkshire Co.: Weatherby 7348 (NEBC); Essex Co.: Pease 2138 (NEBC); Franklin Co.: Churchill June 27, 1925 (NEBC); Hampden Co.: Seymour S741 (DUKE); Hampshire Co.: Seymour 4405 (DUKE); London Co.: Morong Aug. 21, 1879 (NY); Middlesex Co.: Rossbach 966 (NEBC); Norfolk Co.: Kidder July 9, 1915 (NEBC); Plymouth Co.: Poole 278 (GH); Suffolk Co.: Palmer 39636 (NEBC); Worcester Co.: Seymore 5851 (DUKE, NEBC); MICHIGAN: Allegan Co.: Wheeler Aug. 25, 1896 (GH); Alpena Co.: Wheeler July 3, 1895 (GH); Eaton Co.: Deane Sept. 19, 1885 (GH); Emmet Co.: Webb July 22, 1950 (OKL); Ingham Co.: Toumey Sept. 20, 1890 (ARIZ); Ionia Co.: Smith 1887 (GH); Kalamazoo Co.: Hanes 2249 (NY); Keweenaw Co.: Farwell 623 (GH, NY); Lambton Co.: Dodge 17, (NY); Menominee Co.: Grassl 3597 (NY); St. Claire Co.: Dodge June 21, 1896 (NY); Washtenaw Co.: Hermann 9239 (NY); Wayne Co.: Kriebel 5407 (DUKE); MINNESOTA: Hennepin Co.: Sandberg 975 (ARIZ); Houston Co.: Rosendahl June 10, 1902 (GH); Mille Lacs Co.: Sheldon July 1892; Nicollet Co.: Ballard July 1892; Wabash Co.: Manning Aug. 5, 1883 (NY); MISSISSIPPI: Harrison Co.: Tracy 5154 (NY); MISSOURI: Boone Co.: Drouet 855 (GH); Clay Co.: Mackenzie July 16, 1899 (NY); Jackson Co.: Bush 771 (GH); Lafayette Co.: Demetrio 113 (GH); Oregon Co.: Palmer and Steyermark 41689 (NY); Ozark Co.:

Steyermark 66250 (UARK); Polk Co.: Steyermark 71370 (NY); St. Louis Co.: Engelmann Aug. 1861 (GH); Taney Co.: Eggleston 12254 (NY); NEBRASKA: Custer Co.: Bates June 18, 1901 (GH); Frontier Co.: Rydberg 268 (NY); Kearney Co.: Hapeman July 3, 1928 (DUKE); Knox Co.: Clements 2688 (GH); Lancaster Co.: Rydberg Sept. 1895 (NY); Phelps Co.: Hapeman Aug. 24, 1931 (TEX); Thomas Co.: Rydberg 1497 (NY); Washington Co.: MacDougal 10 (NY); NEW HAMPSHIRE: Cheshire Co.: Fernald 549 (GH); Coos Co.: Pease 16918 (NEBC); Correll Co.: Farlow June 1911 (NEBC); Grafton Co.: Brown July 20, 1939 (DUKE); Hillsboro Co.: Batchelder Sept. 6, 1913 (NY); Merrimac Co.: Bullard Aug. 26, 1933 (NEBC); Orange Co.: Reed Oct. 6, 1931 (DUKE); Rockingham Co.: Pease 13687 (NEBC); NEW JERSEY: Middlesex Co.: Kennedy 59 (GH); Monmouth Co.: Willis (MICH); Somerset Co.: Moldenke 2704 (NY); Sussex Co.: Britton Sept. 11, 1887 (NY); Union Co.: Moldenke 6191 (NY); NEW YORK: Albany Co.: Peck (NY); Chautauqua Co.: Southworth (MICH); Erie Co.: Clinton (NY); Madison Co.: House 24448 (NY); New York Co.: Kneishern (NY); Oneida Co.: Haberer 1537 (GH); Orange Co.: Thurber (GH); St. Lawrence Co.: Phelps 846 (GH, NY); Saratoga Co.: Burnham Sept. 25, 1909 (GH); Seneca Co.: Wiegand 3104 (GH); Suffolk Co.: Latham 4047 (GH); Warren Co.: House 28076 (OKL); Washington Co.: Burnham June 25, 1904 (GH); NORTH CAROLINA: Granville Co.: Batson 1225 (DUKE); Forsyth Co.: Batson 1124 (DUKE); Durham Co.: Blomquist 4808 (DUKE); Caswell Co.: Batson 1226 (DUKE); OHIO: Gleason Sept. 24, 1904 (GH); Hamilton Co.: Lloyd (GH); Haywood Co.: Oosting 34399 (DUKE); Lake Co.: Werner 2054 (GH); Lorain Co.: Ricksecker July 23, 1894 (NY); Portage Co.: Webb 1547 (GH); Richland Co.: Wilkinson 7826 (NY); Trumbull Co.: Webb 457 (GH); Warren Co.: Harger 8174 (GH); Wood Co.: Moseley Sept. 1918 (GH);

OKLAHOMA: Blaine Co.: Waterfall 8166 (OKL, OKLA, TEX); Cherokee Co.: Wallis 1180 (OKL); Cleveland Co.: Bebb 4075 (OKLA); Custer Co.: Waterfall 7337 (OKL, OKLA, TEX); Le Flore Co.: Blakely 1440 (NY, OKL); Logan Co.: Goodman 2125 (GH, OKL); McCurtain Co.: Houghton 3777 (GH); Murray Co.: Merrill 1062 (NY); Muskogee Co.: Waterfall 10241 (OKLA, SMU); Oklahoma Co.: Waterfall 2858 (OKL); Payne Co.: Renfro 141 (OKLA); Pontotoc Co.: McCoy 1667 (OKLA); Pottawatomie Co.: McLean (OKLA, TEX); PENNSYLVANIA: Allegheney Co.: Porter 1869 (NY); Bucks Co.: Meredith May 30, 1921 (GH); Center Co.: Wahl July 12, 1937 (GH); Chester Co.: Pennell 11878 (NY); Fayette Co.: Core 2940 (NY); Lancaster Co.: Heller July 1, 1901 (GH); Ludawanna Co.: Glowenke 457 (GH); Mercer Co.: Porter July 27, 1893 (GH); Monroe Co.: Glowenke 691 (GH); Northampton Co.: Schaeffer 17804 (GH); Potter Co.: Moldenke 19384 (NY); York Co.: Britton July 2-6, 1904 (NY); RHODE ISLAND: Barrington Co.: Collins Oct. 14, 1933 (NEBC); Kent Co.: Bailey (GH); Providence Co.: Leland Aug. 29, 1928 (NEBC); SOUTH CAROLINA: Oconee Co.: coll. unknown, July 5, 1897 (NY); SOUTH DAKOTA: Custer Co.: Rydberg 908 (NY); Stanley Co.: Over 6101 (COLO); Washabaugh Co.: Visher 2053 (NY); TENNESSEE: Davidson Co.: Gattinger (NY); Frank Co.: Rurh 525 (NY); Rutherford Co.: Quarterman 3023 (DUKE); TEXAS: Anderson Co.: Marsh 83 (TEX); Burnet Co.: Rogers, Albers and Barksdale 6864 (TEX); Caldwell Co.: McBryde 1931 (TEX); Dallas Co.: Bebb 1322 (OKL); Erath Co.: Gough July 5, 1921 (TEX); Gonzales Co.: Cory 8365 (GH); Harrison Co.: Cory 22884 (GH); Hays Co.: Stanfield July 1895 (NY); Jim Hogg Co.: Tharp June 17, 1928 (TEX); Kerr Co.: Cory 24914 (GH); Lampasas Co.: Tharp May 3, 1934 (GH, OKLA, TEX); Marion Co.: Turner and Tharp 3098 (TEX); Mclennan Co.: Smith 620 (OKLA); Palo Pinto Co.: McVaugh 8340 (TEX); San Saba Co.:

Palmer 11801 (TEX); Smith Co.: Moore 949 (GH); Travis Co.: Lundell and Lundell 9093 (MICH); Walker Co.: Palmer 12022 (UC); Wichita Co.: Tharp 1334 (TEX); Williamson Co.: Tharp May 5, 1930 (OKLA); UTAH: Salt Lake Co.: Garrett 3033 (NY); VERMONT: Addison Co.: Knowlton July 10, 1935 (NEBC); Bennington Co.: Day 413 (GH, NEBC); Caledona Co.: Pease 27660 (NEBC); Chittendon Co.: Kent July 20, 1909 (NEBC); Orleans Co.: Winslow Aug. 1809 (NEBC); Willoughby Co.: Kennedy July 26, 1898 (NEBC); Rutland Co.: Kennedy Aug. 3, 1907 (GH); Windham Co.: Blanchard 5 (NY); Windsor Co.: Underwood 2316 (NEBC) VIRGINIA: Albemarle Co.: Dodge July 1889 (MICH); Bedford Co.: Curtiss Aug. 28, 1871; Brunswick Co.: Fernald and Lewis 14660 (GH); Fauquier Co.: Allard9620 (GH); Frederick Co.: Hunnewell 14019 (GH); Greensville Co.: Fernald and Long 9428 (GH); Isle of Wight Co.: Fernald and Long 12795 (GH); Lee Co.: Small July 27, 1892 (NY); Pendelton Co.: Allard3596 (GH); Prince George Co.: Fernald and Long 9427 (GH, NY); Shenandoah Co.: Hunnewell 13056 (GH); Southampton Co.: Fernald and Long 10412 (GH); Spotsylvania Co.: Iltis 1061 (UARK); Surry Co.: Fernald and Long 8840 (GH); Sussex Co.: Fernald, Griscom and Long 6684 (GH); WEST VIRGINIA: Greenbrier Co.: Hunnewell 2915 (GH); Tyler Co.: Berkeley June 17, 1930 (GH); WISCONSIN: Dane Co.: Watson (NY); Lacrosse Co.: Fassett 9800 (GH); Lincoln Co.: Seymore 14325 (SMU); WYOMING: Crook Co.: Porter 3449 (GH, TEX); Big Horn Co.: Porter 6695 (NY).

7b. Physalis heterophylla Nees, var. clavipes Fernald, Rhodora 49:178. 1947.

Type: Fernald, Long and Clement 15347, sand woods near Darden's Pond, northeast of Courtland, Southampton Co., Virginia, (GH); isotype (NY). Known only from the type collection.

7c. Physalis heterophylla Nees, var. VILLOSA Waterfall, var. nov., caulibus dense articulato-villosis, pilis 2-4 mm. longis.

The abundant, soft, long jointed hairs, 2-4 mm. long, characterize this variety. The leaf size and margin vary in a manner comparable to var. heterophylla.

Type: Earle June 2, 1901, moist hillsides thick woods, Lee County, Alabama. The TYPE and the ISOTYPE are in the Herbarium of the New York Botanical Garden.

Collections examined: ALABAMA: Lee Co.: Earle June 2, 1901 (NY); F. S. Earle May 10, 1896, Auburn (NY); FLORIDA: Gadsden Co.: Berg Summer (NY); Walton Co.: A. H. Curtiss June 1886, De Funiak Springs (NY); County undetermined: W. M. Buswell April 9, 1931, Pine Woods, East Fort Meyers (NY); TEXAS: doubtfully referred here is Tharp April 19, 1930, East Texas coast (TEX).

P. heterophylla appears to intergrade with P. virginiana in some areas, producing individuals with varying indument and leaf-shape, including lanceolate. Such specimens are found in South Carolina from which Michaux described his P. lanceolata, Flora Boreali-americana 149. 1803. Examples are: Gibbes, in 1834, Columbia, S. Car. (NY); Gibbes Aug. 1835, South Carolina (NY); Ravenel, Aiken, South Carolina (NY). The photograph of the type of P. lanceolata in the Gray Herbarium appears to match these specimens fairly well. The author believes that it was on such a specimen that Michaux based his species. This leaves the population of the western prairies and plains, which has been passing under the name P. lanceolata, without a name. It will be treated under P. virginiana.

Other collections believed to be P. heterophylla intergrades are: CONNECTICUT: Bishop Sept. 1902, Norwich (GH); GEORGIA: Harper 93, Dry fields, Clarke Co., June 29, 1900 (NY); coll. unknown (herb. Schw. sub nom. "P. obscura Baldw., Georgia") (PH); NORTH CAROLINA: Williamson Aug. 1900, Wilmington (PH); Small, July 1896, Summit of Paris Mt. (NY).

8. Physalis peruviana L., Species Plantarum, ed. 2, 1670. 1762. P. peruviana, var. latifolia (Lam.) Dunal, in DeCandolle, Prodromus 13(1):440. 1852, based on P. latifolia Lamarck, Tableau Encyclopedique et Methodique ... Bot. 2:29. 1793, is the only snyonymy that has been applied in the area under consideration.

An erect branching perennial, densely villous but not glandular; leaf blades ovate, extending into an acuminate tip; corolla blue-spotted; anthers about 3 mm. long, blue, on slender filaments. This species resembles P. heterophylla, but may be distinguished by the narrow filaments and the rather strongly acuminate leaves, as well as by the blue anthers (sometimes the anthers are violet-tinged in P. heterophylla) and by the darker, bluish spots of the corolla.

Type: "Habitat Limae."

This species is sometimes introduced, and may rarely escape. Some examples are: Kidder Oct. 3, 1926, Norfolk Co., Mass. (NEBC); Martindale Sept. 1879 Camden, New Jersey (NY); Brinkley 222, Sevier Co., Arkansas (TEX) ?; Earle June 26, 1899, Lawrence Co., Alabama (NY)?.

9. P. virginiana Miller, Gardener's Dictionary, ed. 8: no. 4. 1768. The synonymy is given under the varieties.

Stems from a deep rhizome, simple or branched; plants nearly glabrous, or with long hairs, or short curved trichomes; leaf blades

from ovate to linear-lanceolate; corolla from 15-25 mm. long, yellow, dark-spotted; anthers 2-4 mm. long, yellow or blue- or violet-tinged; filaments from one-third as wide to nearly equalling the width of the anthers; calyx from one-half to two-thirds as long as the corolla; flowering peduncles about equalling the flower to 1½ times its length; fruiting calyx inflated, usually 25-35 mm. long and ovate to ovate-oblong, but sometimes much larger, particularly in one forma.

The varieties described below seem to intergrade more or less with each other, making the disposition of individual specimens sometimes difficult. However they seem to represent natural populations, in some instances covering large geographic areas, which are fairly distinct as groups.

9a. Physalis virginiana Miller, var. virginiana, loc. cit. supra; P. virginiana Mill., var. intermedia Rydb., Mem. Torr. Bot. Club 4:345. 1895; P. monticola Mohr, Bull. Torr. Bot. Club 26:119-120. 1899.

Plants villous with long jointed hairs, or having only short retrose ones; leaf blades ovate to lanceolate (rarely narrowly so), their margins irregularly dentate to simuate-dentate; corolla usually 15-20 mm. long; anthers yellow, or sometimes with a blue or violet tinge.

Type: None cited by Miller. It is supposed to be present in the Sloane Herbarium of the British Museum.

Habitat, distribution and flowering time: Growing in open woods, prairies and disturbed areas in most of the eastern United States, and adjacent Canada, extending, generally, into the eastern part of the prairie region, with a few collections from the central Rockiss; flowering in June and July in the northern part of its range, and usually from

April to June in the southern part.

Selected from 358 sheets from 335 collections: CANADA: MANITOBA: Macoun and Herriot 78425 (GH, NY); Thornton Oct. 1892 (MICH); ONTARIO: Macoun 54525 (NY); QUEBEC: Marie-Victorin, Rolland-Germain and Dominique 46421 (GH); UNITED STATES: ALABAMA: Calhoun Co.: Tracy 7609 (NY); DeKalb Co.: Mohr, June 2, 1892 and Sept. 18, 1898 (US); Jackson Co.: Porter June 24, 1938 (GH); Lee Co.: Earle and Underwood Apr. 25, 1896 (NY); central Alabama: Buckley 1 (NY); ARKANSAS: Faulkner Co.: Demaree 6336 (UARK); Franklin Co.: French 528 (OKLA, UARK); Garland Co.: Palmer 29175 (UARK); Hot Springs Co.: Demaree 11825 (NY); Logan Co.: Pyle 327 (UARK); Nevada Co.: Moore 450044 (UARK); Pope Co.: Woolsey, May 1923 (UARK), Pulaski Co.: Pennell 10648 (NY); Sevier Co.: Brinkley 85 (TEX); Stone Co.: Moore 450450; Washington Co.: Harvey 137 (UARK); COLORADO: Boulder Co.: Tweedy 5231 (NY); El Paso Co.: Ehlers 519 (MICH); CONNECTICUT: Fairfield Co.: Setchell Aug. 16, 1885 (UC); Hartford Co.: Andrews July 12, 1902 (GH); DELAWARE: Sussex Co.: Commons June 6, 1893 (PH); FLORIDA: Lafayette Co.: Gardner 679 (NY); GEORGIA: Dade Co.: McVaugh 9027 (MICH); DeKalb Co.: Whitaker May 8, 1936 (UC); Floyd Co.: Chapman (NY); Fulton Co.: Canby May 1869 (NY); Macon Co.: Earle 1895 (NY); McIntosh Co.: Correll 5472 (DUKE); Richmond Co.: Cuthbert 512 (NY); Screven Co.: Cronquist 5019 (NY); Whitfield Co.: Harper 242 (GH); ILLINOIS: Champaign Co.: Pease 11936 (GH); Cook Co.: Chase 1364 (GH); Hebderson Co.: Patterson Oct. 4, 1872 (NY); Jo Daviess Co.: Hermann 8796 (NY); Kanakee Co.: Jones 11499 (GH, NY); Lake Co.: Gates 2463 (MICH); Mason Co.: Gleason Aug. 14, 1903 (GH); McLean Co.: Vasey (GH); Menard Co.: Hall 1862 (NY); Peoria Co.: McDonald June 1904, in part (GH),

Chase 11945 (OKL, UC); Stark Co.: Chase 595 (GH); Union Co.: Earle 766 (NY); Will Co.: Clute 17 (NY); Winnebago Co.: Bebb 1870 (GH); INDIANA: Jasper Co.: Friesener 20576 (OKL, OKLA); Lagrange Co.: Deam 20193 (GH, NY); Laporte Co.: Mell 152 (GH, NY); Lake Co.: Gates 2204 (MICH); Marion Co.: Friesener 10100 (UC); Newton Co.: Hermann 6584 (MICH, NY); Porter Co.: Peattie Sept. 4, 1920 (GH); Starke Co.: Deam 61474 (DUKE, UC); Steuben Co.: Deam June 22, 1937 (OKL); Washington Co.: Brooks Aug. 5, 1930 (LIL); IOWA: Allamakee Co.: Tolstead July 26, 1933 (UC); Cerro Gardo Co.: Shimek Sept. 14, 1920 (UARK); Decatur Co.: Fitzpatrick May 29, 1898 (NY); Dickinson Co.: Shimek July 8, 1934 (UARK); Emmet Co.: Wolden 1404 (GH); Fayette Co.: Fink June 1894 (GH); Iowa Co.: Shimek July 7, 1917 (UARK); Johnson Co.: Barker July 25, 1929 (TEX); Palo Alto Co.: Hayden 2054 (GH, NY); Sioux Co.: Hayden 2056 (NY); Story Co.: Combs and Ball 571 (GH, NY); KANSAS: Atchison Co.: "S.A." Sept. 27, 1929 (KANU); Doniphan Co.: McGregor 10160 (KANU); Douglas Co.: Snow 2211 (KANU); Franklin Co.: Hetzer 140 (KANU); Grant Co.: Thompson June 26, 1893 (NY); Geary Co.: Gayle 492 (NY); Miami Co.: Oyster June 10, 1883 (MICH); Riley Co.: Gates 18451 (UC); Saline Co.: Hancin June 8, 1935 (KANU); Sedgwich Co.: Coll. unknown June 2, 1933 (KANU); KENTUCKY: Edmonson Co.: Palmer May 1899 (GH, NY); Lyon Co.: Eggleston 4636 (NY); McCracken Co.: Eggleston 4498 (NY); Wayne Co.: Smith and Hodgdon 4016 (GH); LOUISIANA: Short in open pine woods (NY); MAINE: Fernald 2155 (GH); MASSACHUSETTS: Middlesex Co.: Riese May 30, 1918 (GH); MICHIGAN: Arenac Co.: Wheeler July 2, 1895 (GH); Cass Co.: Wheeler June 2, 1890 (MICH); Dickinson Co.: Fernald and Pease 3509 (GH, MICH); Kalamazoo Co.: Hanes 1737 (NY); Kent Co.: Bailey June 29, 1892 (MICH); Keweenaw Co.: Farwell 285 (GH); Lake Co.: Beal June 28, 1890 (NY); Menominee Co.: Davis 248 (MICH); St. Clare

Co.: Dodge June 21, 1901 (MICH); Wayne Co.: Farwell 8770 (MICH); MINNESOTA: Anoka Co.: Rydberg 9625 (NY); Clay Co.: Ballard 3085 (GH); Hennepin Co.: Sandberg June 1890 (GH, UC); Clearwater Co.: Moyle 248 (GH, NY); Hubbard Co.: Bebb 4497 (OKL); Nobles Co.: Carr June 30, 1895 (GH); Ottertail Co.: Chandonnet June 17, 1911 (GH); Pipestone Co.: Johnson 360 (NY); Ramsey Co.: Sheldon June 1895 (NY, UC); Renville Co.: Moore 13207 (GH); Rock Co.: Moore and Moore 10560 (UC); Saint Louis Co.: Lakela 2769 (GH); Stearns Co.: Campbell July 1896 (MICH); Wabasha Co.: Manning July 26, 1883 (GH); Winona Co.: Holzinger July 1901 (NY); MISSISSIPPI: Choudler May 14, 1932 Campus (OKL); MISSOURI: Dunklin Co.: Kellogg 27091 (UARK); Iron Co.: Churchill May 24, 1918 (GH); Jackson Co.: Mackenzie June 14, 1895 (NY); Lawrence Co.: Palmer 44514 (NY); McDonald Co.: Kellogg 25531 (NY); St. Louis Co.: Engelmann 321 (GH); NEBRASKA: Fillmore Co.: Wibbe Sept. 1, 1879 (UC); Howard Co.: Bates 4910 (NY); Kearney Co.: Rydberg June 13, 1891 (ARIZ); Lancaster Co.: Rydberg June 25, 1873 (NY); Merrick Co.: Turrell June 11, 1892 (ARIZ); NEW HAMPSHIRE: Merrimack Co.: Clark July 14, 1917 (GH); Coos Co.: Pease 27389 (GH); NEW JERSEY: Halstead's American Weeds 59 (ARIZ); NEW YORK: Britton Oct. 1, 1893 Staten Island (NY); NORTH CAROLINA: Beaufort Co.: Correll 1639 (DUKE); Bladen Co.: Oosting 34107 (DUKE); Cumberland Co.: Correll 9026 (DUKE); Durham Co.: Blomquist 4813 (DUKE); Haywood Co.: Price 169 (DUKE); Johnston Co.: Mitchell Spring 1936 (DUKE); Orange Co.: Oosting 3368 (DUKE); Polk Co.: Churchill May 20, 1899 (GH); Sampson Co.: Oosting 34131 (DUKE); Wake Co.: Godfrey May 19, 1937 (GH); NORTH DAKOTA: Barnes Co.: Bergman 500 (NY); Benson Co.: Lunell July 1, 1911 (NY); Cass Co.: Stevens 261 (OKL, UC); Ransom Co.: Stevens 702 (UC); Rolette Co.: Lunell Aug. 18, 1907 (NY);

OHIO: Lorain Co.: Ricksecker July 25, 1894 (NY); OKLAHOMA: Atoka Co.: Moore and Iltis 375 (UARK); Cherokee Co.: Wallis 399 (OKLA); Cleveland Co.: Chase 60 (OKL); Delaware Co.: Wallis 1583 (OKLA); Latimer Co.: Hopkins 1861 (OKL); LeFlore Co.: Clark 241 (OKLA); Logan Co.: Engleman 1184 (OKL); Mayes Co.: Valkenburg 129 (OKL); McCurtain Co.: Sears 1409 (OKL); Muskogee Co.: Bebb 5174 (OKL, OKLA); Oklahoma Co.: Waterfall 2735 (OKL); Payne Co.: Delay 82 (TEX); Pittsburg Co.: Clark June 11, 1930 (OKL); Pushmataha Co.: Hopkins and Cross 1576 (OKL); PENNSYLVANIA: Chester Co.: Canby (NY); RHODE ISLAND: Providence Co.: Churchill Sept. 19, 1899 (NEBC); SOUTH CAROLINA: Aiken Co.: Canby May 1896 (NY); SOUTH DAKOTA: Brookings Co.: Thornber Aug. 25, 1893 (ARIZ); Campbell Co.: Williams Oct. 1894 (NY); Custer Co.: Degener and Peiler 16303 (NY); Meade Co.: Murdock 4372 (GH, NY); Spink Co.: Brenckle and Mellette July 7, 1939 (MICH, UC); TENNESSEE: Decatur Co.: Ames May 3, 1855 (MIVH); Huston Co.: Harger 7871 (GH); TEXAS: Dallas Co.: Lundell and Lundell 9176 (MICH); Denton Co.: Lundell and Lundell 9444 (MICH); Mason Co.: Dapprich 7829 (SMU); Polk Co.: Cory 22141 (GH); Smith Co.: Moore 948 (GH); Tarrant Co.: Lundell and Lundell 8517 (MICH); Walker Co.: Palmer 12022 (TEX); UTAH: Washington Co.: Hall Sept. 28, 1935 (UC); VIRGINIA: Dinwiddie Co.: Fernald and Long 10022 (GH); Henrico Co.: Fernald and Long 9135 (GH); Isle of Wight Co.: Fernald and Long 14400 (GH); Loudoun Co.: Hunnewell 10764 (GH); Nansemond Co.: Fernald and Long 10812 (GH); Southampton Co.: Fernald and Long 12180 (GH); Sussex Co.: Fernald and Long 10411 (GH); WASHINGTON, D.C.: Peters June 2, 1897 (MICH); WEST VIRGINIA: Monroe Co.: Hunnewell 12940 (GH); WISCONSIN: Bayfield Co.: Cheney 4371 (GH); Dane Co.: Watson (NY); Iowa Co.: Hermann June 15, 1937 (NY); Juneau Co.:

Mearns 489 (NY); La Crosse Co.: Fassett 5991 (DUKE); Marinette Co.: Grassl 2976 (MICH) Trempealeau Co.: Hermann 8950 (NY); Washburn Co.: Fassett8530 (GH).

9b. Physalis virginiana Miller, var. SUBGLABRATA (Mackenzie and Bush) Waterfall, comb. et stat. nov., P. subglabrata Mackenzie and Bush, Trans. Acad. Sci. St. Louis 12:86-87. 1902.

Plants nearly glabrous, or with a few short antrorse hairs; leaf blades mostly ovate to ovate-lanceolate, their margins usually entire, sometimes slightly simuate-dentate; anthers tinged or margined with blue or violet; fruiting calyces mostly 25-35 mm. long and 20-30 mm. wide.

Type: K. K. Mackenzie collected at Sheffield, Jackson Co., Missouri, June 14, 1896 (NY).

Habitat, range and flowering time: Woods, grassland, roadsides, fields and other disturbed sites, primarily in the northeastern United States, but with scattered collections elsewhere; flowering mostly from June to September.

Selected from 393 sheets of 248 collections: CANADA: Ontario: Dodge Sept. 19, 1911 (MICH, PH); Macoun 54527 (GH); UNITED STATES: ARKANSAS: Crittenden Co.: Demaree 15157 (NY); Prairie Co.: Demaree 15441 (NY); Pulaski Co.: Demaree 8612 (GH, NY); St. Francis Co.: Palmer 29253 (UARK); COLORADO: Gunnison Co.: Wheeler 427 (COLO); Routt Co.: Brandegee 1874 (PH); CONNECTICUT: Fairfield Co.: Eames 5360 (NEBC); Litchfield Co.: Fernald Sept. 6, 1909 (GH, NEBC, PH); New Haven Co.: Harger 4835 (NEBC, PH); DELAWARE: New Castle Co.: Commons 5a. (GH); GEORGIA: Wayne Co.: Smith and Hodgdon 3968 (GH); IDAHO: Ada Co.: Clark 305 (GH, NY, UC);

Canyon Co.: Christ 6261 (NY); Payett Co.: Christ 11739 (UC); ILLINOIS: Adams Co.: Brinker 3710 (OKL); Champaign Co.: Jones 16594 (LIL); Hancock Co.: Mead (PH); Henderson Co.: Patterson Sept. 1874 (NY); Johnson Co.: Gleason Aug. 9, 1902 (GH); Macon Co.: Mills Sept. 28, 1940 (NY); Peoria Co.: Chase 13017 (NY, OKL); Platt Co.: Seymour Sept. 1889 (DUKE); Richland Co.: Lansing 3401 (GH); Shelby Co.: Gleason 820 (GH); Stark Co.: Chase 145 (GH); Tazwell Co.: Chase 3252 (LIL, NY, UC); Woodford Co.: McDonald Aug. 1894 (UC); INDIANA: Adams Co.: Kauffman 414 (MICH); Gibson Co.: Deam 24214 (PH); Jasper Co.: Welch 6015 (UC); Jefferson Co.: Coulter 1874 (PH); Lawrence Co.: Kriebel 2542 (DUKE); Marion Co.: Friesener 10100 (DUKE, LIL, NY, OKLA); Monroe Co.: Stewart June 27, 1948 (LIL in part); Parke Co.: Duncan 204 (DUKE); Trimble Co.: Young 40 (NY); Vermilion Co.: Deam 11917 (NY); Wabash Co.: Friesener 16016 (GH); Warren Co.: Shipman 1876 (PH); Warrick Co.: Deam 37668 (PH); Wells Co.: Deam July 16, 1903 (NY); IOWA: Emmet Co.: Wolden 1188 (GH); Madison Co.: Pammel Sept. 20, 1927 (OKL, OKLA, UC); Mahaska Co.: Augustine 295 (OKL); Page Co.: Fitzpatrick and Fields July 27, 1898 (GH); Woodbury Co.: Gleason 9339 (NY); KANSAS: Douglas Co.: McGregor 315 (KANU); Rydberg and Imler 1205 (NY); Shawnee Co.: Volle 456 (KANU); KENTUCKY: Fayette Co.: McFarland 10 (DUKE, GH, OKLA, UC); Union Co.: Shacklette 588 (GH); Wayne Co.: Smith and Hodgden 3968 (GH); LOUISIANA: East Feliciana Co.: Drummond 61 (GH); Grant Co.: Hale (GH); MARYLAND: Kent Co.: Moldenke 13872 (LIL, OKLA); Talbot Co.: Earle 3949 (GH); MASSACHUSETTS: Berkshire Co.: Hoffman Aug. 29, 1902 (NEBC); Essex Co.: Mackintosh Sept. 24, 1933 (NEBC); Suffolk Co.: Palmer 37737 (NEBC); Worchester Co.: Woodward June 28, 1910 (GH); MICHIGAN: Berrien Co.: Gates 1495 (MICH); Huron Co.: Dodge 57 (GH);

Kalamazoo Co.: Hanes 11541 (NY); St. Clair Co.: Dodge Aug. 31, 1899 (MICH); Washtenaw Co.: Hermann 9215 (NY); Wayne Co.: Farwell (NY); MISSISSIPPI: Coahoma Co.: Anderson 4497 (DUKE); MISSOURI: Boone Co.: Drouet 1218 (GH); Clarke Co.: Drouet 1710 (GH); Jackson Co.: Bush 8096 (GH, NY); Jefferson Co.: Sherff 1069 (GH); Johnson Co.: Steyermark 72767 (UARK); LaClede Co.: Pennell 11647 (PH); Lafayette Co.: Demetrio 112 (GH); St. Louis Co.: Letterman July 25, 1894 (NY); Taney Co.: Eggleston 12253 (NY); Vernon Co.: Steyermark 20330 (UC); NEBRASKA: Kearney Co.: Hapeman Aug. 8, 1930 (OKLA); Nemaha Co.: Hansen Aug. 25, 1927 (MICH); NEW JERSEY: Cape May Co.: Gershoy 603 (GH); Middlesex Co.: Stevens June 18, 1892 (GH); Salem Co.: Long 45095 (GH); Somerset Co.: Moldenke 11808 (NY); Sussex Co.: Rusby Sept. 1, 1878 (MICH); Warren Co.: Mackenzie 6281 (DUKE, PH); NEW MEXICO: Lincoln Co.: Skehan 60 (GH); NEW YORK: Albany Co.: House 17215 (GH); Bronx Co.: Weber 1258 (COLO); Erie Co.: Clinton (NY); Madison Co.: House 25301 (GH); Monroe Co.: White 1971 (UARK); Saratoga Co.: Burnham Sept. 2-4, 1911 (GH); Tompkins Co.: MacDaniels 4928 (GH); Washington Co.: Stewart 29 (NY); NORTH CAROLINA: Carteret Co.: Channell and Blomquist 1834 (DUKE); Haywood Co.: Blomquist July 19, 1933 (PH); OHIO: Butler Co.: Wehmeyer and Waters 62 (MICH); Coshocton Co.: Moldenke 13377 (OKLA, LIL); Fairfield Co.: Iltis 1112 (UARK); Greene Co.: Demaree 11482 (GH, UC); Hamilton Co.: Lloyd 1925 (PH); Lake Co.: Werner 2056 (GH); Lorain Co.: Dick July 25, 1894 (NY); Montgomery Co.: Morgan (MICH); Pickaway Co.: Dreisvach Aug. 10, 1912 (PH); Ross Co.: Crowl Aug. 14, 1937 (NY); OKLAHOMA: Rogers Co.: Willson June 3, 1955 (OKL, OKLA); Tulsa Co.: Tenney July 3, 1931 (OKL); OREGON: Polk Co.: Nelson 1957 (GH); PENNSYLVANIA: Allegheny Co.: Wurback Sept. 20,

1942 (PH); Bucks Co.: Bassett Sept. 9, 1923 (GH); Carbon Co.: Wherry July 28, 1952 (PH); Centre Co.: Westerfeld 2826 (DUKE); Chester Co.: Edmondson 6382 (NY); Delaware Co.: MacElwee 1109 (GH); Lancaster Co.: Small 1896 (NY); Montgomery Co.: Stewart 106 (NY); Montour Co.: Meredith 1900 (PH); Northampton Co.: Porter Sept. 5, 1898 (NY); Snyder Co.: Moldenke 4184 (NY); RHODE ISLAND: Providence Co.: Collins July 10, 1892 (GH); Washington Co.: Fernald, Long and Torrey 10344 (GH, NEBC, PH); SOUTH CAROLINA: Pickins Co.: Anderson 1355 (NY); TENNESSEE: Cheatham Co.: Svenson 10390 (GH, UC); Davidson Co.: Quarterman 1037 (TEX); Hamilton Co.: Clalmgh 116 (DUKE); Knox Co.: Ruth 3412 (NY); Rutherford Co.: Svenson 8990 (GH, UC); TEXAS: Delta Co.: Cory 23311 (GH); UTAH: San Juan Co.: Holmgren 3793 (NY); Sanpete Co.: Ward 676 (PH); Virginia: Fairfax Co.: Moore Aug. 20, 1910 (GH); Fauquier Co.: Allard 1056 (GH, NY); Frederick Co.: Moldenke 19178 (SMU); Giles Co.: Fogg 17298 (DUKE); James City Co.: Baldwin 400 (GH); Lee Co.: Small July 27, 1892 (ARIZ, NY); WASHINGTON D.C.: Steele Aug. 24, 1897 (DUKE); WEST VIRGINIA: Kanawha Co.: Millspaugh 627 (NY); Monroe Co.: Steele and Steele 214 (GH); Pendleton Co.: Berkeley Aug. 7, 1930 (GH); WISCONSIN: Milwaukee Co.: Kruschke K-41-347 (LIL).

Sometimes forms are found with larger fruiting calyces which are 4-5 cm. long and 3-4 cm. broad. These may be called forma MACROPHYSA (Rydberg) Waterfall, comb. et stat. nov., P. macrophysa Rydberg, Bull. Torr. Bot. Club 22:308. 1895.

Type: Since Rydberg cited several number without choosing a type, the author selects as LECTOTYPE A. A. Heller 1756 in the Herbarium of the New York Botanical Garden. Syn-lectotypes will be found as a

second sheet at the same institution and in the Herbarium of the University of California.

Although the latter name antedates subglabrata, the author has chosen to transfer the name subglabrata to varietal status, since it is associated with a large, wide-spread population, primarily of the northeastern United States. According to Article 70 of the Rules no name has priority outside its own rank. Article 71, Recommendation 71A suggests that in changing rank it is preferable to retain the original epithet unless it must be rejected under the rules. This particular choice of names seems to be in accordance with both articles, and keeps available the names now in usage, instead of either changing their application, or supplanting them with new names which would be permissible under the rules.

Selected specimens: ARKANSAS: Marion Co.: Demaree 20645 (NY); ILLINOIS: Peoria Co.: McDonald Aug. 1903 (NY); Champaign Co.: Gleason Oct. 7, 1907 (DUKE); INDIANA: Lawrence Co.: Kriebel 1348 (DUKE); IOWA: Story Co.: Hayden 424 (GH); MISSOURI: Jackson Co.: Bush 12483A (NY) and 12483 (DUKE); NEBRASKA: Howard Co.: Bates 4910 (GH); NEW JERSEY: Somerset Co.: Lightipe Aug. 1, 1916 (TEX); TEXAS: Comal Co.: Lindheimer May 1847 (GH); Kerr Co.: Heller 1756 (NY, UC); Tarrant Co.: Ruth 746 (NY, PH); Travis Co.: Tharp May 6, 1931 (TEX).

9c. Physalis virginiana Miller, var. TEXANA (Rydberg) Waterfall, comb. et stat. nov., P. texana Rydberg, Mem. Torr. Bot. Club 4:339-340. 1896.

Plant usually several-branched from the base; herbage glabrous or nearly so; principal leaves ovate and usually entire; plant of the

Gulf coast of Texas, apparently intergrading inland with contiguous varieties.

Type: The type is A. A. Heller 1507 in the Herbarium of the New York Botanical Garden. Isotypes are: ARIZ, GH, PH, UC.

Habitat, distribution and flowering time: Primarily a taxon of the coastal area, but extending inward through chaparral and other habitats nearly to central Texas, becoming more atypical as it does so. It usually flowers from March to June, but flowering specimens have been seen that were collected in December and in August.

Selected from 34 sheets of 17 collections: TEXAS: Bexar Co.: Metz 73 (MICH, NY); Cameron Co.: Parks 17943 (GH); Gonzales Co.: Tharp 51-556 (TEX); LaSalle Co.: Tharp and Tyson 52-488 (OKLA, TEX); Nueces Co.: Tharp, Johnston and Webster 48-58 (TEX, ARK, OKLA); San Saba Co.: Palmer 11841 (TEX); Travis Co.: Tharp and Scarbrough 51-399 (COLO, OKLA, TEX, UARK); Victoria Co.: Tharp 2516 (TEX); Washington Co.: Tharp July 9, 1929 (OKLA, TEX); Wilson Co.: Palmer 947 (GH, NY).

9d. Physalis virginiana Miller, var. SONORAE (Torrey) Waterfall, comb. nov., P. pumila Nutt., var. sonorae Torr., Botany of the Mexican Boundary 153. 1859; P. longifolia Nutt., Trans. Am. Phil. Soc. (n.s.) 5:193-194. 1836; P. lanceolata Michx., var. laevigata Gray, Proc. Am. Acad. Arts and Sciences 10:68. 1875; P. lanceolata Michx., var. longifolia (Nutt.) Trelease, Rep. Ark. Geol. Surv. 4:207. 1891; P. rigida Pollard and Ball, Proc. Biol. Soc. Wash. 13:134-135. 1900.

Since, according to Article 70, "When the rank ... of an infrageneric taxon is changed, the correct name or epithet is the earliest legitimate one available in the new rank," the well-known name longifolia

must be replaced in the varietal status with the relatively unknown sonorae.

Plants usually single stemmed, often branching above; leaf blades usually lanceolate to lanceolate-linear, but rarely ovate, their margins entire to irregularly toothed; herbage sparsely covered with short antrorse hairs, which are more abundant on the younger parts, sometimes nearly glabrous; calyx often with ten lines of short antrorse hairs; anthers yellow. Sometimes this variety is difficult to separate from var. subglabrata. In such cases the bluish, or violet, anthers of the latter is considered a distinguishing characteristic since it occurs in a large population of the northeastern United States where the yellow-anthered var. sonorae is not found.

Type: Geo. Thurber 418, Fronteras, Sonora, Mexico, June 1851 in the Herbarium of the New York Botanical Garden. Two isotypes are in the Gray Herbarium.

Habitat, distribution and flowering time: This variety grows in prairies, plains, foothills, canyons, open woods, sandy areas and in various disturbed habitats. Its primary distribution is in the prairie region of central United States, but it extends into and west of the Rockies. It flowers in June, July and August in the northern part of its range, and from May through September in Texas and Arizona.

Selected from 450 sheets of 373 collections: ARIZONA: Cochise: Thornber 257 (ARIZ); Coconio Co.: Thornber Aug. 14, 1920 (ARIZ); Gila Co.: Gould and Robinson 4931 (ARIZ, UC); Pima Co.: Thornber 2046 (ARIZ); ARKANSAS: Benton Co.: Plank 1899 (NY); Conway Co.: Moore 420300 (UARK); Independence Co.: Coville Aug. 2, 1887 (NY); Little River Co.: Moore and

Iltis 519 (UARK); Logan Co.: Pyle 708 (UARK); Marion Co.: Demaree 20645 (UC); Polk Co.: Moore 480414 (UARK); St. Francis Co.: Demaree 5087B (UARK); Sebastian Co.: Armstrong 160 (TEX, UARK); Washington Co.: Moore 410170 (UARK); CALIFORNIA: Trinity Co.: Hitchcock and Martin 5403 (NY); COLORADO: Baca Co.: Weber 4378 (COLO, TEX); Bent Co.: Osterhout 4117 (NY); Boulder Co.: Tweedy 5203 (NY); Cheyenne Co.: Ownbey 1358 (COLO, GH, NY); Delta Co.: Burritt 100 (COLO); Denver Co.: Eastwood 4 (GH, UC); Ehlers 8467 (COLO); Sutton 139 (DUKE); Fremont Co.: Brandegee 1873 (PH, UC); Jefferson Co.: Ewan 14554 (COLO); Larimer Co.: Nelson 8217 (NY); Las Animas Co.: Rogers 4888 (COLO); Montrose Co.: Brewster (COLO); Otero Co.: Paull 110 (COLO); Pueblo Co.: Baker, Earle and Tracy 11 (GH, MICH, NY); Saguache Co.: Baker 373 (GH, NY); Weld Co.: Ramaley 12421 (COLO); Ewan 12136 (UC); GEORGIA: Harper 242 (ARIZ, NY); IDAHO: Ada Co.: Christ 11736 (UC); Adams Co.: Davis 2416 (UC); Idaho Co.: Packard 262 (GH, UC); Payette Co.: Christ and Christ 18314 (NY); Twin Falls Co.: Christ and Christ 19111 (NY); ILLINOIS: Champaign Co.: Fuller July 20, 1934 (OKL); Cook Co.: Moffatt Aug. 27, 1892 (NY); Iriquois Co.: Jones 18822 (ARIZ) ; Kane.Co.: Erlanson Aug. 5, 1923 (MICH); Tazewell Co.: Chase 8953 (OKL); INDIANA: Adams Co.: Davis 2992 (UC); Howard Co.: Ek Sept. 9, 1942 (UC); Lawrence Co.: Wynn 82 (TEX); Marion Co.: Britton Aug. 23, 1890 (NY); Noble Co.: Ek July 26, 1941 (LIL); IOWA: Clay Co.: Hayden 9540 (NY, PH); Davis Co.: Hayden 9541 (NY); Van Buren Co.: Pammel Sept. 10, 1925; Mahaska Co.: Rohrbaugh 97 (OKL, TEX); Story Co.: Hayden 424 (UC); KANSAS: Anderson Co.: Horr July 23, 1929 (KANU); Barton Co.: Rydberg and Imler 1286 (KANU, NY); Bourbon Co.: Thompson 133 (KANU); Butler Co.: Chase 2054 (NY); Chatauqua Co.: Horr July 5, 1930 (KANU); Cowley Co.: Rydberg

and Imler 469 (KANU, NY); Crawford Co.: Holland 507 (KANU); Dickinson Co.: Imler June 8, 1929 (KANU); Doniphan Co.: Agrelius, Hall and Lovejoy Aug. 7, 1913 (KANU); Douglas Co.: McGregor 9667 (KANU); Edwards Co.: McGregor 10580 (KANU); Ellis Co.: Bondy (ARIZ, DUKE, OKL, OKLA, UARK); Ellsworth Co.: McGregor 9210 (KANU); Finney Co.: Miller and Miller July 18, 1912 (KANU); Ford Co.: Horr 3419 (GH, KANU); Geary Co.: Imler June 4, 1929 (KANU); Greenwood Co.: Horr June 23, 1930 (KANU); Hamilton Co.: Wilson and Miller June 15, 1912 (KANU); Hodgeman Co.: McGregor 3983 (KANU); Linn Co.: Rydberg and Imler 77 (KANU); Logan Co.: Rydberg and Imler 1022 (KANU, NY); Lyon Co.: Horr Aug. 12, 1929 (KANU); Meade Co.: Horr 3905 (KANU); Neosho Co.: Horr July 26, 1929 (KANU); Osborne Co.: Shear 128 (GH); Riley Co.: Norton 371 (GH, NY); Sedgwich Co.: Horr Aug.8, 1929 (KANU); Shawnee Co.: Volle 791 (KANU); Smith Co.: Horr 4675 (COLO); Washington Co.: Horr 4638 (KANU); Wilson Co.: Horr July 12, 1930 (KANU); MICHIGAN: St. Claire Co.: Dodge 6, (MICH, NY); MINNESOTA: Nicollet Co.: Moore and Huff 19785 (DUKE, TEX); MISSOURI: Jackson Co.: Bush 337 (NY); MONTANA: Cascade Co.: Marsh 124 (GH); Clark Co.: Kelsey July 26, 1891 (NY); NEBRASKA: Adams Co.: Barnhart 466 (NY); Banner Co.: Rydberg 272 (NY); Franklin Co.: Ewan 14793 (COLO); Gage Co.: Bates 5193 (GH); Kearney Co.: Hapeman Aug. 18, 1933 (ARIZ, UC); Lancaster Co.: Kiener 16987 (GH); Lincoln Co.: Plank July 1896 (NY); Saline Co.: Dreisbach Aug. 13, 1928 (PH); Webster Co.: Bates 5201 (GH); NEVADA: Churchill Co.: Hitchcock and Martin 5573 (UC); Storey Co.: Brandegee 2059 (UC); NEW MEXICO: Bernalillo Co.: Stiteler Aug. 15, 1951 (PH), Otto Kuntze 28288 (NY); Chaves Co.: Earle and Earle 345 (NY); Colfax Co.: Lucas 120 (TEX); Dona Ana Co.: Wooton 2698 (COLO, GH, UC); Rio Arriba Co.: Mercelline 1783

(MICH); Sierra Co.: Metcalfe 1098 (GH, NY, UC); NORTH CAROLINA: Haywood Co.: Blomquist 4809 (DUKE); OKLAHOMA: Beckham Co.: Waterfall 7743 (OKL); Blaine Co.: Stevens 848 (OKL, OKLA, GH); Cherokee Co.: Wallis 65, 87, 599, 745 (OKLA); Cimarron Co.: Waterfall 9243 (OKLA); Cleveland Co.: Little 387 (OKL); Comanche Co.: Stevens 1330 (GH, OKLA); Custer Co.: Waterfall 1626 (GH); Delaware Co.: Wallis 2715, 2743 (OKLA); Dewey Co.: Stevens 883 (GH); Jackson Co.: Hopkins 885 (OKL); Johnson Co.: Robbins 2772 (OKL, GH); Kay Co.: Stevens 1919 (NY); Kingfisher Co.: Blankinship July 18, 1896 (GH); Murray Co.: Hopkins 6086 (OKL); Merril 558, 1082, 1435 (NY); Muskogee Co.: Little 6185 (OKL); Noble Co.: Harding 38 (OKLA); Oklahoma Co.: Waterfall 3046 (GH, OKL); Ottawa Co.: Wallis 2703 (OKLA); Pawnee Co.: Crowder 101 (OKLA); Payne Co.: Coryell 382, 964, 1010 (OKLA); Pittsburg Co.: McClary 65. (OKL); Pontotoc Co.: McCoy 1058(OKLA); Texas Co.: Goodman 5607 (OKL); Tulsa Co.: Hawk 26 (OKL); Washita Co.: Eskew 1340 (OKL); Woods Co.: Stevens 1639 (GH, NY, OKL, OKLA, SMU); Woodward Co.: Waterfall 12006 (OKLA); OREGON: Malheur Co.: Peck 21265 (NY); SOUTH DAKOTA: Fall River Co.: Rydberg 910 (GH, NY); Pennington Co.: Hayward 555 (NY); Shannon Co.: Visher 2171 (NY); TENNESSEE: Canby Sept. 1, 1887 (NY); TEXAS: Clare Aug. 7, 1931 (UC); Bowie Co.: Heller 4254 (NY); Colorado Co.: Tharp July 29, 1939 (TEX); Dallas Co.: Reverchon June 1877 (NY); Delta Co.: Cory 23310 (GH); Denton Co.: Harris Spring 1926 (TEX); El Paso Co.: Whitehouse 8499 (TEX); Gonzales Co.: Bogusch 1341 (TEX); Grayson Co.: Gentry 50-193 (TEX); Hartley Co.: Cory 16434 (GH, UC); Hunt Co.: Cory 57427 (OKLA); Hutchinson Co.: Thornton 52-382 (TEX); Irion Co.: Palmer 12429 (TEX, UC); Navarro Co.: Rawling 30 (TEX); Tarrant Co.: Ruth 792 (GH); Taylor Co.: Tracy 8003 (GH, NY, TEX); UTAH: Boxelder Co.:

Schreiber 1207 (UC); Emery Co.: Pennell and Schaeffer 22098 (PH); Grand Co.: Rydberg and Garrett 8520 (NY); Salt Lake Co.: Garrett 3075 (GH); Sanpete Co.: Harris C29486 (GH); Tooele Co. Jones 1012 (NY); Washington Co.: Hall Sept. 28, 1935 (COLO, UC); Weber Co.: Dodge June 1889 (MICH); WEST VIRGINIA: Mineral Co.: Core July 31, 1931 (NY); WISCONSIN: Chandler 354, Kilbourn (UC); WYOMING: Park Co.: Rollins July 4, 1933 (MICH); Weston Co.: Degener 16199 (NY).

9e. Physalis virginiana Miller, var. HISPIDA Waterfall, var. nov., foliis ovato-lanceolatis vel lanceolatis, vel spathulato-lanceolatis, crassis, plus minusve hispidis.

This perennial rhizomatous variety has thick leaf blades varying from ovate-lanceolate to linear-lanceolate in shape. The herbage is subglabrous, but it has a varying amount of stiff, more or less divergent trichomes about 1 mmm. long, at least on the flower buds or the margins of the leaves. It is found in sandy areas of the prairie and plains region. It has been passing as P. lanceolata, but that name was given to seemingly aberrant plants of the eastern United States which may very well be intergrades between P. heterophylla and P. virginiana.

The TYPE is Waterfall 7308, sand dunes, 1 mile east of Mangum, Greer Co., Oklahoma, June 28, 1947, in the Herbarium of Oklahoma A. and M. College. Isotypes are in the herbarium of the University of Texas and the Bebb Herbarium of the University of Oklahoma.

Habitat, distribution and flowering time: Usually growing in sandy sites, but also on dry hilltops, edges of fields and other disturbed areas, primarily in Oklahoma, Kansas, Nebraska and eastern Colorado; flowering in May, June and July.

Selected from 209 sheets of 144 collections: COLORADO: Baca Co.: Rogers 6436 (COLO); Boulder Co.: Ramaley 11624 (COLO); Denver Co.: Eastwood 23 (COLO, GH, UC); El Paso Co.: Williamson July 10, 1901 (PH); Fremont Co.: Brandegee 392 (NY, PH, UC); Jefferson Co.: Greene 323 (GH); Larimer Co.: Smith July 15, 1944 (UC); Las Animas Co.: Rogers 6003 (COLO); Lincoln Co.: Ownbey 1318 (COLO, GH, NY, UC); Phillips Co.: Weber 5040 (COLO); Weld Co.: Ramaley 15138 (ARIZ, COLO, OKL, TEX, UC); Yuma Co.: Harrington 5036 (COLO); INDIANA: Lake Co.: Bebb 499 (OKL); Tippecanoe Co.: Ek June 10, 1942 (GH, NY, TEX, UC); KANSAS: Barton Co.: Rydberg and Imler 1330 (KANU, NY); Cheyenne Co.: McGregor 9433 (KANU); Clark Co.: Rydberg and Imler 768 (KANU); Clay Co.: Kellerman July 2, 1888 (GH); Comanche Co.: Rydberg and Imler 1109 (KANU, NY); Finney Co.: Rydberg and Imler 996 (KANY, NY); Grove Co.: Hitchcock 572 (GH); Hamilton Co.: Wilson and Miller (KANU); Meade Co.: Horr and McGregor 3841 (KANU); Reno Co.: Rydberg and Imler 563 (KANU, NY); Riley Co.: Norton 368 (GH, NY); Rooks Co.: Horr 5005 (KANU); Sedgwick Co.: coll. unknown Aug. 20, 1933 (KANU); Wyandotte Co.: Mackenzie 1159 (NY); MINNESOTA: Isanti Co.: Rosendahl and Butters 5051 (GH); MISSOURI: Jackson Co.: Bush 4970 (GH, NY, OKL); Johnson Co.: Stevens 4166 (NY); NEBRASKA: Banner Co.: Rydberg 273 (NY); Cherry Co.: Tolstead 550 (GH); Custer Co.: Bates June 15, 1901 (GH); Dawes Co.: Tolstead 811 (GH); Grant Co.: Rydberg 1330 (GH); Kearney Co.: Hapeman June 7, 1928 (DUKE); Lincoln Co.: Porter 2059 (GH, OKL); NEW MEXICO: Santa Fe Co.: Tracy and Evans 110 (NY); OKLAHOMA: Beckham Co.: Pennell 10556 (NY, PH); Beaver Co.: Goodman 5332 (OKL, TEX); Blaine Co.: Waterfall 7070 (OKL, OKLA, TEX); Cleveland Co.: Little 396 (OKL); Custer Co.: Mericle 318, 328, 703, 1866 (OKL); Ellis Co.: Waterfall 11891

(OKLA); Garvin Co.: Andrews 97 (OKL); Grady Co.: McFarland 15 (OKL); Greer Co.: Bull 219 (OKL); Harper Co.: Stevens 3322 (GH, NY, OKL); Jackson Co.: Stevens 1176 (GH, OKL); Kay Co.: Stevens 1919 (GH); Kingfisher Co.: Byers 211 (OKLA); Logan Co.: Goodman 2126 (GH, OKL); Oklahoma Co.: Waterfall 2350 (GH, NY); Payne Co.: Abernathy 32 (OKLA); Pushmataha Co.: Waterfall 11397 (OKLA); Roger Mills Co.: Smith 607 (OKLA); Texas Co.: Waterfall 7961 (OKL, OKLA); Woods Co.: Waterfall 7857 (OKL, OKLA); Woodward Co.: Nelson and Goodman 5301 (OKL); SOUTH DAKOTA: Meyer Co.: Wallace (NY); TEXAS: Collingsworth Co.: Cory 16151 (GH); Hall Co.: Reverchon 4311 (GH); Hemphill Co.: Cory 16236 (GH); Wichita Co.: Tharp 535 (NY, TEX); UTAH: Sanpete Co.: Ward 676 (GH); WYOMING: Albany Co.: Nelson 7358 (GH, NY); Converse Co.: Nelson 8366 (GH); Platte Co.: Porter 4894 (COLO, GH, OKL, PH, TEX, UC); Sheen Co.: Holland and Crede 362 (DUKE).

9f. Physalis virginiana Miller, var. POLYPHYLLA (Greene) Waterfall, comb. et stat. nov., Physalis polyphylla Greene, Pittonia 4:150-151. 1900.

Plants simple or branched near the base, nearly glabrous, the few hairs short and antrorse; longer leaves mostly 3-5 cm. long, lanceolate or linear-lanceolate.

Type: C. F. Baker 576 Piedra, southern Colorado, July 12, 1899 (GH, NY, UC).

The only other collection seen is Waterfall 11115, collected on a shale hillside, opening in pine forest 12 miles west of Chama, Rio Arribo Co., New Mexico, Aug. 25, 1952. (OKLA).

9g. Physalis virginiana Miller, var. CAMPANIFORMA Waterfall, var. nov., caulibus parvis, curtis retroso-pilosis; foliis ovatis;

corollis maculatis; calycis campaniformis, ad basin 4-5 mm. latis, ad apices 1.5-2 cm. latis.

This variety is characterized by the combination of ovate leaves, short retrose hairs and campanulate calyx, 4-5 mm. wide at its base, and 1.5-2 cm. wide at the tips of its divergent lobes.

Type: P. C. Standley 4556. Mouth of Indian Creek, altitude 8000 ft.; in Pecos National Forest, New Mexico; July 25, 1908. Two sheets, TYPE and ISOTYPE, are in the Herbarium of the New York Botanical Garden. At present this distinctive variety is known only from the type collection.

10. Physalis hederaefolia Gray, Proc. Amer. Acad. Arts and Sciences 10:65. 1875.

Plants erect or spreading from a perennial base, simple or many-stemmed; herbage with a mixture of long jointed hairs and short trichomes, or with short hairs only, which may be viscid or not, glandular or not, antrorse or spreading; leaf blades subreniform to ovate, or rarely ovate-lanceolate; corollas 10-15 mm. long, yellow or yellowish green, usually darker on the base of the limb, but sometimes obscurely so; limb of the corolla often reflexed when fully open; anthers usually yellow, 1.5-4 mm. long; flowering calyx about one-half as long as the corolla, on peduncles usually 3-8 mm. long; fruiting calyx 2-3 cm. long and 1.5-2.5 cm. wide on peduncles 1-2 cm. long.

10a. Physalis hederaefolia Gray, var. hederaefolia, loc. cit. supra; including P. hederaefolia Gray, var. puberula Gray, loc. cit. supra; P. Palmeri Gray, Synoptic Flora 2 (1):235. 1888.

Herbage vestite with one of, or some combination of long

jointed hairs, short divericate or retrose hairs, or glandular hairs; leaf blades subreniform to ovate; calyces at anthesis usually 3-4 mm. wide; anthers mostly 3-4 mm. long, yellow.

Type: Charles Wright 528, in part, Turkey Creek, western Texas to El Paso, Oct. 1849 (GH). It has a few long hairs, a few short hairs and a few sessile, or subsessile spherical glands; the type of var. puberula has many short hairs on the stems, and short hairs and a few spherical sessile glands on the leaves.

Habitat, distribution and flowering time: Growing in desert plains, desert scrub, canyons, mountains and valleys, primarily in southwestern Texas, New Mexico and adjacent Arizona; flowering in May, June and July, sometimes in August, September and October.

Selected from 240 sheets of 178 specimens: ARIZONA: Cochise Co.: Harrison 8259 (ARIZ); Coconino Co.: Hanson 133A (COLO, TEX); Gila Co.: Gould and Hudson 3742 (ARIZ, GH, UC); Pima Co.: Gould 3952 (ARIZ); Pima Co.: Toumey 404 (ARIZ); Yavapai Co.: Wolf 2311 (GH); CALIFORNIA: San Bernardino Co.: Wolf 10772 (UC); San Diego Co.: Abrams 3703 (GH); NEVADA: Clark Co.: Clokey 8107 (GH, NY); Lincoln Co.: Ripley and Barneby 6405 (NY); NEW MEXICO: Bernalillo Co.: Koelz June 28, 1926 (MICH); Dona Ana Co.: Wooton 136 (NY); Grant Co.: Greene Sept. 31, 1880 (NY); Lincoln Co.: Wooton 634 (NY); San Miguel Co.: Rose and Fitch 17606 (NY); TEXAS: Cory 16628 (GH); Bandera Co.: Palmer 12253 (TEX); Brewster Co.: Mueller 8154 (GH, MICH, NY, TEX, UC); Warnock 341 (GH, NY, TEX); Burnet Co.: Rogers, Albers and Barksdale 6864 (OKLA, TEX); Cameron Co.: Chandler 7064 (GH, NY, UC); Culberson Co.: Waterfall 4059 (GH, NY); Duval Co.: Croft 11 (MICH, NY); El Paso Co.: Warnock 4100 (TEX); Gonzales Co.: Smith and

LeSeur 42-42 (GH, TEX); Grimes Co.: Tharp April 11, 1936 (TEX); Hidalgo Co.: LeSeur 442 (TEX); Hudspeth Co.: Waterfall 4875 (GH, NY); Jeff Davis Co.: Palmer 31935 (TEX); Kenedy Co.: Cory 28408 (GH); Leon Co.: Cory 21810 (GH); Mason Co.: Whitehouse Sept. 1, 1929 (TEX); McLennan Co.: Smith 620 (TEX); Maverick Co.: Pringle 8324 (GH, NY, UC); Pecos Co.: Tharp 256 (OKL, UC); Presidio Co.: Hinckley 2753 (GH); Real Co.: Cory 42778 (GH); Reeves Co.: Tracy and Earle 126 (GH, NY, TEX); Smith Co.: Cory 25881 (GH); Taylor Co.: Cory 7393 (MICH, UC); Terrell Co.: Webster 190 (TEX); Tom Green Co.: Reverchon 3922 (GH); Travis Co.: Tharp Aug. 18, 1941 (GH, TEX); Upton Co.: Cory 53482 (GH); Webb Co.: Mackenzie 86 (NY); UTAH: Kane Co.: Boyle 208 (UC); Millard Co.: Garrett 2969 (NY).

10b. Physalis hederaefolia Gray, var. comata (Rydberg) Waterfall, Rhod. 52:171. 1950; P. comata Rydb., Bull. Torr. Bot. Club 22:306. 1895; including P. rotundata Rydb., Mem. Torr. Bot. Club 4:352. 1896.

Herbage with long jointed hairs more or less abundantly mixed with shorter hairs, which may, or may not, be viscid or glandular; flowering calyx 8-11 mm. wide; leaf blades ovate to rotund, toothed to nearly entire.

Type: P. A. Rydberg 269, under the cliffs, south side of Scott's Bluff, Nebraska, July 20, 1891, in the Herbarium of the New York Botanical Garden. It is representative of the extreme with ovate leaf blades which is not as common as the rotund-leaved phase upon which P. rotundata was based upon a collection from South Dakota.

Habitat, distribution and flowering time: Plains, mountain slopes, dry hills, gravel banks and sandhills, principally in western Nebraska, western Kansas and eastern Colorado; usually flowering in June,

July, August and September.

Selected from 74 sheets of 57 collections: COLORADO: Bent Co.: Osterhout 4118 (NY); Boulder Co.: Ewan 12258 (UC); Cheyenne Co.: Ownbey 1357 (COLO, GH, NY); Denver Co.: Eastwood Sept. 10, 1910 (GH, UC); El Paso Co.: Ehlers 7764 (ARIZ, GH); Fremont Co.: Ewan 14248 (COLO); Larimer Co.: Nelson Aug. 31, 1900 (NY); Las Animas Co.: Rogers 4843 (COLO); Weld Co.: Osterhout 2309 (NY); KANSAS: Barber Co.: Rydberg and Imler July 5, 1929 (NY); Cheyenne Co.: McGregor 9425 (KANU); Ellis Co.: Rydberg and Imler 1228 (KANU, NY); Finney Co.: Wilson and Miller July 22, 1912 (KANU); Kiowa Co.: Hitchcock 774 (GH, NY); Osborne Co.: Shear 221 (GH, NY); Riley Co.: Gates 14537 (MICH); Rooks Co.: Bates 4563 (GH); NEBRASKA: Adams Co.: Bates 4607 (GH); Rydberg Aug. 8, 1891 (NY); Buffalo Co.: Bates 4903 (GH); Custer Co.: Bates 2403 (GH); Garfield Co.: Bates 4634 (NY); Lincoln Co.: Rydberg Sept. 1895 (UC); Webster Co.: Bates July 3, 1907 (NY); NEW MEXICO: Lincoln Co.: Skehan July 7, 1898 (GH, NY, UC); OKLAHOMA: Cimarron Co.: Waterfall 7902, 9122, 9240 (OKL, OKLA); Texas Co.: Waterfall 7867 (OKL, OKLA, TEX); Woods Co.: Ward 54 (NY); SOUTH DAKOTA: Lawrence Co.: Bennett 3259 (UARK).

10c. Physalis hederaefolia Gray, var. CORDIFOLIA (Gray) Waterfall, comb. nov., P. Fendleri Gray, Proc. Amer. Acad. Arts and Sciences 10:66. 1875; P. Fendleri Gray, var. cordifolia Gray, Synop. Flora N. Amer. 2(1):395. 1878.

Indument of short reflexed hairs with many to few short, somewhat flattened branched hairs, which are sometimes present only on the calyx; leaf blades ovate to ovate-lanceolate (2) 3-6 cm. long and 1-3 cm. wide, from (1.2) 1.4-2.5 times longer than wide.

Type: The type of P. Fendleri is Fendler 683, New Mexico (GH). That of var. cordifolia is Palmer 363, St. George, southern Utah (GH).

Habitat, range and flowering time: Mountains, canyons, mesas, plains, in juniper-pinon pine areas, and in disturbed habitats, principally in southern Colorado and southern Utah, Arizona, New Mexico and southwestern Texas; flowering mostly in July, August and September.

Selected from 193 sheets of 145 collections: ARIZONA: Apache Co.: Goodman and Payson 3167 (GH, NY); Cochise Co.: Blumer 2104 (ARIZ, GH, NY); Coconimo Co.: Thornber 2088 (ARIZ); Gila Co.: Parker, McClintock and Robbins 6125 (ARIZ); Maricopa Co.: Rusby 775 (MICH, NY); Mohave Co.: Kearney and Peebles 12761 (ARIZ); Navajo Co.: Jones 1109 (ARIZ); Pima Co.: Parker, McClintock and Haskell 5885 (ARIZ, UC); Santa Cruz Co.: Peebles and Loomis 7019 (ARIZ); Yavapai Co.: Kearney and Peebles 9719 (ARIZ); CALIFORNIA: San Bernardino Co.: Wolf 10722 (NY, UC); San Diego Co.: Palmer 1875 (GH); COLORADO: Archuleta Co.: Weber and Livingston 6254 (COLO); El Paso Co.: McCosh and Greene 1877 (NY); Fremont Co.: Waterfall 11503 (OKLA, TEX); Huerfano Co.: Ramaley 16236 (COLO); La Plata Co.: Jones 503 (MICH); Las Animas Co.: Rogers 5416 (COLO); Mesa Co.: Rollins 1915 (GH, NY); Montezuma Co.: Baker, Earle and Tracy 823 (NY); Montrose Co.: Payson 3927 (GH); Otero Co.: Paull 87 (COLO); Pueblo Co.: Pammel Aug. 24, 1913 (GH, TEX); NEVADA: Clark Co.: Train 2003 (ARIZ); Clokey 8204 (ARIZ, DUKE, NY, OKL, OKLA, TEX); NEW MEXICO: Colfax Co.: Standley 14012 (NY); Dona Ana Co.: Wooton and Standley 3157 (ARIZ, NY); Grant Co.: Blumer 49 (GH, NY); Luna Co.: Shreve 8343 (ARIZ); Otero Co.: Schulz 297 (GH); San Miguel Co.: Standley 4945 (GH, NY); Santa Fe Co.: Robbins 8244 (COLO); Sierra Co.: Metcalfe 945 (GH, NY); Taos Co.:

Wooton 2693 (NY); Torrance Co.: Parker and McClintock 6526 (ARIZ); Valencia Co.: Vogt 27 (ARIZ); OKLAHOMA: Cimarron Co.: Waterfall 7915 (OKL, OKLA); TEXAS: Brewster Co.: Marsh 261 (GH); El Paso Co.: Lee, Berkman and Tharp 46192 (TEX); Hudspeth Co.: Waterfall 6694 (GH); Jeff Davis Co.: Hinckley 574 (NY); UTAH: Piute Co.: Tidestrom 2942 (MICH); San Juan Co.: Rydberg and Garrett 9390 (NY); Washington Co.: Gould 2028 (ARIZ, COLO, GH, NY).

11. Physalis caudella Standley, Field Mus. Publ. Bot. 17:273. 1937.

Plants simple or branched, apparently from a deep rhizome which is not collected; indument usually villous, of long jointed hairs (1) 2-3 mm. long, dense or sparse, or of long and short hairs intermixed in varying proportions; leaf blades 4-7 cm. long and 1.5-4 cm. wide, usually lanceolate, rarely ovate-lanceolate or linear-lanceolate, on petioles 0.5-2 cm. long (this amount of variation in length of petioles may be found in the same plant, with the longer petioles below and the shorter ones above); margins of the leaf blades entire to irregularly undulate to saliently few-toothed; corollas 14-18 mm. long, yellow, with prominent deep reddish-blue or purplish spots on the limb; anthers blue or blue-green, about 3 mm. long, on slender filaments much narrower than the anthers; calyx 7-10 mm. long, its lobes 3-8 mm. long; flowering peduncles usually about 5 mm. long, sometimes as much as 8 mm. long; fruiting calyx (2.5) 3-5 cm. long and (2) 2.5-3 cm. wide, with calyx lobes (6) 10-15 (17) mm. long.

Type: Howard Scott Gentry 2710, on oak-pine slope, 2,160 meters elevation, Cajurichi, Rio Mayo, Chihuahua, Mexico, Sept. 13, 1936, in the

Herbarium of the Field Museum. An isotype is in the Herbarium of the University of California. The isotype has lobes of the flowering calyx 3-8 mm. long, and a calyx cup only about 2 mm. long; the fruiting calyx also has lobes at the extreme limit of length, being 14-17 mm. long. One of the Arizona specimens approaches the type, having a flowering calyx with lobes 7 mm. long and a calyx tube 3 mm. long. However most of them have calyx lobes somewhat shorter than the calyx tube; the lobes of the fruiting calyx in the Arizona material is usually 10-15 mm. long, rarely as short as 6 mm.

Habitat, range and flowering time: Growing in canyons, pine woods and oak woods in the mountains of southern Arizona (with one collection from southwestern New Mexico) and adjacent Sonora and Chihuahua; flowering in June, July and August.

Selected from 31 sheets of 19 collections: ARIZONA: Cochise Co.: Benson 10448 (ARIZ, NY, UC); Gooding 843 (ARIZ, GH, NY); Pima Co.: Kearney and Peebles 10504 (ARIZ, UC); Santa Cruz Co.: Parker 7683 (ARIZ, COLO, NY, UC); NEW MEXICO: Socorro Co.: Wooton Aug. 6, 1900 (NY).

12. Physalis crassifolia Bentham, Botany of the Voyage of the Sulphur 40. 1844.

Stems usually several from a ligneous base, each stem branched, sometimes several times; herbage minutely puberulent, sometimes slightly glandular; principal leaf blades (1.5) 2-3 (5) cm. long, and (1.5) 2-2.5 (3.5) cm. wide, usually broadly ovate; leaf margins entire to sinuately or repandly few-toothed to dentate; petioles two-thirds the length of the blade to equalling it; corolla yellow, sometimes becoming bluish in age, or when dried and pressed, 10-15 mm. long, its limb reflexed when fully

open; anthers yellow, 2.5-3 mm. long; filaments having a few long hairs growing on them; calyx at anthesis usually 3-6 mm. long on peduncles 5-10 times as their length; fruiting calyx usually 2-3 cm. long and 1.5-2 cm. wide.

12a. Physalis crassifolia Bentham, var. crassifolia, loc. cit. sup.; P. cardiophylla Torrey, Bot. Mex. Bound. 153. 1859; P. crassifolia var. cardiophylla (Torr.) Gray, Synoptic Flora 2(1):235. 1878; P. muricu-lata Greene, Bull. Calif. Acad. 1:209. 1885.

Leaves thick, entire to simuately or repandly few-toothed; flowering calyx usually 4-6 mm. long on peduncles 6-7 times their length; corollas yellow, sometimes with brownish centres.

Type: Bay of Magdalena, Lower California, Mexico; not seen.

Habitat, distribution and flowering time: Growing on deserts, canyon floors, rocky hillsides, and mountains, principally in Arizona, and California; flowering from March through October.

Selected from 183 sheets of 156 collections: ARIZONA: Cochise Co.: Blumer 90 (ARIZ); Mohave Co.: Harrison, Kearney and Fulton 7549 (ARIZ); Pima Co.: Harrison and Kearney 7238 (NY); Pinal Co.: Gillespie 8919 (NY, UC); Yavapai Co.: Peebles, Harrison and Kearney 7431 (NY); Yuma Co.: Benson 10807 (ARIZ); CALIFORNIA: Imperial Co.: Rose 36830 (OKL, MICH); Inyo Co.: Clokey and Templeton 5776 (NY, UC); Kern Co.: Munz, Johnston and Harwood 4034 (NY); Riverside Co.: Clokey 6881 (NY, UC); Mason 4185 (GH, UC), Rose 36001 (GH, UC); San Bernardino Co.: Munz 11720 (ARIZ, COLO, NY); San Diego Co.: Abrams 3160 (GH, NY); NEVADA: Clark Co.: Clokey 8577 (COLO, NY, UC); Clover 8235 (MICH); Lincoln Co.: Kennedy and Gooding 10 (ARIZ, NY, UC).

12b. Physalis crassifolia Bentham, var. VERSICOLOR (Rydberg) Waterfall, comb. et stat. nov., P. versicolor Rydb. Bull. Torr. Bot. Club 22:307. 1895; P. genucaulis Aven Nelson, Bot. Gaz. 47:430. 1909.

Leaves thinner, usually dentate, but wometimes nearly entire; calyx usually 3-4 mm. long on peduncles 5-10 times their length; corolla yellow, usually some, or all, of them turning bluish in drying.

Type: Rydberg selected no type, therefore Edward Palmer 622, collected at Guaymas, Mexico in 1887 is selected as the LECTOTYPE. It is in the Herbarium of the New York Botanical Garden. An iso-lectotype is in the Herbarium of Harvard University (GH).

Habitat, distribution and flowering time: Apparently similar to the above, but not so widespread.

Selected from 71 sheets of 55 collections: ARIZONA: Gila Co.: King and Belden 2439 (ARIZ); Mohave Co.(?): Clover 6009 (ARIZ); Pima Co.: Toumey June 1, 1896 (GH, NY), Gould and Macbride 4128 (ARIZ, GH, NY, UC); Pinal Co.: Thornber 5517 (ARIZ, NY); Yuma Co.: Parker, Parker, Wright and Lowe 7816 (COLO, NY, UC); CALIFORNIA: Imperial Co.: Wiggins 9606 (GH, UC); Riverside Co.: Wiggins 9673 (GH, NY, UC); NEVADA: Clarke Co.: Train 1366 (NY, UC).

13. Physalis ixocarpa Brotero ex Hornemann, Hortus Regius Botanicus Hafniensis, Supplement :26. 1819; P. aequata Jacq. f. ex Nees, Linnaea 6:470. 1831.

Annual, 15-60 cm. tall, branched, glabrous to rather sparsely vestite with short appressed hairs; leaf blades 2-7 cm. long, ovate to ovate-lanceolate; margins of the leaves dentate to simuate-dentate to entire, on petioles about one-half as long as the blade to equalling it

in length; corolla 7-15 mm. long, with 5 bluish-tinged dark spots on its limb which is recurved when fully open; anthers blue, about 3 mm. long, strongly twisted after dehiscence; flowering peduncles 3-5 mm. long; fruiting calyx usually 2-2.5 (3) cm. long, nearly globose, often well-filled with the fruit; fruiting peduncles usually 3-8 mm. long.

Fruiting material may often resemble P. virginiana var. subglabrata. It can be distinguished by its shorter peduncles.

Type: None was selected by Hornemann, and no material was cited. Presumably a neotype should be selected, probably from Mexican collections since the species seems to be native there. However the author prefers to defer this action until a more detailed study of the species from that area may be accomplished. The concept of the species is based upon the material cited later, which seems to be conspecific with Mexican material seen.

Cultivated and escaped; flowering through much of its growing season.

Selected from 89 sheets of 75 collections: CANADA: OTTAWA: Marie-Victorin, et al. 43923 (GH); UNITED STATES: CALIFORNIA: Butte Co.: Yates 6127 (UC); Fresho Co.: Bacigalupi, Ferris and Wiggins 2491 (GH, NY, UC); Los Angeles Co.: Fosberg 53036 (GH, NY); Riverside Co.: Conger Oct. 1909 (UC); San Bernardino Co.: Parish Sept. 1888 (UC); San Luis Obispo Co.: Miossi Aug. 5, 1840 (UC); Santa Barbara Co.: Bingham 29 (NY); Ventura Co.: Pollard Oct. 27, 1945 (COLO); DELAWARE: NewCastle Co.: Commons Nov. 2, 1898 (GH); Sussex Co.: Churchill Sept. 11, 1908; ILLINOIS: Adams Co.: Seymour Aug. 1878 (DUKE); DuPage Co.: Moffett 3197 (GH, OKLA); Fulton Co.: Vasey 1862 (GH); MARYLAND: McVaugh 134543, cult.,

originally from Mexico (MICH); MASSACHUSETTS: Middlesex Co.: Deane Sept. 24, 1884 (NEBC); Norfolk Co.: Fernald Sept. 26, 1908 (GH); MICHIGAN: Emmet Co.: Hoover 1943, seeds from the Orange Free State (DUKE, TEX, UC); MINNESOTA: Herb. Canby Sept. 1868 (NY); NEW JERSEY: Hunterdon Co.: Dodge July 18, 1899 (MICH); NEW MEXICO: Rio Arriba Co.: Wooton 2697 (NY); Santa Fe Co.: Fendler 680 (GH); NEW YORK: Ontario Co.: col. unknown Aug. 2, 1887, raised from seeds from Palmer from Mexico (GH); Tompkins Co.: Hoisington 340, cultivated (OKL); OREGON: Multnomah Co.: Nelson 3325 (GH); PENNSYLVANIA: Fretz 1881 (UC); Philadelphia Co.: Parker Sept. 9, 1874 (NY); TEXAS: Bexar Co.: Jermy 1904 (NY); Brewster Co.: Marsh 163 (GH); Crockett Co.: Cory 29703 (GH); Refugio Co.: Tharp Sept. 7, 1929 (MICH); Webb Co.: Mackenzie 85 (NY); VERMONT: Chittenden Co.: Flynn 4 (GH); VIRGINIA: Clarke Co.: Young 485, raised in experimental plots (TEX); WASHINGTON: Klickitat Co.: Suksdorf 2284 (GH, UC); WASHINGTON D.C.: Steele Sept. 20, 1899 (DUKE); WEST VIRGINIA: Rawleigh Co.: Tosh 650 (UC).

14. Physalis Wrightii Gray, Proc. Amer. Acad. Arts and Sciences 10:63. 1875.

Annual 30-90 cm. tall, nearly glabrous, the few hairs short, stiff and appressed; leaf blades ovate-lanceolate to linear-lanceolate, the principal ones usually 4-12 centimeters long on petioles 1.5-7 cm. long; leaf margins usually irregularly and often coarsely dentate, sometimes regularly and saliently dentate; corolla a light yellow color, sometimes with a greenish tinge, rotate with very little tube, 15-23 mm. wide when fully open, with five hairy pads on its limb near the base, alternating with the stamens; anthers (2.8) 3 (3.8) mm. long, yellow with a blue or blue-green tinge; filaments slender, somewhat exceeding the

anthers in length; flowering calyx usually 4-5 mm. long on peduncles 5-12 times its length; fruiting calyx usually 2-2.5 cm. long and 1.7-2 cm. wide, on peduncles usually 2.5-6 cm. long, sometimes nearly filled by the fruit.

Type: Charles Wright 1602, prairies along the San Pedro River, southwestern Texas, 1851-52 (GH); isotype (NY); no other collections have been seen from Texas.

Habitat, distribution and flowering time: Growing in deserts and mountains, but particularly in fields and other disturbed habitats, primarily in Arizona and California; flowering from July to November.

Selected from 46 sheets of collections: ARIZONA: Cochise Co.: Griffiths 1579 (ARIZ, NY); Gila Co.: Collom Sept. 15, 1934 (MICH); Graham Co.: Richardson 437 (ARIZ); Maricopa Co.: Wiggins 3860 (MICH); Navajo Co.: Zuch 49 (ARIZ); Pima Co.: Pringle Aug. 1, 1894 (GH, NY); Gould 3938 (ARIZ, TEX, UC); Pinal Co.: Arnold and Darrow Sept. 13, 1936 (GH, UC); Yuma Co.: Thornber Sept. 24, 1912 (ARIZ); CALIFORNIA: Imperial Co.: Munz 11523 (NY); Kern Co.: Yates 6839 (UC); Los Angeles Co.: Wheeler 964 (UC); San Diego Co.: Brandegee July 1895 (UC); TEXAS: Wright 1602.(GH, NY).

15. Physalis angulata Linnaeus, Species Plantarum 1:183. 1753; other synonymy under the varieties.

Annual, 15-90 cm. tall, glabrous, or with a few short appressed hairs especially on the younger parts; blades of principal leaves usually 4-10 cm. long, ovate to lanceolate, or sometimes linear-lanceolate; margins of the leaves irregularly and sometimes coarsely or saliently toothed, or entire, on petioles 1-4 cm. long; corolla yellowish, not

dark spotted, usually 4-10 mm. long; anthers usually 1-2.3 mm. long, bluish, on slender filaments; flowering calyx usually 3-5 mm. long with calyx lobes 1-2.5 mm. long; flowering peduncles 5-40 mm. long; fruiting calyx usually 2-3 cm. long and 1.5-2.5 cm. wide on peduncles 10-40 mm. long.

15a. Physalis angulata L., var. angulata, loc. cit. sup., incl. P. Linkiana Nees, Linnaea 6:471-472. 1831; P. angulata L., var. Linkiana (Nees) Gray, Proc. Amer. Acad. Arts and Sciences 10:64. 1875.

Leaves ovate to ovate-lanceolate; corolla usually 6-10 mm. long; flowering calyx usually 4-5 mm. long with calyx lobes 2-2.5 mm. long; flowering peduncles usually 5-15 mm. long; fruiting calyx on peduncles usually 20-30 mm. long, shorter than to equalling the length of the fruiting calyx.

Habitat, distribution and flowering time: Growing in open woods, pastures, ditches, fields, and various disturbed habitats in the extreme eastern states, and in the southeastern states as far west as eastern Oklahoma and Texas; flowering from May to September.

Selected from 104 sheets of 77 collections: ALABAMA: Coosa Co.: Pollard and Ball 263 (GH, NY); Lee Co.: Earle and Baker Aug. 11, 1897 (NY); Tuscaloosa Co.: Pollard and Maxon 330 (MICH, NY); ARKANSAS: Arkansas Co.: Moore 32748 (OKLA, UARK); Ashley Co.: Demaree 16362 (NY); Chicot Co.: Demaree 18567 (ARIZ, NY); Hempstead Co.: Buckholz 388 (UARK); Jefferson Co.: Demaree 13987 (NY); Pulaski Co.: Merrill 672 (UARK); CONNECTICUT: Hartford Co.: Bissell Aug. 19, 1904 (GH); DELAWARE: Commons Aug. 15, 1877; FLORIDA: Collier Co.: Moldenke 5761 (NY); Columbia Co.: Straub 36 (GH); Duval Co.: Curtiss 5737 (GH, NY, UC); Gadsden Co.: Berg

(NY); Gulf Co.: Chapman 4345 (GH, NY); Hillsborough Co.: Deam 2746 (GH); Lake Co.: Nash 1052 (GH, MICH, UC); Lee Co.: Hitchcock 238 (GH, NY); Leon Co.: Godfrey 52385 (DUKE); Pinellas Co.: Deam 2905 (GH); Polk Co.: McFarlin 6569 (MICH); Volusia Co.: Hood 9 (GH); GEORGIA: Decatur Co.: Thorne 4629 (GH); De Kalb Co.: Small Sept. 11, 1894 (NY); McDuffie Co.: Bartlett 1662 (MICH); LOUISIANA: Baton Rouge Co.: Chamblis 17 (NY); Coryell 9567 (DUKE, GH, NY); Tangipahoa Co.: Coryell 9240 (DUKE); MISSISSIPPI: Harrison Co.: Tracy 6476 (GH, NY); Jackson Co.: Pollard 1123 (GH, NY); NEW JERSEY: Brunswick Co.: Godfrey 10083 (TEX); Camden Co.: Beringer Sept. 1891 (MICH); NORTH CAROLINA: Moore Co.: Oosting 34777 (DUKE, PH); New Hanover Co.: Williamson Sept. 1, 1900 (NY, PH); Wilson Co.: Randolph and Randolph July 7, 1922 (GH); OKLAHOMA: Delaware Co.: Wallis 2728 (OKLA); Oklahoma Co.: Waterfall 2349 (OKL); Pottawatomie Co.: Barkley 395 OKL); SOUTH CAROLINA: Charleston Co.: Moldenke 5196 (NY); in cultis Curtis (GH); TEXAS: Angelina Co.: Cory 10665 (GH); Brazos Co.: Parks Dec. 1, 1946 (TEX); Gonzales Co.: Tharp Nov. 23, 1935 (MICH); Harris Co.: Boon 481 (TEX); Houston Co.: Cory 26121 (GH); Jefferson Co.: Tharp Sept. 9, 1937 (TEX); Wood Co.: Cory 57671 (COLO); VIRGINIA: Princess Anne Co.: Fernald and Long 10881 (GH); Southampton Co.: Fernald and Long 13742 (GH).

15b. Physalis angulata L., var. PENDULA (Rydberg) Waterfall, comb. et stat. nov., P. pendula Rydb., in Small, Flora of the Southeastern United States 983. 1903.

Similar to var. angulata, but leaves sometimes narrower; flowering calyx usually 3 mm. long, sometimes 4 mm. long; with calyx lobes about 1 mm. long; flowering peduncles usually 15-40 mm. long;

fruiting peduncles usually 20-40 mm. long, equalling the fruiting calyx (which is uaually 20-25 mm. long) to three times its length.

Type: In describing this species, Rydberg did not select a type, stating that it was the taxon that he had originally called P. lanceifolia, or at least the part of it occurring from Illinois to Texas. He cited several collections in his treatment of the genus,[1] and from among these F. L. Harvey 65 "central and southern Arkansas" (UARK) is selected as LECTOTYPE.

Habitat, distribution and flowering time: Growing in river valleys, bottom woods, fields and various disturbed sites, primarily in Oklahoma and Texas, but extending north to Illinois; flowering from June through September.

Selected from 119 sheets of 99 collections: ARKANSAS: Conway Co.: Moore 420229 (UARK); Garland Co.: Demaree 20471 (NY, UC); Harvey 65 (MICH); Little River Co.: Moore 510682 (UARK); Prairie Co.: Demaree 15498 (NY); Pulaski Co.: Merill 725 (UARK); ILLINOIS: Alexander Co.: Palmer 16628 (PH); Cook Co.: Umbach Aug. 3, 1897 (MICH, NY, PH); St. Claire Co.: Eggert Sept. 16, 1893 (GH); Union Co.: Vasey 1862 (GH), Vasey (NY); KANSAS: Douglas Co.: McGregor 607 (KANU); Geary Co.: Hitchcock 775 (GH, NY); Linn Co.: Rydberg and Imler 77 (NY); Miami Co.: McGregor 11048 (KANU); Sedgwick Co.: Horr 6191.1 (KANU); LOUISIANA: Hale (GH); MASSACHUSETTS: Middlesex Co.: Perkins Oct. 22, 1880 (NY); MISSOURI: Jackson Co.: Mackenzie May 10, 1896 (NY); Jasper Co.: Palmer 3093 (NY); St. Louis Co.: Eggert Sept. 7, 1887 (PH, UC); Engelmann 324 (GH); OKLA-

[1] Mem. Torr. Bot. Club 4:332-333. 1896.

HOMA: Alfalfa Co.: Waterfall 9970 (OKLA); Blaine Co.: Waterfall 2387 (OKL, UC); Cherokee Co.: Wallis 1468, 1891 (OKLA); Creek Co.: Bush 397 (GH); Custer Co.: Palmer 12555 (TEX, UC); Garvin Co.: Andrews 133 (OKL); Logan Co.: Smith 889 (OKL); Murray Co.: Robbins 2729 (OKL); Muskogee Co.: Little 188 (OKL); Oklahoma Co.: Waterfall 2091 (OKL, GH); Osage Co.: Stevens 2115 (GH, NY, OKL, OKLA); Payne Co.: Coryell 388, 596 (OKLA); Pittsburg Co.: McClary 66 (OKL); Pontotoc Co.: McCoy 852, 1267, 1915 (OKLA); Pottawatomie Co.: Van Vleet July 12, 1905 (OKL); TEXAS: Bexar Co.: Metz 64 (NY, UC); Bowie Co.: Plank May 9, 1891 (NY); Brazos Co.: Reeves 62 (GH); Calhoun Co.: Gentry 49 (TEX, LIL); Colorado Co.: Bush 333 (GH, NY); Dallas Co.: Hall 504 (GH, NY); DeWitt Co.: Riedel Aug. 3, 1941 (TEX); Harris Co.: Boon June 22, 1943 (TEX); Jackson Co.: Tharp Aug. 8, 1941 (TEX); Lamar Co.: Strandtman 10 (TEX); McLennan Co.: York 46232 (OKL, TEX); Refugio Co.: Tharp Dec. 4, 1928 (TEX); San Patricio Co.: Cory 45389 (GH); Tarrant Co.: Ruth 1242 (NY); Titus Co.: Jones 10 (TEX); Travis Co.: Tharp 1717 (TEX); Washington Co.: Brackett July 15, 1938 (GH, TEX).

15c. Physalis angulata L., var. LANCEIFOLIA (Nees) Waterfall, comb. et stat. nov., P. lanceifolia Nees, Linnaea 6:473. 1831.

Similar to var. pendula, but lanceolate to linear-lanceolate, and corolla usually only 4-5 mm. long; anthers often only 1-1.5 mm. long.

Type: No collections were cited by Nees who said "Habitat in Peruvia (Ruiz et Pavon); in Mexico (Herb. Hort. Reg. Ber.)". A Neotype should be selected, but preferably after a study of Peruvian and Mexican material. Specimens cited below appear to be similar to a number of Mexican collections seen by the author.

Habitat, range and flowering time: In wet areas, river valleys, fields and other disturbed habitats in California, Arizona, New Mexico and to a lesser extent in Texas and southern Oklahoma, often being atypical in the latter two states, probably due to gene interchange with var. pendula; a few Florida collections are also referred here; flowering usually in June to September, or as late as November in the warmer parts of its range.

Selected from 62 sheets of 39 collections: ARIZONA: Cochise Co.: Thornber 2627 (GH), put here because the anthers are only about 1 mm. long, even though the leaves are broad; Pima Co.: Pringle Aug. 5, and Sept. 5, 1884 (NY, PH, UC); Pinal Co.: Kearney 15067 (ARIZ); Yuma Co.: Schott 2 (NY); CALIFORNIA: Butte Co.: Heller 13355 (GH); Fresno Co.: Bacigalupi, Ferris and Wiggins 2488 (GH, NY, UC); Imperial Co.: Parish 8337 (GH); Los Angeles Co.: Wheeler 965 (UC); Merced Co.: Hoover 1599 (UC); San Diego Co.: Spencer 1014 (GH); Stanislaus Co.: Hoover 2442 (UC); Tulare Co.: Michener and Bioletti 1893 (NY); FLORIDA: Dade Co.: Small and Carter 649 (NY, PH); Kevy Co.: Small, Small and DeWinkeler 10036 (NY); Monroe Co.: Eyles 8213 (GH, OKL); NEW MEXICO: Dona Ana Co.: Archer 489 (MICH); Kearney and Peebles 15073 (ARIZ); OKLAHOMA: McCurtain Co.: Waterfall 7604 (OKL, OKLA); Oklahoma Co.: Waterfall 2893, near var. pendula (OKL); Payne Co.: James 37 (OKLA); TEXAS: Brewster Co.: Cory 31275 (GH); Cameron Co.: Runyon 4243 (TEX); Llano Co.: Bray 10 (NY); Presidio Co.: Warnock T164 (GH, TEX); Refugio Co.: Tharp Sept. 7, 1929 (TEX); Travis Co.: Tharp, Warnock and Barkley Nov. 31, 1945, atypical material, perhaps intermediate with var. pendula (COLO, DUKE, GH, NY, OKL, OKLA, UARK, UC).

16. Physalis pubescens Linnaeus, Species Plantarum 1:183. 1753. Synonymy is listed under the varieties.

Plants annual, 15-60 cm. tall, villous or viscid-villous vestite, sometimes with granular glands, sometimes glabrate; blades of principal leaves usually 3-10 cm. long, narrowly to broadly ovate, on petioles half as long to about equalling them in length; margins of the leaves toothed to entire; corolla 6-10 mm. long, yellow with 5 prominent dark spots on the limb near its base; anthers 1.5-2 (2.4) mm. long, blue; flowering calyx 4-7 mm. long, its lobes 2-4 mm. long; flowering peduncles 3-12 mm. long; fruiting calyx 2-4 cm. long and 1.5-2.5 cm. wide, 5-angled, on peduncles 5-20 mm. long.

16a. Physalis pubescens L., var. pubescens, loc. cit. sup.; P. turbinata Medicus, Academia Theodora-palatina 4:188-192. 1780; P. barbadensis Jacquin, Miscellanea Austriaca Sive Plantarum Selectarum 360. 1781; P. obscura, var. viscido-pubescens Michx., Flora Boreali-Americana 1:149. 1803; Alicabon barbadense (Jacq.) Rafinesque, Sylva Telluriana 56-57. 1838; P. viscido-pubescens (Michx.) Dunal, in DeCandolle's Prodromus 13(1)442. 1852; P. floridana Rydberg, in Small, Flora of the Southeastern United States 983. 1903.

Plants more or less villous; leaf blades usually with 5-8 teeth on each side, usually not translucent; flowering peduncles 3-7 mm. long; fruiting calyces 2-3 cm. long on peduncles usually 5-9 mm. long.

Type: "In India utraque." A photograph of the Type is in the Arnold Arboretum's collection of photographs of specimens in the Linnaean Herbarium, London.

Habitat, distribution and flowering time: Growing in swamps,

margins of lakes, sand dunes, brush, fields and other disturbed habitats, primarily from Florida to Texas in our area; flowering from May through November. It is a widespread pantropical species.

Selected from 81 sheets of collections: FLORIDA: Broward Co.: Moldenke 480 (NY); Dade Co.: Small and Small 4632 (DUKE, NY); Franklin Co.: Chapman 3055b (GH, NY); Highlands Co.: Moldenke 5417 (NY); Hillsboro Co.: Churchill March 28, 1936 (GH); Lake Co.: Nash 1251 (GH, MICH, NY, UC, PH); Lee Co.: Tracy 7612 (GH, NY) Monroe Co.: Killip 41456 (NY, UC); Pinellas Co.: Williams Mar. 12, 1926 (DUKE); Polk Co.: McFarlin 5924 (MICH); St. Lucie Co.: Small 8507 (GH, NY); ILLINOIS: Jackson Co.: Vasey (GH); LOUISIANA: Hale (GH); TEXAS: Bexar Co.: Metz 771 (MICH); Brazos Co.: Moncreif 1476 (TEX); Gonzales Co.: Tharp Aug. 12, 1940 (TEX); Harris Co.: Fisher Oct. 9, 1917 (UC); Hidalgo Co.: Walker 8 (GH, TEX); Jackson Co.: Warnock 105 (TEX); Jefferson Co.: Tharp Sept. 10, 1937 (GH, TEX); McLennan Co.: Smith 59 (TEX); Newton Co.: Tharp 52141 (GH); Nueces Co.: Tharp and Brown 48-165 (TEX); Travis Co.: Tharp Nov. 8, 1929 (GH, OKLA, TEX); Willacy Co.: Johnston 542221 (TEX); Williamson Co.: Wolcott 314 (TEX).

16b. Physalis pubescens L., var. OBSCURA (Michx.) Waterfall, comb. nov., P. obscura Michx., var. obscura (var. glabra Michx.), Flora Boreali-Americana 1:149. 1803; P. hirsuta Dunal, var. repando-dentata Dunal, in DeCandolle's Prodromus 13(1):445. 1852; P. barbadensis Jacq., var. obscura (Michx.) Rydb., Mem. Torr. Bot. Club 4:327. 1896; P. barbadensis Jacq., var. glabra (Michx.) Fernald, Rhodora 51:82. 1949.

When Michaux described P. obscura he immediately divided it into two varieties, var. glabra and var. viscido-pubescens. The present

author interprets var. glabra as being the "typical" variety, that is var. obscura under the present Rules, Article 35. Hence the name, glabra is unavailable for transfer, and cannot be used in any combination for the glabrate taxon.

This material has been referred recently, by some American authors, to P. turbinata Medicus, Academia Theodora-palatina 4:188-192. 1780. However, in describing this species Medicus says "Die Hauptstamme und nebenaste sind vierkandigt, haarich und rotlich violet-braun." One might dismiss the reddish violet-brown color, as either not necessarily being a characteristic of the whole taxon, or as possibly not being retained in herbarium specimens, but it seems dubious if the term "hairy" would be used to describe nearly glabrous, or slightly puberulent specimens. It seems that the taxon described by Medicus, at least as the name has been applied in our flora, is more likely referable to var. pubescens.

Plants glabrous or sparingly puberulent, but not villous as in the other varieties; blades of the principal leaves usually 2-7 cm. long, ovate, often rather broadly so, acuminate in many specimens; margins of the leaves irregularly toothed, sometimes saliently so; petioles about equalling the blades in length; anthers 1.8-2.4 mm. long, bluish; flowering calyx 5-7 mm. long with narrow lanceolate-acuminate lobes 2.5-4 mm. long; flowering peduncles 5-12 mm. long; fruiting calyx 3-4 cm. long, ovate or broader in outline, often acuminate at the apex, on peduncles 1-2 cm. long.

Type: In the Herbarium of Michaux, Mus. Nat. Hist. Nat., Paris; photograph in the Harvard University Hergarium (GH).

Habitat, distribution and flowering time: Open woods, creek sides, valleys, yards and other disturbed habitats, mostly southeastern coastal states from North Carolina to Texas, and inland in Arkansas and Missouri; usually flowering from July through October.

Selected from 46 sheets of 34 collections: ALABAMA: Crenshaw Co.: Reed 2103 (TEX); Mobile Co.: Mohr Aug. 1883 (MICH); ARKANSAS: Drew Co.: Demaree 16498 (NY); Fulton Co.: Bush 961 (NY); Hot Springs Co.: Demaree 19471 (NY); Logan Co.: Palmer 24209 (UARK); Saline Co.: Moore 53-311 (UARK); FLORIDA: Dade Co.: Tatnell 620 (PH); Gadsden Co.: Curtiss 5896 (GH, UC); GEORGIA: Calhoun Co.: Thorne 7338 (GH); CALIFORNIA: San Diego Co.: Jones March 1882 (PH); LOUISIANA: Calasieu Co.: Coryell and Coryell 9566 (DUKE, GH, NY, PH); Natchitiches Co.: Palmer 8777 (PH); Vermilion Co.: Tharp July 27, 1929 (TEX); MISSISSIPPI: Oktibbeha Co.: Pollard 1338 (GH); MISSOURI: Barry Co.: Bush 547 (NY); Butler Co.: Eggert July 1893 (NY, UC); Madrid Co.: Bush 189 (GH, NY); NORTH CAROLINA: Curtis (GH); PENNSYLVANIA: Bucks Co.: Moyer (PH); TEXAS: Bowie Co.: Heller and Heller 4253 (GH, NY, PH); Harris Co.: Hall 503 (GH, NY); Newton Co.: Tharp 42-141 (GH, TEX); Orange Co.: Tharp 2518 (TEX); Rusk Co.: Reverchon 3239 (NY).

16c. Physalis pubescens L., var. INTEGRA Waterfall, nom. nov., P. hirsuta Dunal, var. integrifolia Dunal, in DeCandolle, Prodromus 13(1):445. 1852.

Since Dunal divided his P. hirsuta into three varieties, the first of these, var. integrifolia, is taken to be the equivalent of var. hirsuta under the present Rules, and, according to Article 35, unavailable for transfer. The above name is proposed in its place.

Plants more or less villous; leaf blades often entire, sometimes 3-4 (rarely more) more or less prominent teeth on each side, translucent or semitransparent; fruiting calyx 2-3 cm. long on peduncles 5-9 mm. long.

Included here are the plants, primarily of the northeastern United States, which have been referred to P. pubescens by recent American authors.

Type: "Physalis, n. 30, un. itin., Frank e sylvaticis agri Cincinnati civ. Ohio," presumably in the De Candolle collection in the Conservatoire et Jardin Botaniques, Geneve, Switzerland.

Habitat, distribution and flowering time: Creek banks, lake shores, woods, hills, and various disturbed habitats, mostly from Pennsylvania to Iowa and south to Florida and south central Texas, but also in southern New Mexico, Arizona and California; less frequent in southeastern United States than var. pubescens.

Selected from 162 sheets of 128 collections: ALABAMA: Jefferson Co.: Karle June 18, 1899 (NY); Tuscaloosa Co.: Pollard and Maxon 331 (GH); ARIZONA: Pima Co.: Toumey Aug. 30, 1895 (UC); ARKANSAS: Baxter Co.: Moore 510540 (OKLA, UARK); Clay Co.: Demaree 20311 (OKLA, NY, UC); Crawford Co.: Demaree 15300 (NY); Garland Co.: Demaree 16190, 21841, 20422 (NY); Newton Co.: Moore 430237 (OKLA, UARK); Perry Co.: Demaree 20168 (NY); Polk Co.: Moore and Williams Aug. 15, 1951 (UARK); Pulaski Co.: Demaree 16640 (NY); Sevier Co.: Demaree 9913 (NY, UC); Union Co.: French 500150 (UARK); Washington Co.: Giles 429 (UARK); Yell Co.: Demaree 20109 (NY); CALIFORNIA: Colusa Co.: Stinchfield 460 (NY); Imperial Co.: Thomas (GH, NY); Lake Co.: Baker 11226 (UC); San Diego Co.: Orcutt Mar. 6, 1883

(MICH); Tulare Co.: Congdon Oct. 8, 1881 (UC); FLORIDA: Dade Co.: Small and Moiser 5902 (GH, NY); Leon Co.: Godfrey 52473 (DUKE); ILLINOIS: Adams Co.: Seymour Sept. 26, 1876 (DUKE); Massac Co.: Gleason 2630 (GH); INDIANA: Grant Co.: Deam 15287 (NY); Lawrence Co.: Kriebel 2564 (DUKE); Putman Co.: Banker 1499 (NY); Tippecanoe Co.: Boot Oct. 6, 1895 (GH); Whitely Co.: Friesener 16539 (GH, NY); KANSAS: Riley Co.: Norton 366 (GH, NY); KENTUCKY: Bell Co.: Lloyd Aug. 10, 1888 (NY); Hickman Co.: McFarland and Anderson 2223 (NY); MARYLAND: Montgomery Co.: Blanchard Aug. 12, 1892 (NY); Worcester Co.: Canby Sept. 1863 (NY); MASSACHUSETTS: Suffolk Co.: Perkins Sept. 6, 1881 (NEBC); Butler Co.: Eggert July 1893 (UC) on sheet with var. obscura; Jackson Co.: Bush 6423 (GH, NY); Jasper Co.: Demaree 4424 (OKLA, UARK); Moniteau Co.: Steyermark 70814 (UARK); Newton Co.: Palmer 32492 (NY); Osage Co.: Jeffrey 366 (GH); Phelps Co.: Kellogg 196 (NY, TEX, UC); St. Louis Co.: Eggert Aug. 14, 1891 (TEX, UC); NEW MEXICO: Rusby 310, Burro Mts. (GH, NY); NORTH CAROLINA: Brunswick Co.: Blomquist 4811 (DUKE); Carteret Co.: Lewis 234 (NY); Washington Co.: Correll 1921 (DUKE); OHIO: Moldenke 13543 (OKLA); Franklin Co.: Gleason Sept. 5, 1904 (GH); Hamilton Co.: Lloyd 2209 (MICH); Lake Co.: Werner 141 (GH); OKLAHOMA: Cherokee Co.: Waterfall 9661 (OKLA); Delaware Co.: Wallis 2732 (OKLA); Johnston Co.: Houghton 3572½ (NY); Murray Co.: Hopkins and Cross 6429 (OKL); Muskogee Co.: Waterfall 10139 (OKLA); Ottawa Co.: Stevens 2530 (GH, NY); Payne Co.: Thompson 82 (OKLA); PENNSYLVANIA: Allegheny Co.: Porter Aug. 28, 1896 (GH, NY); SOUTH CAROLINA: Berkeley Co.: Godfrey and Tryon 622 (GH, NY); TENNESSEE: Cheatham Co.: Svenson 10395 (UC); Davidson Co.: Svenson 9494 (GH); Hamilton Co.: Clalmgh 101 (DUKE); TEXAS: Cameron Co.: Johnston 542210 (TEX); Dallas Co.: Reverchon 382 (GH);

Gonzales Co.: Tharp 51-467 (OKLA, TEX); Jackson Co.: Warnock 105 (NY); Travis Co.: Armor 5508 (OKLA) approaching var. pubescens; Willacy Co.: Davis and Johnston 53256.15 (TEX); VIRGINIA: Fernald and Long 12794 (GH); Isle of Wight Co.: Fernald and Long 13442 (GH); James City Co.: Fernald and Long 13441 (GH); Loudon Co.: Holms Aug. 1888 (ARIZ, NY); Nansemond Co.: Fernald and Long 10810 (GH); Northampton Co.: Canby Sept. 1878 (NY); Page Co.: Steele and Steele 197 (GH, NY); Princess Anne Co.: Fernald and Long 4167, 4168, 10809 (GH); WEST VIRGINIA: Mertz Sept. 22, 1878 (NY).

16d. Physalis pubescens L., var. GRISEA Waterfall, var. nov., Planta grisea, nunc villosa nunc brevipilosa, nunc glandularo-farinacea; foliis ovatis simuato-dentatis; calycibus fructus a pedunculis 5-9 mm. longis.

Stems densely covered with long, jointed hairs, or with long and short hairs mixed, or densely short viscid-hairy; leaves usually short hairy, sometimes with gramular glands, the surfaces having a greyish appearance; leaf blades ovate, coarsely and irregularly 6-9 dentate, or simuate dentate nearly to their bases; fruiting calyces on peduncles 5-9 mm. long.

This is the taxon, primarily of the northeastern United States, that has been passing as P. pruinosa L. However the photograph of the type of P. pruinosa in the Arnold Arboretum of Harvard University shows a plant with a more prominent acumination on the leaf blade, and a much longer flowering peduncle than is found in any of our material. The author has been unable to determine the application of the name, P. pruinosa. He has seen no material comparable with the photograph of the type.

Type: As the TYPE is selected Walter Deane Sept. 24, 1844, Cambridge, Mass. It is in the Harvard University Herbarium (GH). An ISOTYPE is in the Herbarium of the New York Botanical Garden.

Habitat, range and flowering time: Growing on mountainsides, wooded slopes, roadsides, in gardens and various disturbed habitats, principally in northeastern United States; usually flowering in August, September and October.

Selected from 105 sheets of 93 collections: CANADA: ONTARIO: Macoun 54524 (NY); UNITED STATES: ALABAMA: Baldwin Co.: Dukes 118 (NY); CALIFORNIA: Inyo Co.: Roos and Roos 6221 (UC); CONNECTICUT: New Haven Co.: Blewitt 1381 (NEBC); DELAWARE: New Castle Co.: Latnall 1882 (GH); FLORIDA: Chapman (NY); GEORGIA: DeKalb Co.: Small Aug. 1-6, 1895 (NY); ILLINOIS: DuPage Co.: Umbach 12484 (GH); Macon Co.: Mills Sept. 29, 1940; INDIANA: Lawrence Co.: Kriebel 2538 (DUKE, GH); KANSAS: Imler 68 (NY); KENTUCKY: Short 1840 (NY); MAINE: Cumberland Co.: Chamberlain 1127 (NEBC); MASSACHUSETTS: Barnstable Co.: Collins 950 (NEBC); Bristol Co.: Hervey (NEBC); Dukes Co.: Bicknell 7704, 7706, 7693 (NY); Essex Co.: Morong Aug. 1, 1868 (NY); Hampshire Co.: Torrey and S.J.E. Sept. 16, 1943 (DUKE); Middlesex Co.: Fernald Sept. 26, 1908 (GH); Nantucket Co.: Flynn July 30, 1904 (NEBC); Norfolk Co.: Kidder Aug. 23, 1888 (NEBC); Plymouth Co.: Williams Aug. 21, 1898 (NEBC); Suffolk Co.: Young Sept. 1878 (GH, NEBC); Worcester Co.: Woodward 2 (GH); MICHIGAN: Dodge Aug. 25, 1906, St. Claire Co.; MISSOURI: Barry Co.: Bush 564, 469 (NY); Christian Co.: Blankenship Aug. 1, 1895 (GH); Jackson Co.: Mackenzie 7 (MICH); Jasper Co.: Bush 10402 (GH, NY); Taney Co.: Bush 170 (GH); NEW JERSEY: Hastings Sept. 6, 1917 (NY) foot of Palisades; NEW YORK: Chemung Co.: Lucy 7825, 11098

(NY); Oswego Co.: Sheldon 6008 (UC); Tompkins Co.: Hoisington 312 (OKL); Washington Co.: Burnham Sept. 25, 1896 (GH); NORTH CAROLINA: Granville Co.: Godfrey 2060 (GH); Jackson Co.: Thaxter June-July 1887 (GH); Swain Co.: Beardslee and Kofoid Aug. 15, 1891 (GH); OREGON: Tillamook Co.: Lloyd Sept. 10, 1894 (NY); PENNSYLVANIA: Bucks Co.: Fretz Sept. 7, 1901 (GH); Lancaster Co.: Small Sept. 1889 (GH); Westmoreland Co.: Shafer and Medsyer 182 (UC); RHODE ISLAND: Providence Co.: Leland Sept. 18, 1881 (NEBC); TENNESSEE: Knox Co.: Ruth 3411 (NY); TEXAS: De Witt Co.: Riedel Aug. 3, 1941 (TEX); VERMONT: Bennington Co.: Ames May 1885 (MICH); Chittenden Co.: Flynn 3 (GH); Rutland Co.: Eggleston 1510 (GH, NEBC); VIRGINIA: Bedford Co.: Curtiss Oct. 3, 1871 (GH); Page Co.: Steele and Steele Aug. 28, 1901 (GH, NY); WASHINGTON: Klickitat Co.: Suksdorf 2285 (NY); Yakima Co.: Henderson 2496 (GH).

17. Physalis foetens Poiret, var. NEOMEXICANA (Rydb.) Waterfall, comb. et stat. nov., P. neomexicana Rydb., Mem. Torr. Bot. Club 4:325-326. 1895.

Plants annual, 10-60 cm. tall, usually branched; indument short (0.5-1 mm. long) and usually dense, more or less yellowish or brownish capitate-glandular; leaf blades 3-6 cm. long, ovate to oblong-ovate or lanceolate-ovate, their margins toothed, or sometimes sinuate-toothed; petioles one-half to three-fourths as long as the blades; corollas 6-7 mm. long, bluish spotted; anthers (0.3) 1-1.5 (2) mm. long, bluish, on filiform filaments; flowering calyces 3-4.5 mm. long, on peduncles usually 1.5-3 mm. long; fruiting calyces 2-3 cm. long, more or less ovate in outline, sharply 5-angled, on peduncles mostly 4-7 mm. long.

This variety differs from var. foetens of Mexico primarily in its shorter anther-length (2-3 mm. in var. foetens), usually shorter corolla (as much as 1 cm. long in some Mexican material) and in having fewer yellowish or brownish capitate glands than var. foetens.

Type: In describing P. neomexicana, Rydberg cited several collections, but designated none of them as type. From among those cited Fendler 678 (GH) is selected as the LECTOTYPE. A second sheet of the same collection, an iso-lectotype, is in the same herbarium.

Habitat, distribution and flowering time: Growing in the mountains, often with junipers and pines, and in adjacent areas, including cultivated fields, in New Mexico and adjacent Colorado and Arizona; flowering in June through October.

Selected from 46 sheets of 38 collections: ARIZONA: Graham Co.: Bohrer 409 (ARIZ); Greenlee Co.: Gould and Haskell 4080 (UC); Maricopa Co.: Rusby 310 (MICH); Navajo Co.: Wooton September 13, 1913 (ARIZ); Pima Co.: Toumey Aug. 30, 1894 (NY); Yavapai Co.: Wilcox Sept. 1918 (ARIZ); COLORADO: Porter July 1872 (PH); El Paso Co.: Livingston 497 (DUKE); NEW MEXICO: Colfax Co.: Standley 13869 (NY); Bernalillo Co.?: Ellis 287 (NY); Grant Co.: Rusby Oct. 1881 (MICH); Lincoln Co.: Skehan 60 (GH, NY), Wooton 633, 635 (NY); Rio Arriba Co.: Parker and McClintock 6449 (ARIZ, UC); San Miguel Co.: Standley 4920 (GH, NY); San Miguel Co.: Nelson 11568 (UC); Santa Fe Co.: Heller and Heller 3803 (GH, NY); Sierra Co.: Metcalfe 1210 (GH, NY, UC); Socorro Co.: Metcalfe 425 (NY); Torrance Co.: Parker and McClintock 6529 (NY); Socorro or Grant Co.: Rusby 309, Mogollon Mts. (MICH).

18. Physalis LATIPHYSA Waterfall, sp. nov. Planta annua, 15-45

cm. alta, ramosa, plus minusve villosa; folio-laminis 5-7 cm. longis, ovatis vel ovatis-rotundis, integris vel paucidentatis, acuminatis; corollis maculatis, 4-6 mm. longis; antheris coeruleis, 1.5-2 mm. longis; calycibus fructus (2.5) 3-4 cm. latis; pedunculis 1-1.5 cm. longis.

Annual, 15-45 cm. high, branched, more or less villous; blades of the principal leaves 5-7 cm. long, ovate to ovate-rotund, thin and translucent, their margins from entire to having a few teeth, acuminate; petioles 1.5-7 cm. long; corollas yellow, dark-spotted, small, 4-6 mm. long; flowering calyces 3-4 mm. long with lobes about half that long, on peduncles 3-8 mm. long; fruiting calyces sparsely appressed-hairy, strongly 5-angled, 2.5-4 cm. long and (2.5) 3-4 cm. wide; fruiting peduncles 1-1.5 cm. long; linear-subulate calyx lobes 7-10 mm. long, extending 5-7 mm. beyond the body of the inflated fruiting calyx.

Type: T. H. Kearney and R. H. Peebles 14425, Rondstadt Ranch, plain east of Baboquivari Mts., Pimal Co., Arizona, Sept. 23, 1939. It is deposited in the Herbarium of the University of Arizona.

Collections: In addition to the type, the following collections have been seen: ARIZONA: Pima Co.: Bartram 237 Santa Catalina Mts., east of Pima Canyon, Jan. 16, 1920 (PH); Kearney and Peebles 10427, Toro Canyon, Baboquivari Mts., Sept. 30, 1934 (ARIZ, MICH); Kearney and Peebles 14932, South Canyon, Baboquivari Mts., Aug. 31, 1940 (ARIZ); Santa Cruz Co.: Harrison and Hope 9058, Forty miles south of Tucson on Sasabe Road, Sept. 11, 1932 (ARIZ); Harrison and Fulton 8158, Nogales, Aug. 30, 1931 (ARIZ); County undetermined: Harrison 9058, Robles to San Fernando, Sept. 10, 1932 (GH, MICH); Harrison, Kearney and Hope 8950, half-way from Sasabe to Robles, Aug. 21, 1932 (ARIZ); Kearney and Peebles

10576, Florida Canyon, Santa Rita Mts., Oct. 7, 1934 (ARIZ).

19. Physalis missouriensis Mackenzie and Bush, Trans. Acad. Sci. St. Louis 12:84-85. 1902.

Annual, usually branched above, villous, sometimes with shorter hairs, often somewhat viscid; principal leaf blades 2-6 cm. long, ovate to narrowly ovate, dentate to simately dentate, or sometimes entire; petioles one-third the length of, to nearly as long as the blades; corolla yellow, not dark spotted, 7-10 mm. long; anthers (0.6) 1-1.2 mm. long, bluish, on slender filaments; flowering calyx 3-4 mm. long, its lobes 1-2 mm. long, on peduncles 3-6 mm. long; fruiting calyx 1.5-2.5 cm. long, ovoid, on peduncles 5-10 mm. long.

This species is easily distinguished from P. pubescens by its unspotted corollas and its smaller anthers.

Type: K. K. Mackenzie 485, Rocky soil, Red Bridge, Jackson Co., Missouri. The type was deposited in the "Herbarium of K. K. Mackenzie." Isotypes have been seen from the herbaria of Harvard University and Michigan University.

Usually growing in rocky woods and limestone barrens, mostly in Missouri, northeastern Kansas, western Arkansas, with two collections from adjacent Oklahoma, and one collection, dubiously referred here, from southwestern Texas; flowering from June through October.

Collections examined: ARKANSAS: Carroll Co.: Palmer 29310 (UARK); Hempstead Co.: Palmer 8955 (PH); Washington Co.: Moore 3008 (UARK); Moore and Iltis 430209 (OKLA, UARK); Giles 404 (UARK); J.T.B. 645 White River (UARK); KANSAS: Douglas Co.: Snow 2210 (KANU); McGregor 9703 (KANU); Marshall Co.: Horr 4610 (KANU); Riley Co.: Gates 18566 (GH, TEX, UC); Hitchcock 402 (GH); Shawnee Co.: Volle 737 (KANU); MISSOURI:

Barry Co.: Bush 162 (OKL); Jackson Co.: Bush June 27, 1887 (GH), Aug. 1888 (GH, NY), 772 (GH, NY); 4079 (GH), 7334 (GH), 7695 (GH, NY), 12298 (NY), 12298A (NY); Mackenzie 360 (NY), Aug. 23, 1896 (MICH, NY); 485 (MICH); Jefferson Co.: Prince July 4, 1883 (GH); Phelps Co.: Kellogg Oct. 22, 1913 (TEX); Platte Co.: Bush 11804 (NY); St. Louis Co.: Eggert July 20, 1887 (GH), Aug. 21, 1891 (NY); Pennell 11701 (PH); Taney Co.: Bush 173 (GH, NY); County undetermined: Blankenship 1893 (NY); Nelson 5 (NY); OKLAHOMA: Muskogee Co.: Little 2568 (OKL); Ottawa Co.: Stevens 2351 (GH, on sheet with Stevens 2530, P. pubescens); TEXAS: Brewster Co.: Cory 35570, five and three-quarter miles east of Alpine, Sept. 19, 1940 (GH) is somewhat doubtfully referred to this taxon.

20. Physalis Greenei Vasey and Rose, Contr. U. S. Natl. Herb. 1:18. 1890; P. pedunculata Greene, Pittonia 1:268-269. 1899, non Mart. and Gal., Bull. Acad. Brux. 12:132. 1842.

Annuals, villous or short pilose, glandular and viscid; principal leaf blades 2-4 cm. long, ovate; petioles one-half as long as to slightly longer than the blades; leaf margins dentate to sinuate-dentate, or rarely entire; corolla 8-10 mm. long, yellowish, or sometimes with a slightly darker tinge; anthers 1.5-2.5 mm. long, yellow, on slender filaments; flowering calyx 3-4 mm. long on peduncles 15-30 mm. long; fruiting calyx 2-2.5 cm. long, pointed-ovoid, on peduncles 15-40 cm. long.

The smaller anthers of this species will serve to distinguish it, and separate it from P. crassifolia in those instances in which they tend to resemble each other.

Type: Charles F. Pond Feb. 1889, Cedros Island, off the coast of Lower California; "southwest side of the island" according to Greene;

TYPE and isotype (US).

Habitat, distribution and flowering time: Hills and sea-cliffs, southern California; flowering in February, March and April.

Collections examined: CALIFORNIA: Orange Co.: Abrams June 12, 1901 (NY); Mason 2933 (GH, UC); Placer Co.: Jones 88 (GH); San Diego Co.: Abrams 3308 (GH, NY, PH, UC, US); Allen 77 (GH); Jones March 1882 (GH, UC); Wiggins 1821 (UC).

21. Physalis lobata Torrey, Ann. Lyc. Nat. Hist. New York 2:226-227. 1828; Quincula lobata (Torr.) Rafinesque, Atlantic Journal, 1:145. 1832; P. sabeana Buckley, Proc. Acad. Sci. Phil. 14:6. 1863; Chamaesaracha physaloides Greene, Bull. Torr. Bot. Club 9:122. 1882; Quincula lepidota Aven Nelson, Bot. Gaz. 47:430. 1909.

Chamaesaracha physaloides is included here on the basis of Greene's phrase "flat scale-like hairs," which seems to be a good description of the appearance of the characteristic crystalline vesicles of P. lobata after they are dried. These structures are not found on P. Wrightii, the other species to which this name has been referred.

Perennial, branching from the base, the branches spreading or procumbent; indument consisting of a varying amount of crystalline vesicles, flattening when dried, which may be abundant enough to give the plant a scurfy appearance, or may be very sparse; principal leaves usually 4-10 cm. long, with blades usually 0.5-3 cm. wide, ovate-lanceolate to linear-lanceolate, cuneate at the base to a winged petiole, usually pinnatifid, rarely sinuate-toothed or entire; corollas blue or violet, rotate, 1.5-2 cm. broad, with five hairy pads on its base near the point of attachment of the filaments and alternating with them;

anthers about 1.5-2 mm. long, yellow, on slender filaments; style twisted and bent to one side; flowering calyx 3-4 mm. long, its lobes 1.5-2 mm. long, deltoid; flowering peduncle 1-3 (5) cm. long; fruiting calyx 1.5-2 cm. long, pentagonal-ovoid, inflated, on peduncles 1-2.5 (3) cm. long; seeds usually somewhat crenate on their backs.

Type: James "On the Canadian."

Habitat, distribution and flowering time: Growing on plains, prairies, mesas, canyons, juniper barrens, desert areas and various disturbed habitats principally in western Kansas, Oklahoma and Texas, and eastern Colorado and New Mexico, and southern Arizona.

Selected from 346 sheets of 274 collections: ARIZONA: Cochise Co.: Lemmon 407 (UC); Maricopa Co.: Keck 4258 (UC); Navaho Co.: Zuck, Aug. 28, 1896 (GH, NY); Pima Co.: Parker 7233 (ARIZ, COLO, OKLA); Thornber 135 (ARIZ, UC); Toumey July 1, 1894 (GH, UC); Pinal Co.: Thornber 7348 (ARIZ); Yuma Co.: Keck et al 6225 (NY); CALIFORNIA: Fremont's Expedition in 1845 (GH); COLORADO: Ramaley 1011, 1287 (COLO); Cheyenne Co.: Heustis June 26, 1916 (COLO); Crowley Co.: James Sept. 1, 1932 (COLO); Denver Co.: Eastwood 118 (COLO, GH, UC); Douglas Co.: Greene 324 (GH); El Paso Co.: Robbins 492 (ARIZ, UC);Fremont Co.: Brandegee 1872 (UC); Huerfano Co.: Shear 4761 (UC); Larimer Co.: Wiegand and Wiegand 2085 (GH); Las Animas Co.: Robbins 502 (UC); Lincoln Co.: Ownbey 1342 (COLO, UC); Prowers Co.: Ramaley and Gambill 16049 (COLO); Pueblo Co.: Rollins 2060 (GH); Weld Co.: Brenckle 48186; Yuma Co.: Ewan 12793 (COLO); KANSAS: Barber Co.: Horr E252 (COLO, KANU, OKL), McGregor 10683 (KANU), Rydberg and Imler 683 (COLO, KANU); Ellis Co.: Albertson 106 (ARIZ, OKL, OKLA, UARK); Hamilton Co.: Thompson 77 (GH, UC); Kearney Co.: Horr 3055 (KANU);

Kiowa Co.: Horr and McGregor 3815 (KANU); Logan Co.: Hitchcock 372 (GH); Meade Co.: Horr 3335 (KANU); Scott Co.: Agrelius, Wilson and Agrelius Aug. 9, 1912 (KANU); Wallace Co.: Snow (KANU); NEVADA: Clark Co.: Goodding 2223 (RM); Jones April 30, 1905 (GH); Maguire and Blood 4471 (UC); Train 1915 (ARIZ); NEW MEXICO: Chaves Co.: Nelson 11315 (GH, UC); Colfax Co.: Lucas 141 (TEX); Hidalgo Co.: Hershey 3461 (GH); Lincoln Co.: Hitchcock, Rethke and Raadshooven 4273 (UC); Quay Co.: Ikenberry May 1, 1937 (OKLA); Santa Fe Co.: Snow Aug. 1879 (DUKE); Union Co.: Nelson and Nelson 4697 (GH, UC); OKLAHOMA: Alfalfa Co.: Demaree 12358 (GH, OKLA, OKL); Beckham Co.: Eskew 1603 (OKL); Blaine Co.: Goodman 2378 (OKL); Cimarron Co.: Goodman and Waterfall 4805 (OKL, OKLA, TEX); Cleveland Co.: Fielder 83 (OKL); Comanche Co.: Eskew 1603 (OKL, OKLA); Cotton Co.: Pottz 109 (OKL); Garfield Co.: Gephardt 343 (OKL); Grant Co.: Hopkins and Valkenburgh 40 (OKL); Greer Co.: Robbins 3034 (OKL, UC); Harmon Co.: Innes, Moon and Brunelle 1001 (GH, OKLA, TEX), Stevens 1001 (GH, OKL, OKLA); Jackson Co.: Smith 2041 (OKL, UC); Kay Co.: Byler 309 (OKLA); Kingfisher Co.: Byers 197 (OKLA); Kiowa Co.: Stevens 1200 (GH, OKLA); Major Co.: Hopkins and Valkenburgh 167 (OKL); Oklahoma Co.: Waterfall 1947 (GH, OKL, TEX); Noble Co.: Harding 311 (OKLA, UC); Payne Co.: Coryell 535 (OKL); Stephens Co.: Waterfall 3666 (OKL); Texas Co.: Butler 60 (OKLA); Tillman Co.: Smith 2040 (ARIZ, OKL); Woods Co.: Stevens 656 (OKL, OKLA, SMU); TEXAS: Anderson Co.: Marsh 83 (TEX); Armstrong Co.: Rose-Innes and Moon 1030 (GH, TEX); Bexar Co.: Palmer 944 (GH); Brewster Co.: Warnock April 10, 1937 (GH, OKLA); Castro Co.: Rachaner May 3, 1946 (TEX); Childress Co.: Bio. Class, Spring 1927 (OKLA); Clay Co.: Parks May 25, 1946 (OKLA); Crockett Co.: Tharp July 9, 1928 (OKLA, TEX); Culberson Co.: Cory 2384

(GH); Dickens Co.: Engleman June 20, 1940 (OKL); Dimmit Co.: Johnston, Tharp and Turner 3566 (TEX); Duval Co.: Tharp and Johnston 542024 (TEX); Edwards Co.: Cory 5493 (GH); Hale Co.: Demaree 7615 (GH, UARK); Hardeman Co.: Hughes April 30, 1950 (OKL); Hemphill Co.: Tharp and Miller 51-339 (TEX); Howard Co.: Tracy 8002 (TEX); Jacks Co.: Tharp June 13, 1941 (GH, TEX); Jeff Davis Co.: Waterfall 4403 (GH); Kinney Co.: McVaugh 7691 (GH, TEX); La Salle Co.: Wiegand and Wiegand 2082 (GH); Lynn Co.: McGlothlin 43 (UARK); Maverick Co.: Johnston, Tharp and Turner 3586 (TEX); McMullen Co.: Rogers 6798 (OKLA, TEX); Nolan Co.: Tharp July 9, 1941 (TEX); Palo Pinto Co.: Gentry 1266 (TEX); Pecos Co.: Tharp 43-833 July 10, 1934 (TEX); Presidio Co.: Hinckley 1583 (ARIZ, GH, TEX); Randall Co.: Lundell and Lundell 11436 (TEX); Reeves Co.: Tharp July 20, 1943 (UC); Runnels Co.: Johnson 656 (TEX); Sherman Co.: Weaver July 21, 1936 (TEX); Starr Co.: Tharp, Johnson and Webster (OKLA, TEX, UARK); Sterling Co.: Bray May 20, 1899 (TEX); Tarrant Co.: Ruth 468 (UC); Taylor Co.: Tolstead 5717 (GH, UC); Terrell Co.: Webster 127 (TEX); Throckmorton Co.: April 1934 (TEX); Tom Green Co.: Bray 351 (TEX, OKLA); Travis Co.: Tharp 1337 (GH, OKLA, TEX), Warnock 87 (TEX); Val Verde Co.: Palmer 11360 (TEX, UC); Ward Co.: Tracy and Earle 297a (GH, TEX); Webb Co.: Johnston, Tharp and Turner 3494 (TEX); Wichita Co.: Tharp 8843 (OKLA); Winkler Co.: Parks 2900 (TEX); Wise Co.: Shinners 12331 (COLO); Young Co.: McCart and Knox 13 (TEX).

22. Physalis Carpenteri Riddell ex Rydberg, Mem. Torr. Bot. Club 4:330-331. 1896; P. Carpenteri Riddell, N. Orl. Med. and Surg. Journ. 759. 1852, as a nomen nudum; Bot. Gaz. 3:11. 1847 in synonymy.

Plant over two-thirds of a meter tall, widely branched; herbage

short-hairy, the leaf blades sometimes nearly glabrous and the calyces sometimes with a few long hairs; principal leaf blades (3) 7-11 cm. long, ovate to lanceolate-ovate, acuminate; petioles one-third to two-thirds as long as the blades; leaf margins usually entire, sometimes repand; flowers from single to 3-6 in the axils of the leaves; the fascicled flowers apparently due to the presence of a telescoped axillary branch, sometimes 2-4 cm. long and bearing reduced leaves (Curtiss 6901: UC, GH, NY) as well as flowers; corolla about 1 cm. long, yellow; anthers about 2 mm. long, yellow, on slender filaments; flowering calyx 4-5 mm. long on peduncles 5-8 mm. long; fruiting calyx about 1.5 cm. in diameter, nearly spherical, only slightly inflated; fruit having 1 to several plump, rounded, corky, seed-like bodies (possibly a peculiar development of unfertilized ovules) in addition to the normal, more or less reniform, flattened seeds.

The species may be annual, according to some collectors, or from a deep-seated "rootstock" according to others; all the specimens examined were branches only.

The author prefers to leave this species in Physalis, regardless of its peculiar characteristics, until a more thorough study of related genera, or possible subgenera, can be made.

Collections examined: ALABAMA: S. B. Buckley, April (NY); FLORIDA: Columbia Co.: Geo. V. Nash 2503, Aug. 29-31, 1895 (GH, MICH, NY); Erdman West, seeds from Fort White, raised by Margaret Young Menzel as her 508a (TEX); Escambia Co.: Curtiss, 1886, Pensacola (GH); Suwanee Co.: A. H. Curtiss 6901, annual 2 ft. high and widely branched, growing in a cultivated field near Wellborn, Sept. 14, 1901 (GH, NY, UC);

County undetermined: M. A. Curtis, Florida? LOUISIANA: East Feliciana Co.: Riddell, March 1878 (GH, one fruiting calyx); Orleans Co.: Drummond, New Orleans (GH); Ingalls in 1835, New Orleans (NY); West Feliciana Co.: R. S. Cocks, 3603, common in rich woods (NY).

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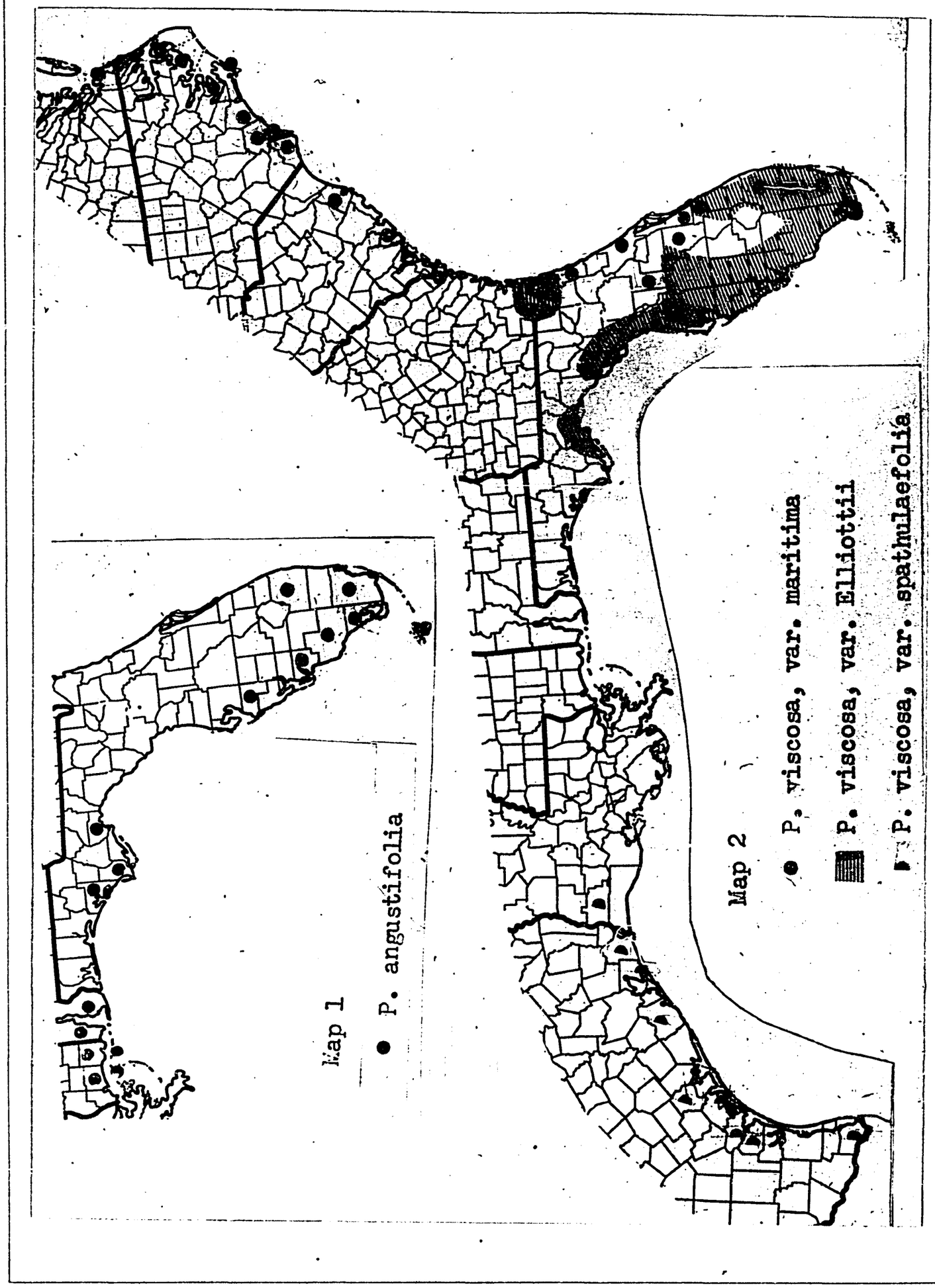
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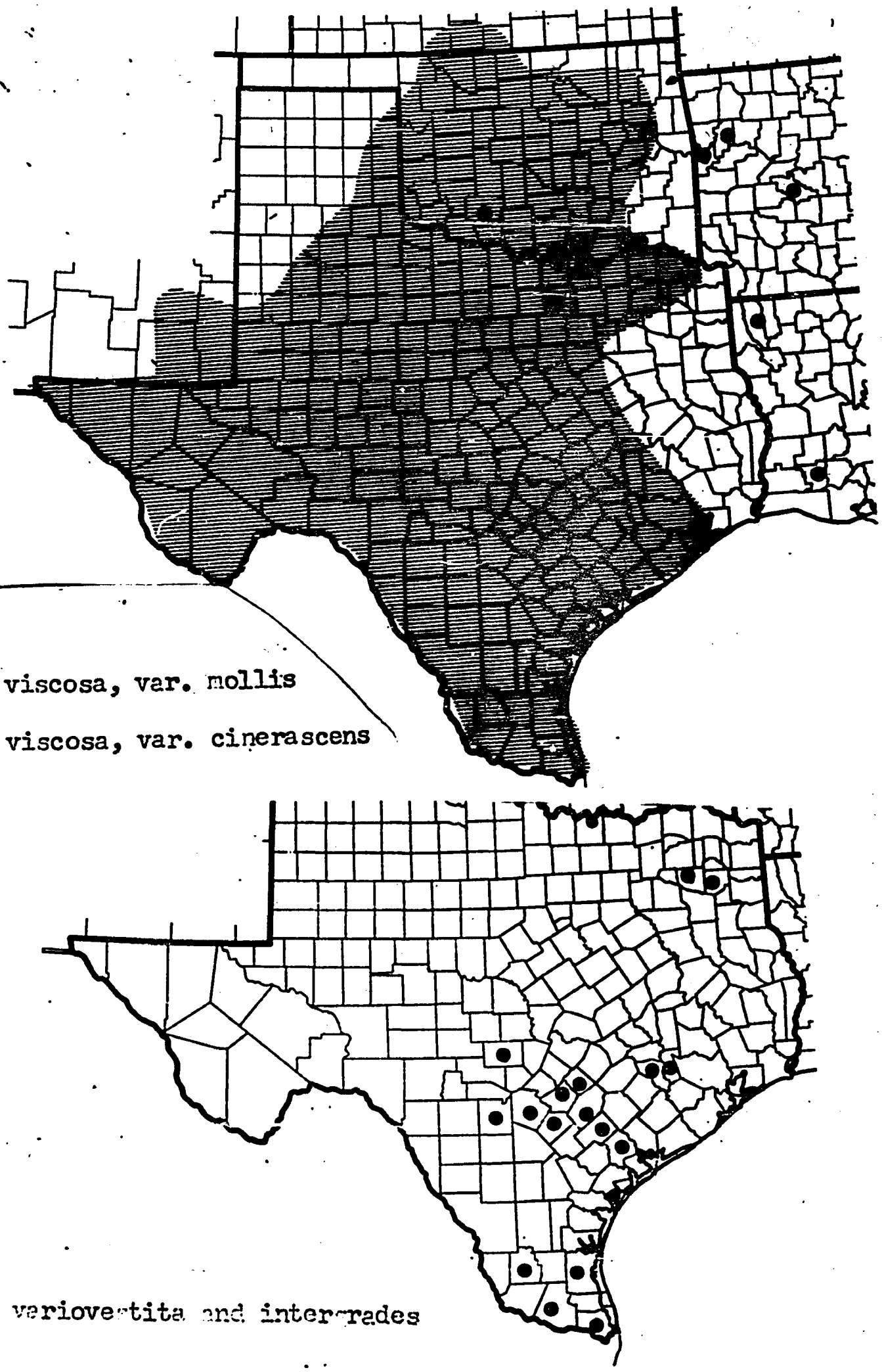
MAPS SHOWING THE DISTRIBUTION OF TAXA

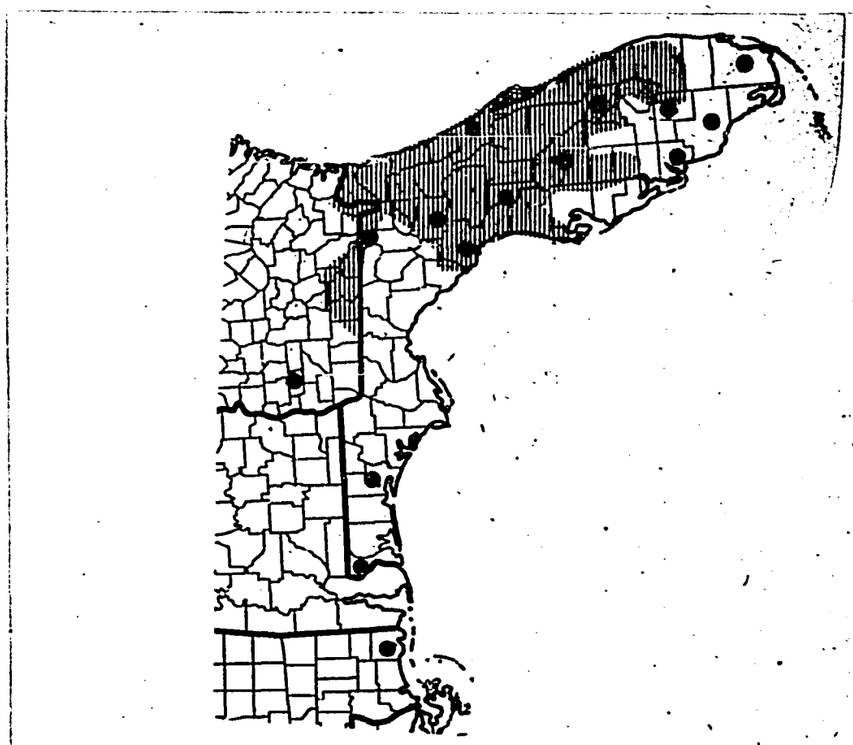
The following maps show the distribution of all the taxa treated in this work, excepting those which are known only as escapes from cultivation which consequently have no significant geographic distribution.

In several instances the maps show the principal area of distribution only. Scattered records, possibly induced by man's distributional efforts, are not included in the maps, as they tend to obscure the delineation of the principal range of taxa, some of which are already difficult to delimit due to intergradation.

The list of collections will show in each case at least one collection from each county, selected from the material examined.


Map 1
● P. angustifolia
Map 2
● P. viscosa, var. maritima
P. viscosa, var. Elliottii
P. viscosa, var. spathulaefolia

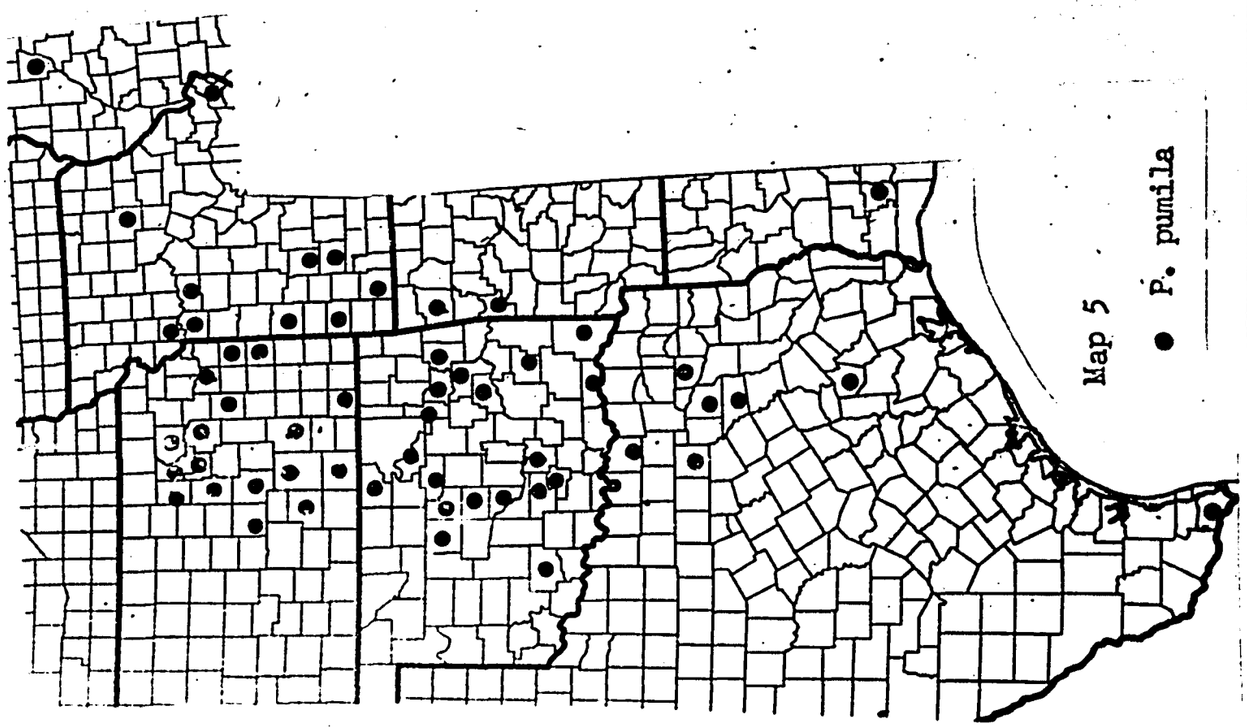

Map 3
P. viscosa, var. mollis
P. viscosa, var. cinerascens
Map 4
P. variovestita and interrades



Map 6

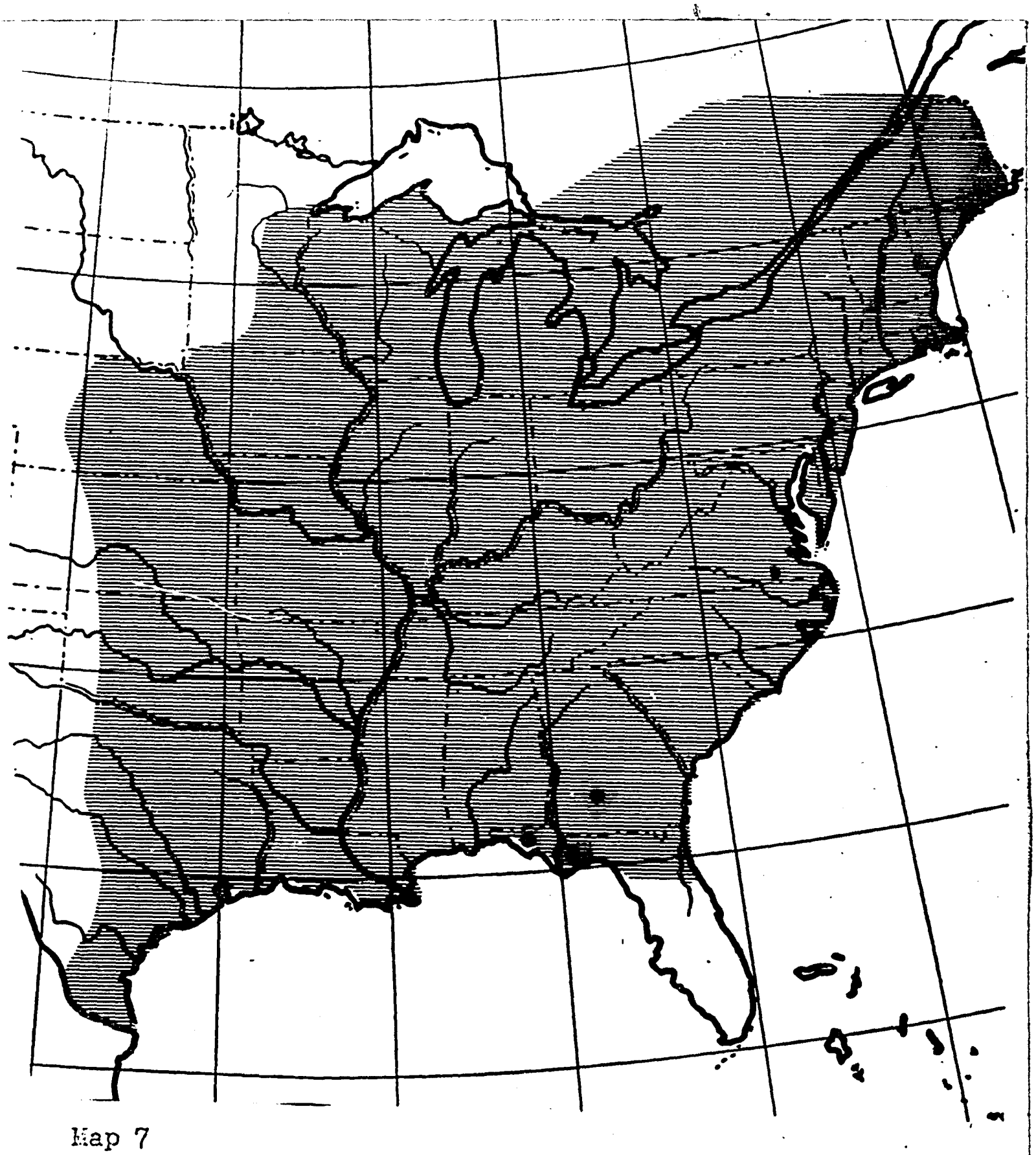
▒ P. arenicola, var. arenicola

● P. arenicola, var. ciliosa



Map 5

● P. pumila



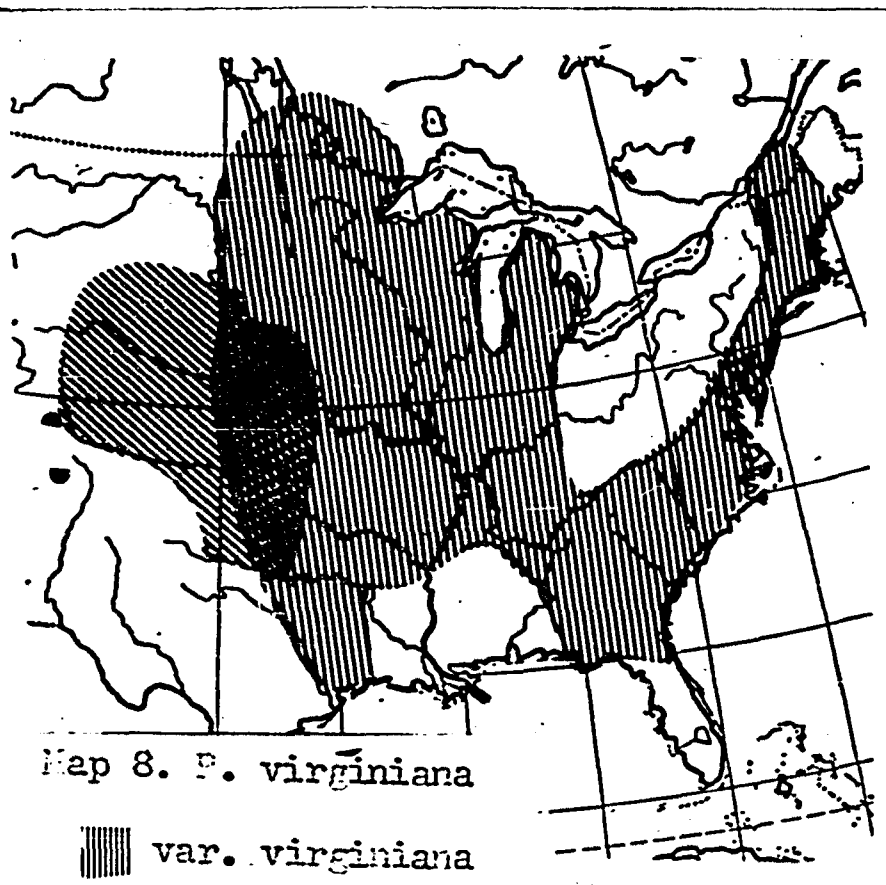
Map 7

▒ P. heterophylla, var. heterophylla

◗ P. heterophylla, var. clavipes

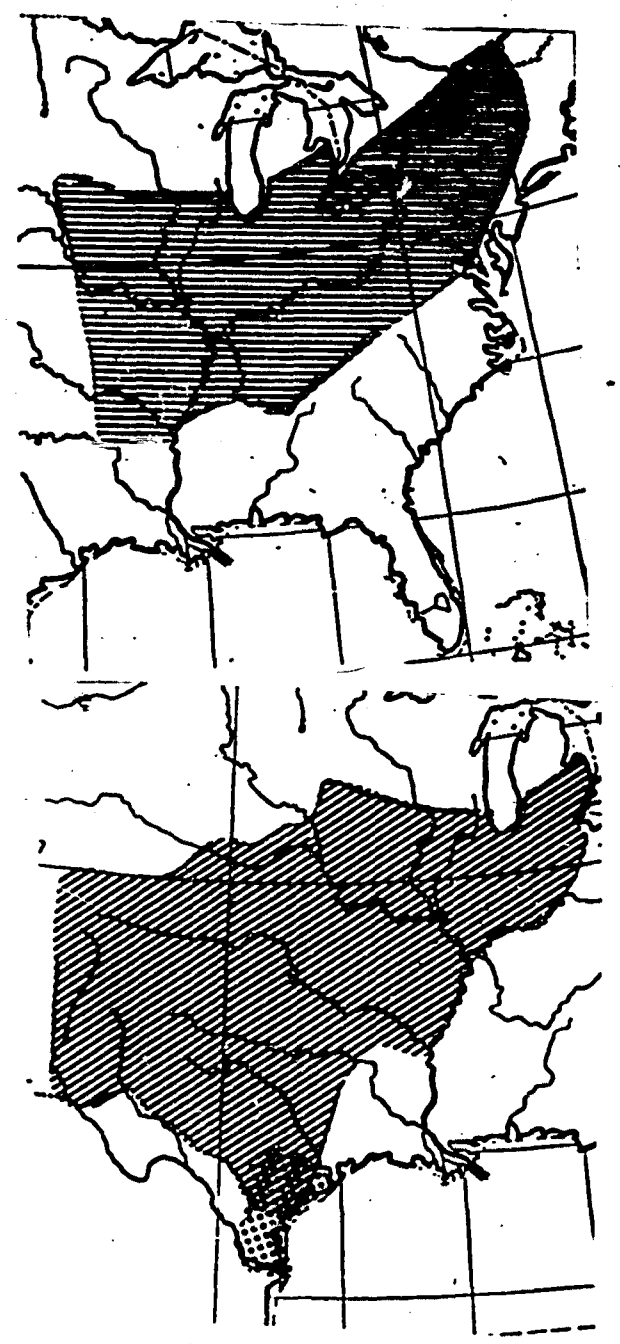
● P. heterophylla, var. villosa

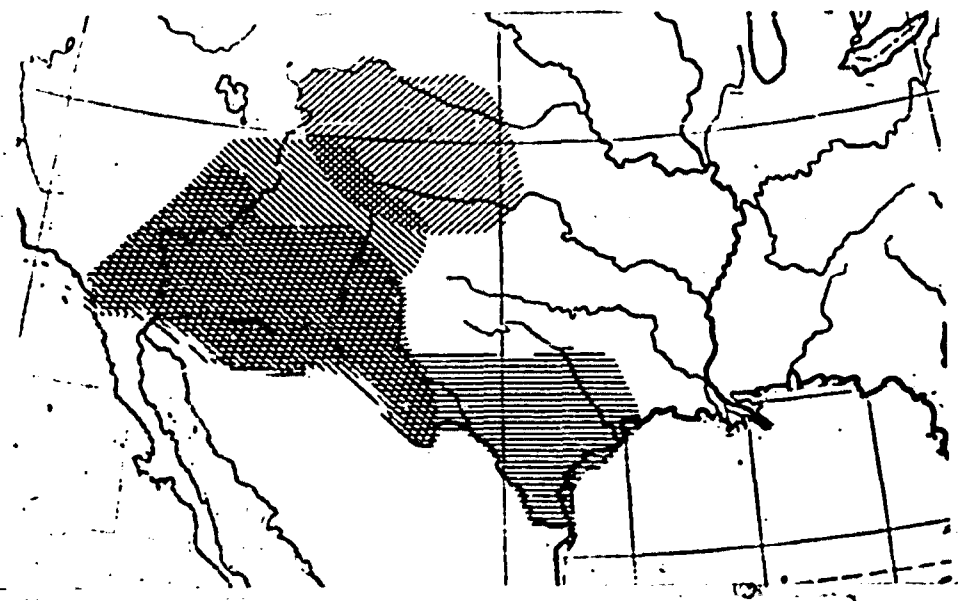
Map used with permission of George F. Cram Company



Map 8. P. virginiana

- var. virginiana
- var. subglabrata
- var. sonorae
- var. hispida
- var. texana
- var. polyphylla
- var. campaniforma

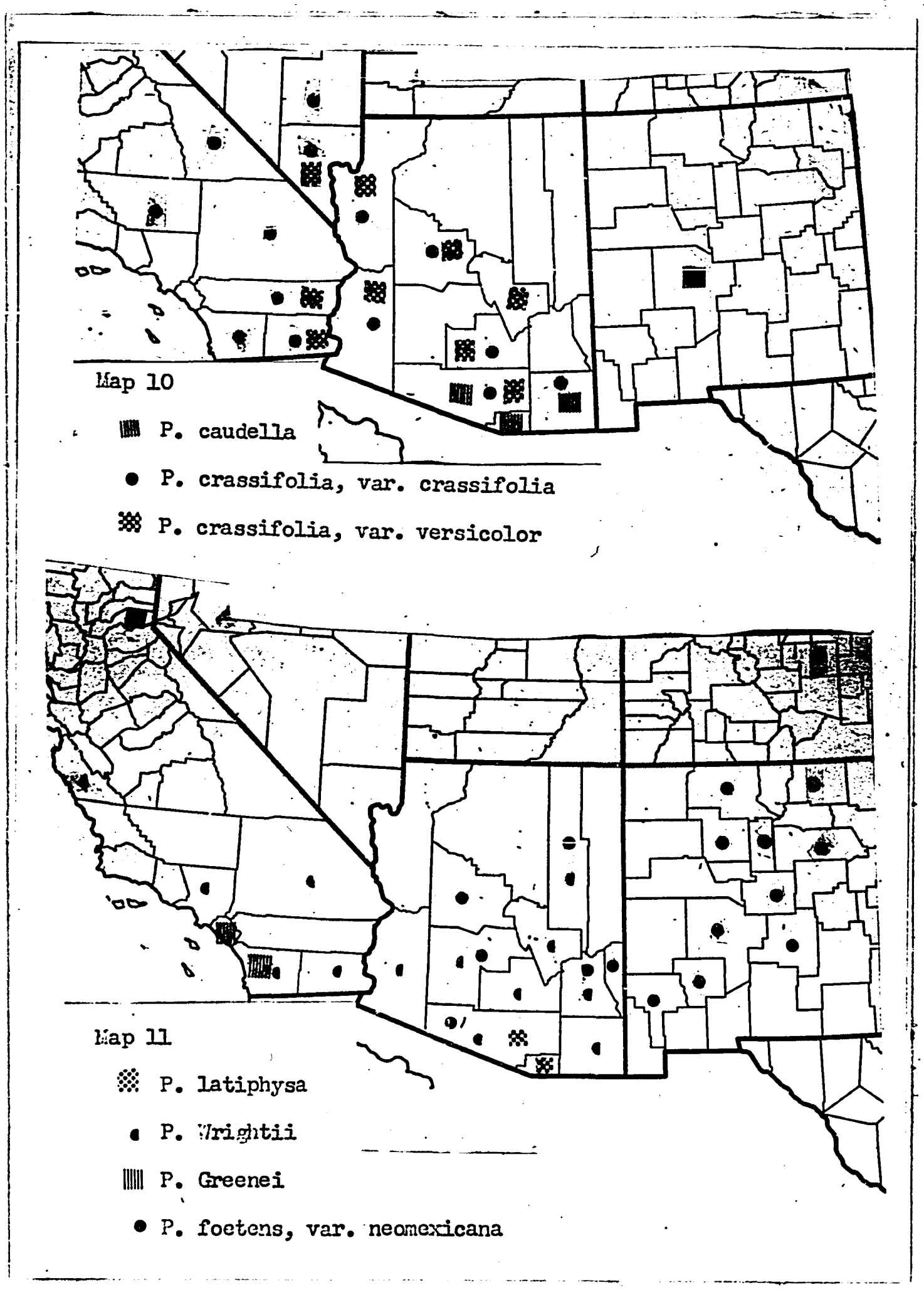




Map 9. P. hederaefolia

- var. hederaefolia
- var. cordifolia
- var. comata

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Map 10

▥ P. caudella

● P. crassifolia, var. crassifolia

▩ P. crassifolia, var. versicolor

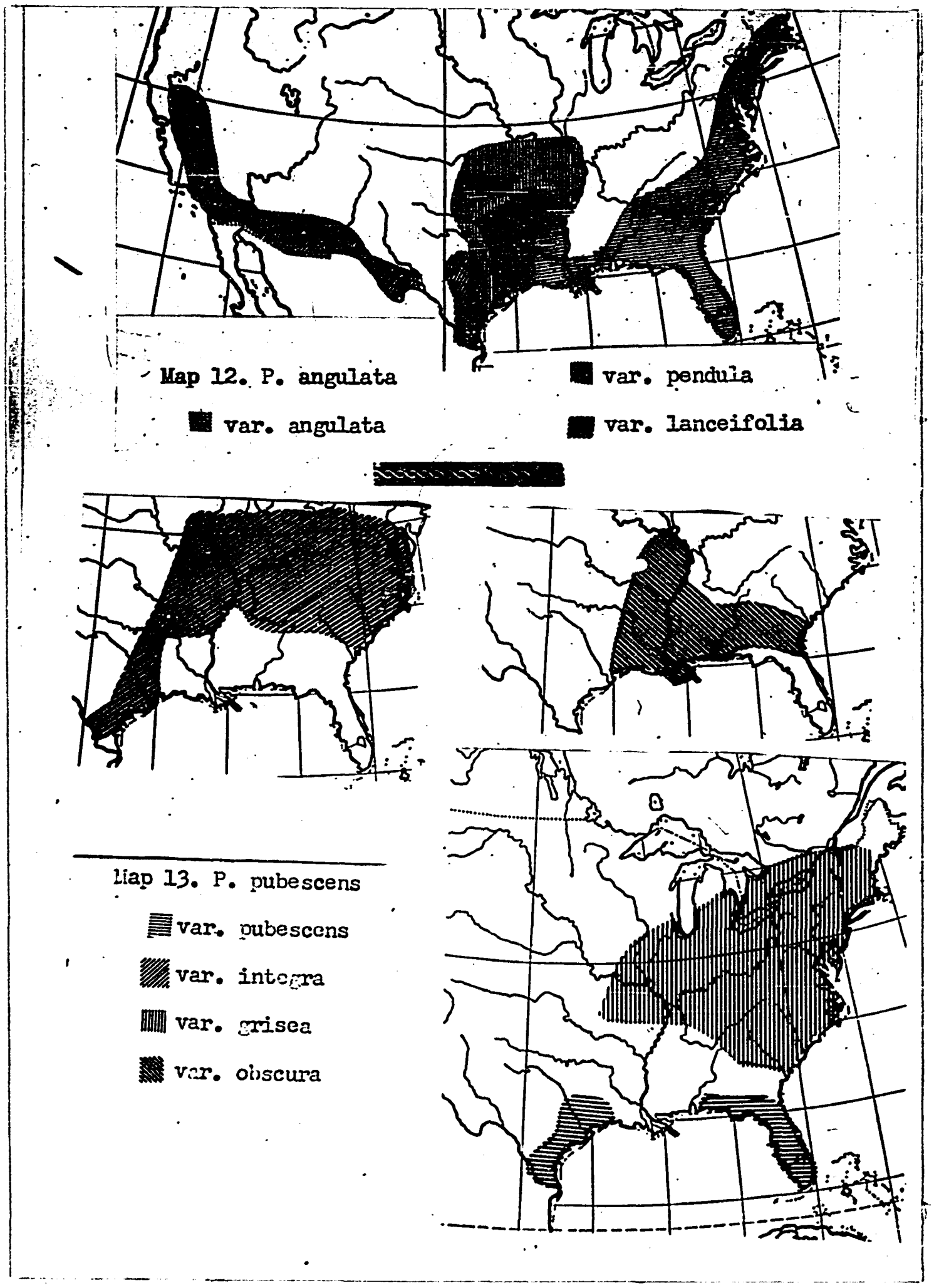
Map 11

▩ P. latiphysa

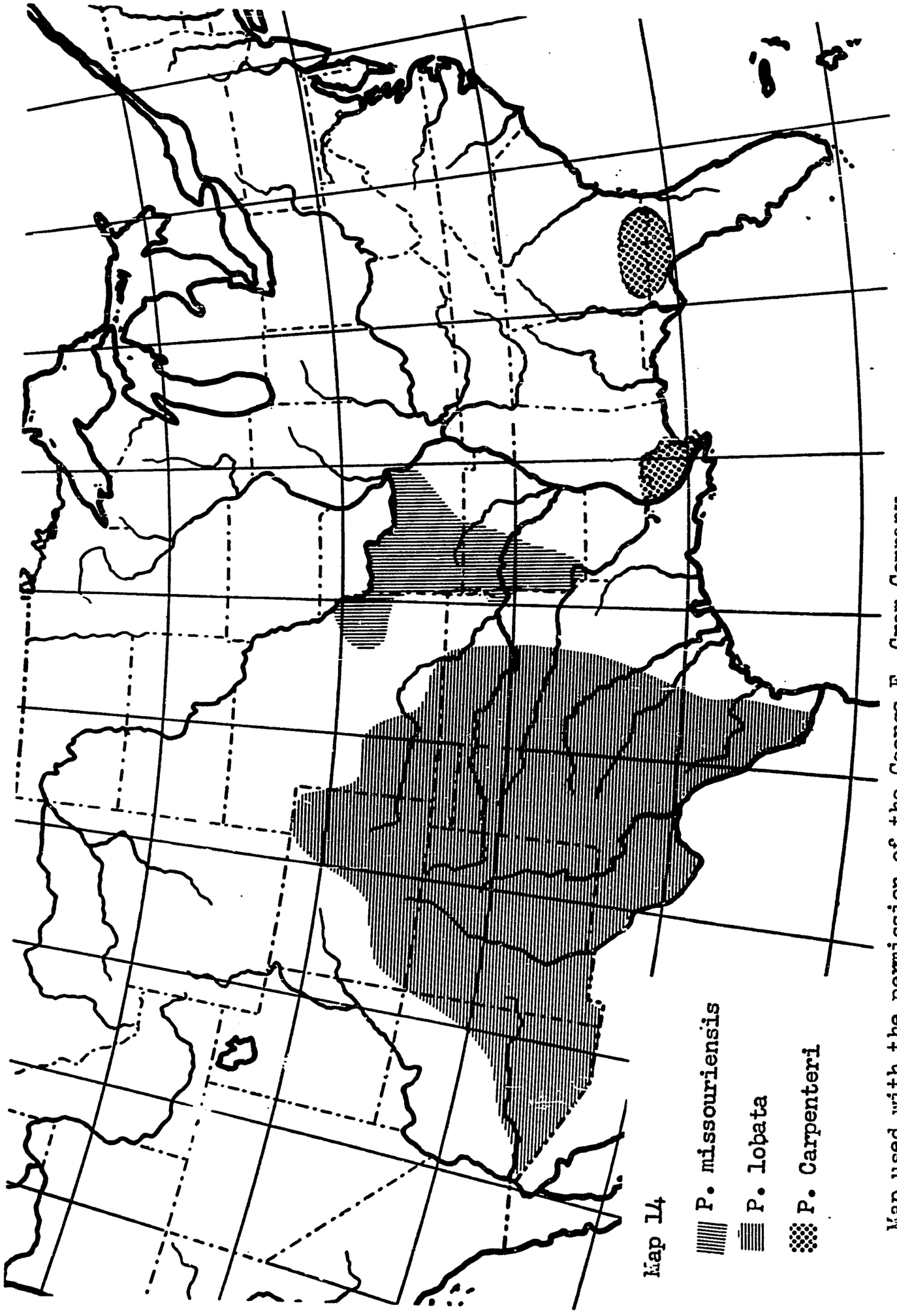
● P. Wrightii

▥ P. Greenei

● P. foetens, var. neomexicana



Maps used with permission of Rand McNally and Company.



Map 14

Map used with the permission of the George F. Cram Company

INDEX TO NAMES OF TAXA

The number following each name is the one given in this work to the species, or variety, to which the taxon is referred. Names considered as synonyms are placed in parentheses. Names of new taxa, or new combinations, appear in capital letters.

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var. angulata 15a
var. lanceifolia 15c
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var. arenicola 6a
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var. NEOMEXICANA 17

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var. heterophylla	7a	(P. obscura)	16b
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