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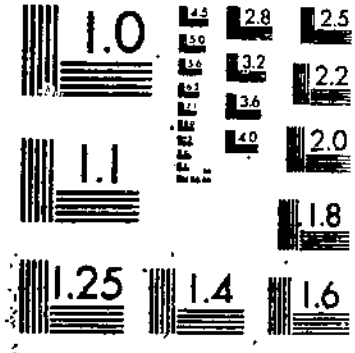

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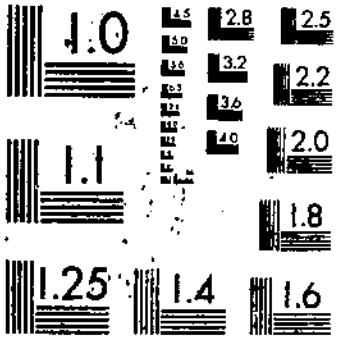

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Seed Characteristics of 42 Economically Important Species of Solanaceae in the United States

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Seed Characteristics of 42 Economically Important Species of Solanaceae in the United States

By CHARLES R. GUNN, *botanist, Plant Taxonomy Laboratory, Northeastern Region, Agricultural Research Service,* and FREDERICK H. GAFFNEY, *manager, Cape May Plant Materials Center, Soil Conservation Service*

This study constitutes an investigation of external and internal seed characters of 42 economically important species of Solanaceae (nightshade family) found in temperate North America. The Solanaceae is composed of 85 to 90 genera and more than 2,000 species (three-fourths belong to the genus *Solanum*). The family had its origin in Central and South America, where about 40 genera are endemic.

The number of native genera and species diminishes from south to north in the New World, decreasing sharply in the central United States. For example, in a manual on the Texas flora (*11*),[1] 17 genera and 68 species are listed. More than half of the genera and over two-thirds of the species are endemic. New England has 10 genera and 31 species, with four native genera and seven native species (*35*). Alaska has only one species, which was introduced, viz *Solanum nigrum* (including *S. americanum*) (*24*).

The nightshade family, which is of great economic importance, contains many food, drug, and ornamental plants, as well as noxious weeds and poisonous plants. Heiser (*20*) gave an excellent summary of economically important species in the Solanaceae.

Seed characteristics of the family have been summarized by Gunn (*17*), Isely (*25*), LeMaout and Decaisne (*29*), Lubbock (*30*), and Martin (*31*). Seed identification at the species level generally has been restricted to a few crops or weedy species (*3, 7, 13, 28, 33, 36*). Usually seed characteristics have been omitted or only mentioned superficially in the literature on State or regional floras. With this study it is possible to identify isolated seeds of economically important species found in American agriculture either by using the key or by comparing unknowns to photographs and drawings.

Both internal and external seed characters were used in preparing the key, descriptions, and illustrations, because external seed topography was not always sufficiently discrete to identify seeds. Collateral data presented with seed descriptions include notes about origin, distribution, and economic value of the plant, as well as a brief description of its fruit.

MATERIALS AND METHODS

At least one seed sample of each of the 42 species is documented by a voucher herbarium specimen. A complete set of specimens is deposited in the U.S. National Herbarium, Smithsonian Institution (US), and a partial set is deposited in the U.S. National Arboretum Herbarium (NA). These authenticated seed samples were used in preparing the photographs and drawings and in constructing the key. Additional seed samples, many identified by comparison, were used to complete the survey for each species.

Thirty-five of the forty-two vouchered seed samples were harvested from field- and greenhouse-grown plants planted in a mixture of sandy loam, peat, and perlite (3:2:1) with a pH of 6 to 6.5. In the greenhouse, night temperatures of 18° to 21° C. and day temperatures of 24° to 30° coupled with a day length of 14 to 16 hours were used. Blossom Set (*beta*-naphthoxyacetic acid—0.0042 percent) was

[1] Italic numbers in parentheses refer to Literature Cited, p. 31.

sprayed on some flowering plants to insure fruit production.

External seed topography was observed at 10 to 20 magnifications with a dissecting stereoscopic microscope equipped with an ocular micrometer. Measurements used in the key and descriptions are average values. At least 50 seeds from four to 20 samples were examined for each studied species.

Photographs were taken on a 5- by 7-inch Ektapan film. The camera was equipped with a bellows and a Microtessar lens. A black or white background was used depending on the color of the seed samples.

In the legends for the photographs, the numbers after the collector's name refer to the voucher herbarium specimens.

Embryo sketches and seed cross sections were made with a camera lucida fitted on a stereoscopic microscope and a below-stage fluorescent light. In preparing seeds for dissection, sound mature specimens of average size and shape were placed in a softening solution of 74 percent distilled water, 25 percent methyl alcohol, and 1 percent dioctyl sodium sulfosuccinate (aerosol OT). The seeds were kept in solution for one-half to 3 hours depending on the permeability and consistency of the seedcoat.

The seedcoat was peeled, leaving the intact endosperm around the embryo. In most seeds the embryo was opaque and the well-developed endosperm was sufficiently translucent to transmit an embryonic image. The dark-brown endosperm of *Datura stramonium* was partially cleared with lactophenol. A drop of lactophenol was used to keep some small seeds in place during seedcoat peeling or cross sectioning.

Cross sections of moderate size, flattened seeds were made along the long axis usually parallel to the hilum. Cross sections of minute seeds were made at right angles to the length of the seed and often at right angles to the hilum (fig. 1).

Fruit notes were prepared from live plants as well as herbarium specimens. Additional data on fruits are included in the section Fruit Notes.

GENERAL SEED MORPHOLOGY

Externally the seeds of the Solanaceae may be placed in two categories: (1) Moderate size (usually over 1.5 mm. in length), rather circular in outline, and strongly compressed or (2) minute (usually less than 1.5 mm. in length), angular and not compressed, or oblong and terete.

Internally the embryos may be categorized as (1) linear, strongly curved, with well-developed cotyledons, (2) stocky, bent, with poorly developed cotyledons, and (3) spatulate, straight, with well-developed cotyledons.

Correlations of internal and external seed characters with phylogenetic studies result in placing flattened seeds with linear, strongly curved embryos and well-developed cotyledons in tribes Datureae, Nicandreae, and Solaneae fide Wettstein (*40*) or tribes Atropeae, Hyoscyameae, and Solaneae fide Bentham and Hooker (*4*). Minute, cuboidal to elongate seeds, with stocky, bent embryos and poorly developed cotyledons are found in tribes Cestraeae and Salpiglossideae (*4, 40*). The spatulate embryo in *Cestrum diurnum* seeds is also present in other genera in the tribe Cestraeae.

The seed characters discussed here are presented in the order of their appearance in the seed description section of Synopses of Seed Characteristics. The terminology in figures 1-3 is used in the seed descriptions.

Dimensions of seeds are length (long axis of seed without regard to hilum position), width (at right angles to length and in same plane), and thickness (short axis of seed). Seeds larger than 1.5 mm. are classified as moderate size and those smaller as minute.

Seed outlines are categorized for moderate size, flattened seeds (tribes Datureae, Nicandreae, and Solaneae) as C-shaped, D-shaped, obovate, ovate, oblong, or irregularly circular. These seeds are usually smooth in outline though some may be moderately to definitely angular or lumpy. Seed outlines of minute seeds (tribes Cestraeae and Salpiglossideae) are categorized as cuboidal, linear-angular, oblong to spheroidal-angular and terete in cross section,

or reniform. Most of these seed outlines are shown in figure 1.

Solanaceous seed color is often uniform and monochrome. Regina O. Hughes, botanical illustrator, classified basic seedcoat colors in natural light as black, brown, gray, ocher, straw, and yellow. Seedcoat color may be affected by aging and length of time seeds remain in a mature berry. Lighter colored seeds, especially those in *Physalis* and *Solanum*, become golden brown with age. This type of seed when removed from a berry soon after maturity is usually much

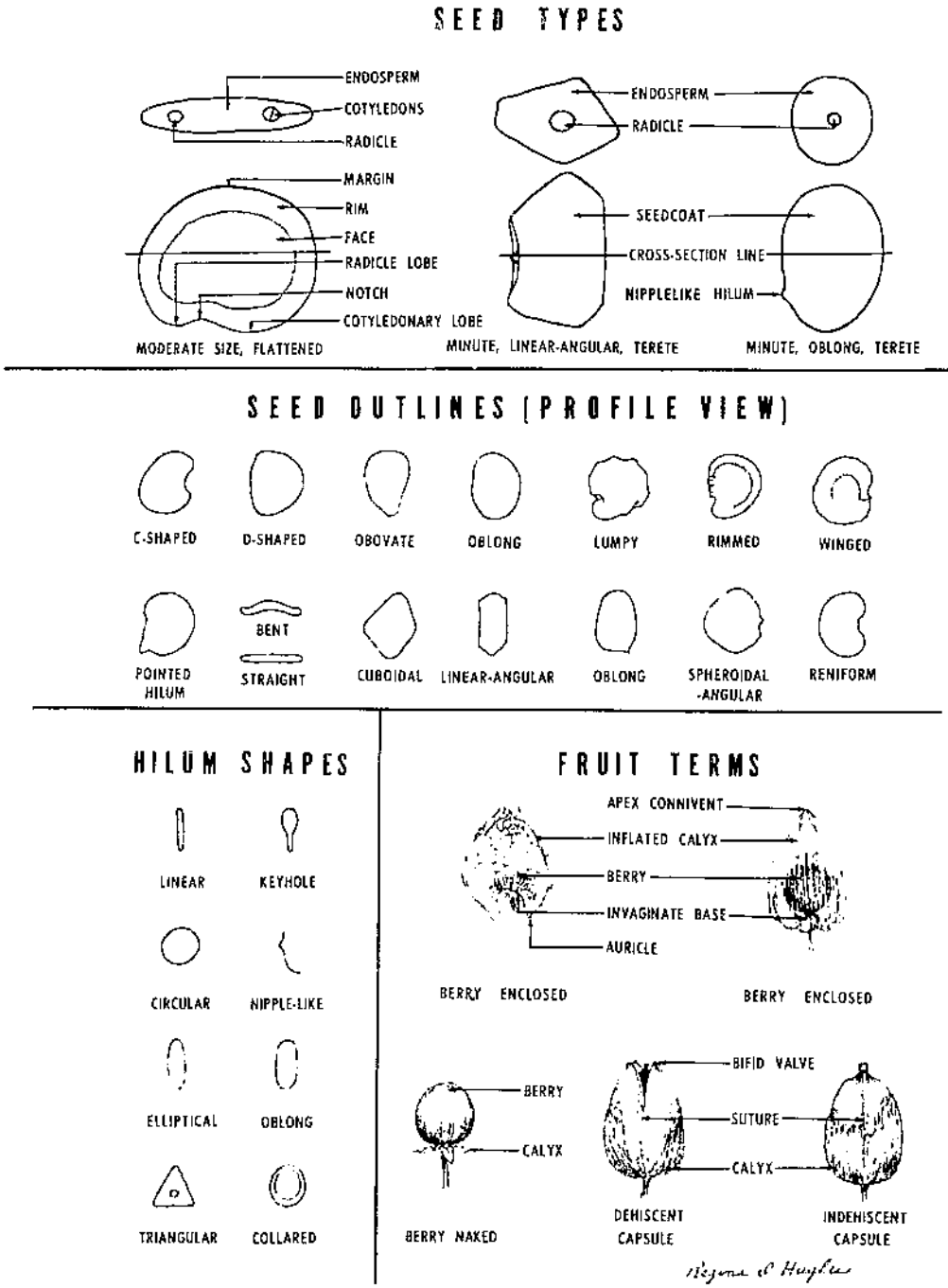


FIGURE 1.—Components of solanaceous seeds and fruits, seed outlines, and hilum shapes.

lighter in color than seeds that remain in a berry for some time. Recorded colors are based on fresh seeds removed from mature fruits unless otherwise noted. Commercial retting and subsequent bleaching of *Capsicum* and *Lycopersicon* seeds lighten their color.

Seedcoat reticulation (best seen at 10 X or 20 X) is a reliable feature in identifying nightshade seeds. Epidermal cells of the seedcoat are often broken down during maturation so that only lateral cell walls persist. Mature seedcoats thus resemble a coarse or fine meshwork. Occasionally lateral cell walls are eroded to such an extent that the seedcoat appears to be smooth or nearly so at less than 20 X. An unusual modification of epidermal cell walls is found on *Lycopersicon esculentum* and *Salpichroa origanifolia* seeds, which appear to be covered by hairs. These hairs, which are radially extended, thickened sections of sidewalls, are described by Dnyansagar and Cooper (*14*).

Patterns formed by reticulum are especially important in distinguishing seeds of *Petunia* from those of *Nicotiana*. The straight-walled patterns on *Petunia* seeds are markedly different from the wavy-walled patterns on *Nicotiana* seeds. Variations in reticulation are also important in identifying other seeds. Some reticula of *Chamaesaracha coronopus* resemble miniature wings up to 2 mm. in height, whereas other reticula are prominent but not winglike. Reticular patterns are illustrated in figure 2.

The hilum is often inconspicuous; it is not large, specially colored, or ornamented. For moderate size seeds with strongly curved embryos, the hilum is marginal and either medial or subbasal. If medial, the hilum is often located in a well-defined or poorly defined notch. Minute, angular seeds with bent or straight embroys have hila centered on a ventral seed face, whereas minute, oblong to spheroidal-angular seeds (*Nicotiana* and *Petunia*) have subbasal, nipplelike hila. With the exception of *Datura stramonium*, the hila are the color of the seedcoats or lighter.

Hilar shapes in order of frequency are linear, keyhole shaped, circular, nipplelike, elliptical, oblong, triangular, and collared. The frontal views are shown in figure 1 except the profile of the nipplelike hilum. Seeds of some species

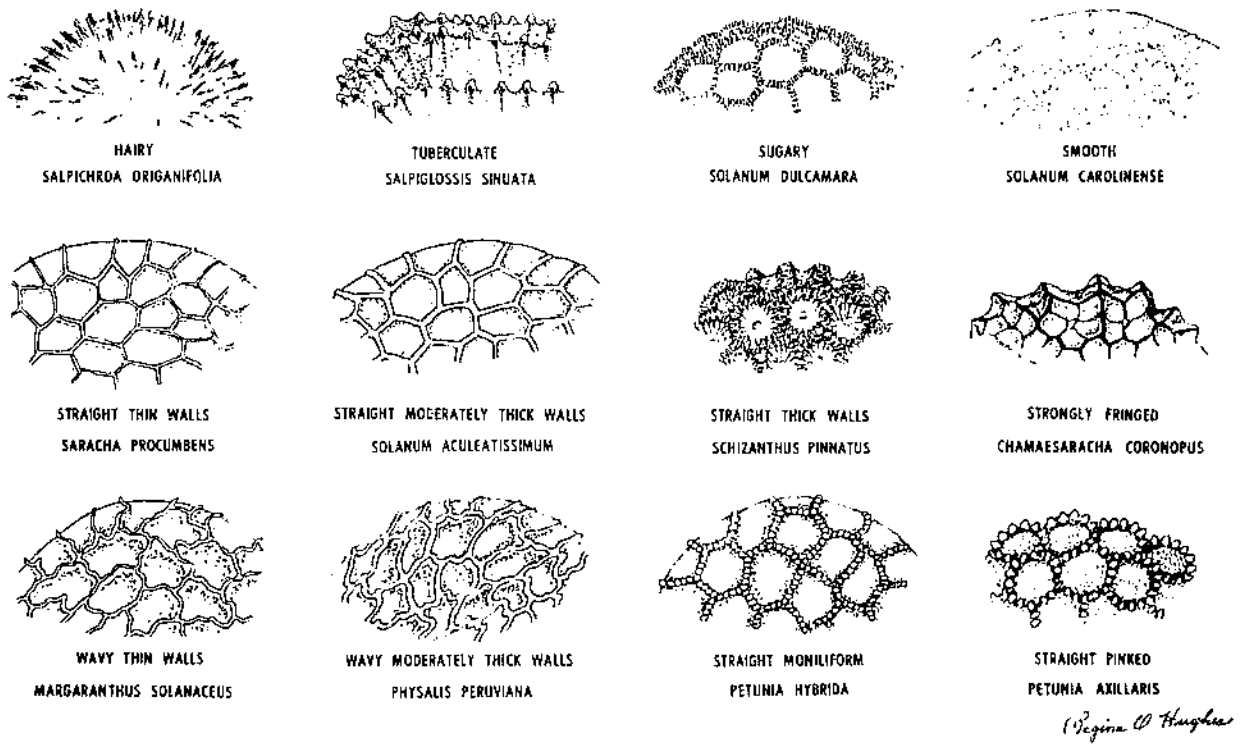


FIGURE 2.—Solanaceous seedcoat topography.

may have two, or rarely three, hilar shapes. The deeply recessed hilum on *Solanum melongena* seeds can be readily distinguished from a flush hilum on *Solanum nigrum* seeds. However, between these extremes are various degrees of recessed hila, confounded by flush hila whose centers are pitlike. Because of these factors, the diagnostic value of a recessed hilum is limited.

Two basic types of embryos—spatulate and linear—are shown in figure 3. *Cestrum diurnum* seeds have a spatulate embryo, whereas other studied species have seeds with

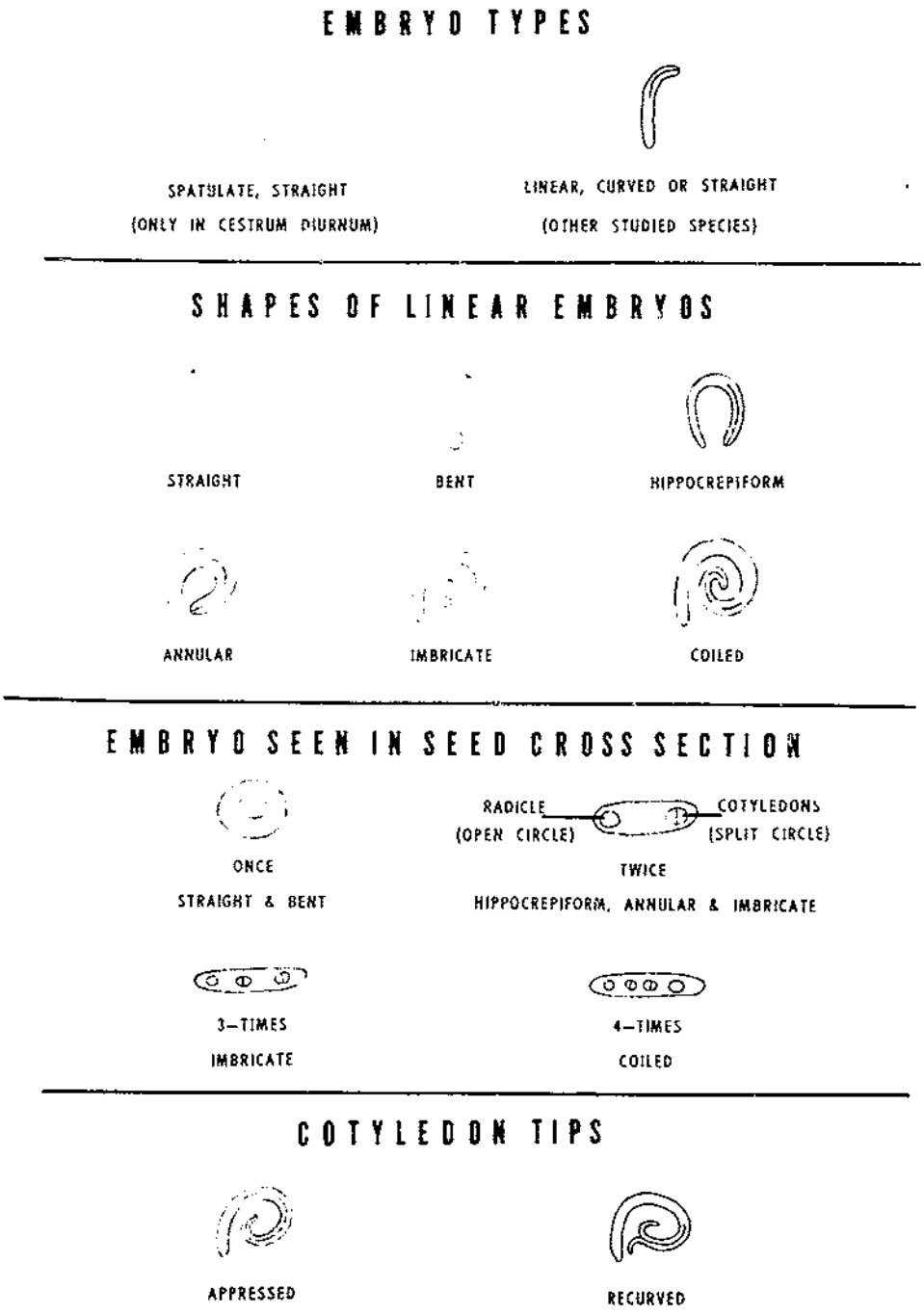


FIGURE 3.—Solanaceous embryo types and shapes.

linear and variously shaped embryos, viz straight, bent, hippocrepiform, annular, imbricate, and coiled. Relative positions of cotyledon tips to the radicle are necessary in establishing these embryo shapes. The relationships are self-evident (fig. 3) except for annular and imbricate embryos. Cotyledon tips in an annular embryo point toward the radicle, whereas these tips are parallel or almost parallel to the radicle in an imbricate embryo.

When a cross section of a seed is made, the embryo may be seen from one to four times (fig. 3). Tips of cotyledons are usually appressed, except in *Lycopersicon esculentum* (tomato), *Capsicum annuum*, and *C. frutescens* (pepper), where tips may be appressed or recurved. In a survey of 200 seeds from each of 70 tomato cultivars the highest percentage of recurved tips for any one cultivar was 70 and the lowest 4, with an average of 36.[2] Although comparable data for peppers are not available, our study indicates that the position of cotyledon tips has no diagnostic value at species or cultivar levels.

Purple or purplish embryos of *Nierembergia hippomanica* var. *coerulea* and *Salpiglossis sinuata* set these two species apart from other species whose embryos are whitish.

The endosperm is firm and abundant in all studied seeds. Except for color variation, viz purplish in *Nierembergia hippomanica* var. *coerulea* and brown in *Datura stramonium*, the endosperms of the studied seeds are whitish and similar.

The inner margin of a seedcoat is usually appressed to the periphery of the endosperm. However, six of the studied seeds have an externally visible rim or wing that extends beyond the periphery of the endosperm and may be empty, viz *Capsicum annuum, C. frutescens, Datura meteloides, Solanum aculeatissimum, S. pseudocapsicum*, and *S. tuberosum*.

FRUIT NOTES

The superior ovary matures into a many-seeded berry or capsule, which may be naked or partially or completely enclosed in a persistent, enlarged calyx (fig. 1). Fruits, either a berry or capsule, are usually two-celled, rarely three- to five-celled, or four-celled by development of spurious septa in *Datura*.

Berries

Berries may be fleshy or juicy as in *Solanum melongena* and *Lycopersicon esculentum* or dry as in *Cestrum diurnum*. Because berries lack a regular dehiscence mechanism, the pericarp ruptures irregularly (rotting, eating, or squashing) to release seeds. Berries may be enclosed in an enlarged, loose-fitting calyx as in *Physalis* spp. or may be essentially naked as in *Lycopersicon esculentum*, where a persistent, nonenlarged calyx covers only the base of the fruit.

Seeds borne in a berry are usually more than 1.5 mm. long, strongly flattened, and smooth or nearly so in profile view, though they may be slightly bent. Since seeds in fleshy or juicy berries are usually not crowded, they retain their regular shape. However, seeds in small, dry berries (*Cestrum diurnum*) are angular, resembling capsular seeds, which are usually less than 1.5 mm. in length.

Seeds retained in juicy berries beyond maturation may be discolored through action of fruit acids, fungi, or other factors. Commercial retting and subsequent bleaching of seeds of *Capsicum* spp. and *Lycopersicon esculentum* also alter their color.

An unusual feature of some solanaceous berries is the so-called stone cells (American seed literature) or scleroidal concretions or sclerotic granules (European seed literature). Sclerotic granules are shown in seed photographs of *Physalis alkekengi* and *Solanum americanum*.

At first these granules were thought to be aborted ovules. However, this theory has been rejected in favor of the one advanced by Bitter (*5, 6*), Danert (*12*), and others. They consider these granules, found in pericarps of some solanaceous fruits, to be rudiments of drupaceous fruits. Bitter's theory that number and size of sclerotic granules are important taxonomic characters has also been rejected. Although the presence or absence of granules

[2] Koostra, P., personal communication, Aug. 2, 1971.

provides useful data, their number and size are inconsistent; however, some consistently have more granules than others.[3] Sclerotic granules are organic in nature, containing some phosphoric acid and traces of calcium, but no nitrogen has been found.[4]

Capsules

Capsules have a regular dehiscence mechanism, viz two valves (four valves in *Datura*) that separate apically and septicidally or in *Hyoscyamus niger* circumscissilely. A valve apex may be entire or bifid (fig. 1).

Seeds borne in capsules are usually less than 1.5 mm. long and are cuboidal, angular, or oblong to spheroidal-angular. They are not strongly flattened except in *Datura*. Seeds borne in capsules are shaped by pressures from adjacent seeds as well as from rather rigid outer pericarp walls. Compare seeds of *Datura stramonium*, borne in a capsule, with those of *Solanum rostratum*, borne in a berry that is almost capsulelike. Both seeds are lumpy in profile view. Generally seeds in a capsule vary in shape more than those borne in a fleshy or juicy berry.

Except for *Datura* spp., where capsules are spiny and naked (the indurate part of the calyx is reflexed), capsules are completely or partly invested at maturity by a tight-fitting calyx. These capsules are smooth and glabrous.

[3] Heiser, C. B., personal communication, Mar. 4, 1972.
[4] Edmonds, J. M., personal communication, Nov. 3, 1971.

SEED KEY TO SOLANACEOUS SPECIES

1. Embryo straight or bent, seen once in seed cross section.
   2. Seedcoat appearing fringed because of some lateral reticular walls 0.2 mm. high ... *Chamaesaracha coronopus*
   2. Seedcoat fringeless or nearly so.
      3. Seed over 2 mm. in length; hilum medial on ventral face of seed; embryo straight, spatulate ... *Cestrum diurnum*
      3. Seed less than 2 mm. in length (usually less than 1.5 mm.); hilum basal, subbasal, marginal, or on ventral face; embryo bent or straight, linear.
         4. Embryo purple or purplish ... *Nierembergia hippomanica* var. *coerulea*
         4. Embryo whitish.
            5. Seed reniform-angular, cuboidal, or flattened; hilum not nipplelike, not conspicuous.
               6. Seeds over 1 mm. in length, reniform-angular ... *Schizanthus pinnatus*
               6. Seeds seldom as much as 1 mm. in length, cuboidal or occasionally flattened ... *Browallia viscosa*
            5. Seed oblong to spheroidal-angular; hilum nipplelike, conspicuous in profile view.
               7. Reticulum wavy walled at 20 X.
                  8. Seeds over 1 mm. in length (usually 1.1-1.3 mm.); reticulum around hilum not noticeably elongated and straight sided ... *Nicotiana rustica*
                  8. Seeds less than 1 mm. in length (usually 0.6-0.9 mm.); reticulum around hilum elongated and straight sided.
                     9. Seed 0.6-0.8 mm. in length, bright light to bright medium brown ... *Nicotiana tabacum*
                     9. Seed 0.6-0.9 mm. in length, dull dark brown ... *Nicotiana alata*
               7. Reticulum pinked or appearing to be straight walled at 20 X.
                  10. Reticulum at 20 X definitely pinked ... *Petunia axillaris*
                  10. Reticulum at 20 X appearing to be straight.
                     11. Reticulum at 60 X minutely moniliform ... *Petunia hybrida*
                     11. Reticulum at 60 X minutely pinked ... *Petunia parviflora*

1. Embryo hippocrepiform, annular, imbricate, or coiled, seen two to four times in seed cross section.
   12. Seedcoat black to gray black.
      13. Hilum triangular, tan, conspicuous ... *Datura stramonium*
      13. Hilum circular or keyhole shaped and color of seedcoat, thus not conspicuous.
         14. Seedcoat essentially smooth; outline of seed smooth ... *Solanum elaeagnifolium*
         14. Seedcoat reticulate; outline of seed lumpy ... *Solanum rostratum*
   12. Seedcoat yellow or brown or a derivative color.
      15. Seedcoat hairy or extended into encircling wing 1 mm. or more in width.
         16. Seedcoat glabrous; wing color of seedcoat, 1 mm. or more in width ... *Solanum aculeatissimum*
         16. Seedcoat hairy; wing transparent or darker colored, less than 0.6 mm. in width or absent.
            17. Seedcoat with wavy-walled reticulation at 30 X, brownish ocher ... *Salpichroa origanifolia*
            17. Seedcoat essentially smooth at 30 X (reticulum straight walled), dull straw colored ... *Lycopersicon esculentum*
      15. Seedcoat glabrous, not winged.
         18. Seed 3 mm. or more in length.
            19. Hilar area drawn out to prominent point or knob ... *Capsicum annuum* and *C. frutescens*
            19. Hilar area rounded or truncate, not drawn out to prominent point or knob.
               20. Embryo seen twice in seed cross section.
                  21. Seed with well-defined and prominent rim ... *Datura meteloides*
                  21. Seed with face and rim undifferentiated ... *Lycium halimifolium*
               20. Embryo seen three or four times in seed cross section.
                  22. Embryo imbricate; seedcoat essentially smooth or hilar area chamberlike.
                     23. Seedcoat essentially smooth; hilar area flattened ... *Solanum pseudocapsicum*
                     23. Seedcoat reticulate; hilar area chamberlike ... *Solanum melongena*
                  22. Embryo coiled; seedcoat reticulate; hilar area flattened.

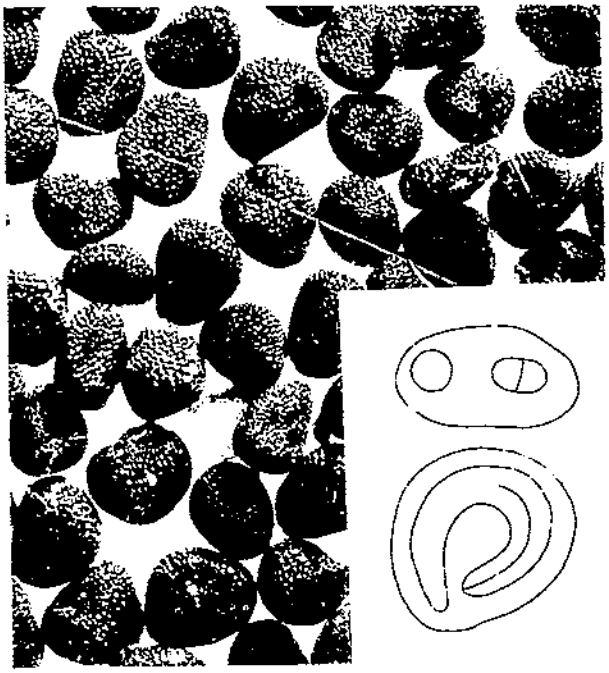
24. Seed over 3.5 mm. in length; seedcoat not appearing sugary
Solanum dimidiatum (discussed in Notes under *S. elaeagnifolium)*
24. Seed 3 mm. or less in length; seedcoat appearing sugary at 10 X . . *Solanum dulcamara*

18. Seed less than 3 mm. in length (usually less than 2.5 mm.).
25. Embryo seen four times in seed cross section.
26. Seedcoat at 10 X appearing sugary; seed usually over 2.5 mm. in length . . *Solanum dulcamara*
26. Seedcoat at 10 X not sugary in appearance.
27. Reticulum essentially absent at 10 X, at higher magnifications obscure reticular rows discernible especially toward margin *Solanum carolinense*
27. Reticulum conspicuous at 10 X.
28. Embryo imbricate, cotyledon tips pointed away from radicle *Physalis pubescens*
28. Embryo coiled, cotyledon tips pointed toward radicle.
29. Interstices prominent, about 0.1 mm. in length *Physalis peruviana*
29. Interstices inconspicuous, about 0.03 mm. in length *Solanum villosum*
25. Embryo seen two or three times in seed cross section.
30. Cotyledon tips not overlapping or near radicle tip; embryo seen twice in seed cross section.
31. Seed less than 1.5 mm. long, cuboidal, not flattened; embryo purple to purplish
Salpiglossis sinuata
31. Seed 2 mm. or more in length, C-shaped to obovate, strongly flattened; embryo whitish.
32. Hilum located in definite marginal notch *Lycium halimifolium*
32. Hilum subbasal, not in notch *Solanum torvum*
30. Cotyledon tips overlapping or nearly touching radicle tip; embryo usually seen three times, seldom twice, in seed cross section.
33. Seedcoat slightly winged along margin, especially in area of hilum *Solanum tuberosum*
33. Seedcoat not winged.
34. Seedcoat light to dark brown.
35. Reticulum forming fringe visible in seed profile view at 10 X.
36. Sides of reticulum marked with vertical lines of reddish brown that may unite at base into horizontal line *Hyoscyamus niger*
36. Sides of reticulum without lines *Saracha procumbens*
35. Reticulum not forming fringe.
37. Hilum circular *Atropa belladonna*
37. Hilum linear *Nicandra physalodes*
34. Seedcoat yellow, straw, or ocher.
38. Seedcoat deeply reticulate, honeycomblike; seed lumpy in profile view *Physalis lobata*
38. Seedcoat reticulate, not honeycomblike; seed smooth in profile view.
39. Hilum medial, located in conspicuous marginal notch.
40. Reticulum thin walled, sharply defined at apex *Margaranthus solanaceus*
40. Reticulum moderately thick walled, flattened at apex.
41. Seed less than 1.5 mm. in length *Physalis pubescens*
41. Seed 1.5 mm. or more in length.
42. Hilum in notch of seed and extending up radicle lobe *Physalis alkekengi*
42. Hilum contained in notch of seed *Physalis virginiana*
39. Hilum subbasal, not in marginal notch.
43. Seed 2 mm. or more in length.
44. Hilum conspicuous, recessed, in profile view hilum area truncate
Solanum carolinense
44. Hilum inconspicuous, flush, hardly noticeable in profile view *Solanum triflorum*
43. Seed less than 2 mm. in length.
45. Seed D-shaped, not drawn out at base *Physalis pubescens*
45. Seed obovate to C-shaped, drawn out at base.
46. Cotyledon tips paralleling radicle *Solanum americanum*
46. Cotyledon tips pointing toward radicle *Solanum nigrum*

SYNOPSES OF SEED CHARACTERISTICS

Atropa belladonna L.

(belladonna, deadly nightshade)



PN-3129

Atropa belladonna L., F. B. Gaffney 37, greenhouse grown, (US), seeds X 7.

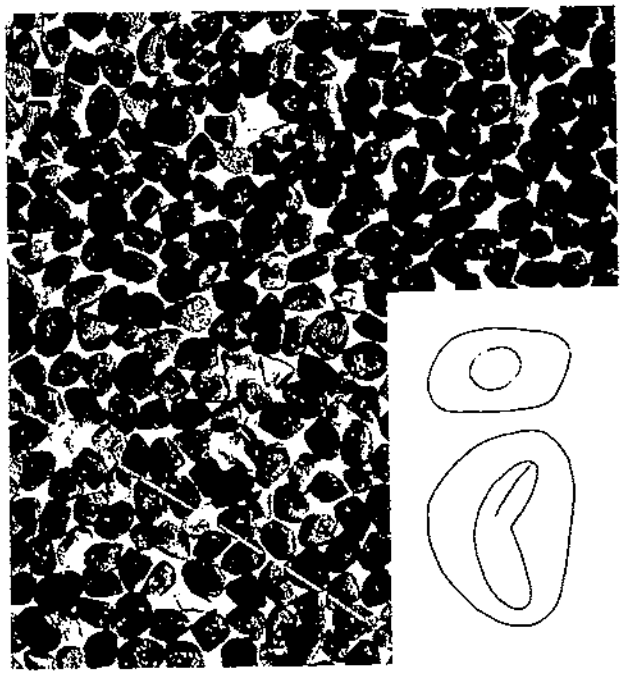
Seed 1.7-2 X 1.2-1.5 X 0.3-0.5 mm., C- or D-shaped, flattened, medium brown (yellow in var. *lutea*), reticulate, reticulum well defined at 10 X with straight to slightly wavy, thin walls. Hilum inconspicuous, marginal, subbasal, color of seedcoat, circular, 0.1 mm. in diameter, flush or occasionally nipplelike. Embryo linear, annular, seen twice in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit berry, 10-20 mm. in diameter, subglobose, usually black (yellow in var. *lutea*), glabrous, smooth, 19- to 25-seeded. Mature fruit naked, enlarged calyx five-parted and flaring from base of fruit.

Notes: Native of Europe, established northwestern United States, or locally adventive. Source of atropine and scopolamine. Atropine is an important natural drug, used as a mydriatic and as an antidote for some poisons (*20*). $2n=50, 72$ (*15*).

Browallia viscosa H.B.K.

(sticky browallia)



PN-3130

Browallia viscosa H.B.K., F. B. Gaffney 46, greenhouse grown, (US), seeds X 7.

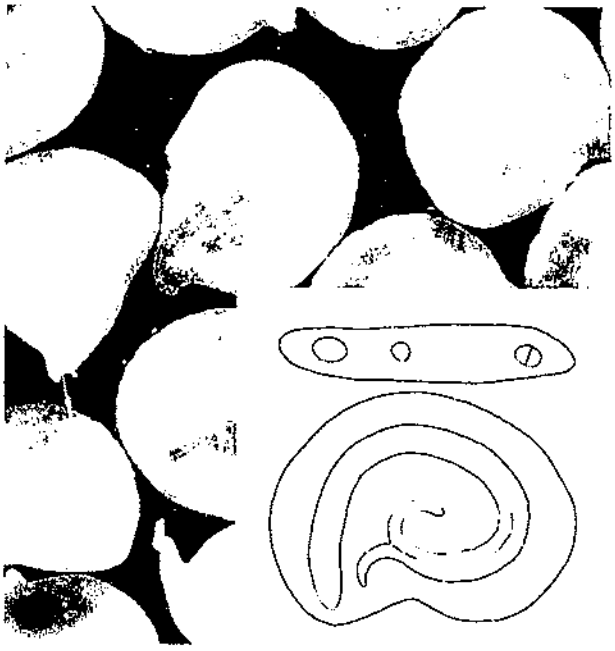
Seed 0.5-1 X 0.5-0.7 X 0.5-0.7 mm., cuboidal or occasionally flattened, yellow, brown to blackish brown, reticulate, reticulum noticeable at 20 X with straight, thin wall, at 20-30 X seedcoat appears tuberculate. Hilum inconspicuous, centered on ventral seed face, brown, circular, 0.05 mm. in diameter, flush or occasionally nipplelike. Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 3-10 mm. long, 2-5 mm. in diameter, pubescent, tan, 15- to 45-seeded, dehiscing by two entire valves. Mature fruit enclosed in glandular-pubescent calyx, which is usually twice as long as capsule.

Notes: Native of tropical South America, cultivated in United States as an annual ornamental. $2n=22$ (*15*).

Capsicum annuum L.

(green pepper, chili pepper, capsicum pepper)



PN-3131

Capsicum annuum L., F. B. Gaffney 8 and 28, field grown, (US), seeds X 7.

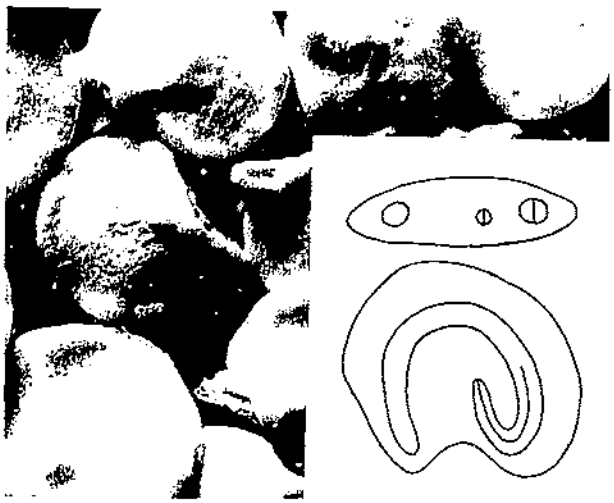
Seed 3.5-5 X 3.5-4 X 0.5-1 mm., C- or D-shaped with noticeable pointed hilum, strongly flattened, often bent, pale yellow, smooth to obscurely reticulate, in center reticulum usually quite faint at 20 X but clearly distinguishable, minutely wrinkled along rim, rim about 0.5 mm. wide encompassing seed. Hilum conspicuous, marginal, subbasal, silvery to orange within, linear to almost keyhole shaped, 2-2.5 X 0.5-1 mm., recessed. Embryo linear, imbricate, seen three times in seed cross section. The tips of the cotyledons may be appressed (see *C. frutescens* illus.) or recurved (see *C. annuum* illus.). The position of tips does not have taxonomic significance at species level and is not significant at cultivar level. Seedcoat extending about 0.5 mm. beyond endosperm (width of rim).

Fruit lustrous fleshy berry, generally 5-15 cm. long, 6-9 cm. in diameter, subglobose or conic to elongate and lobed, red, green, or yellow, glabrous, smooth, 45- to 160-seeded. Mature fruit naked.

Notes: Native of tropical America, cultivated in United States as a condiment and vegetable. U.S. statistics for 1969: 21,400 hectares yielding 9,970 kg. per hectare, with total value of $51,411,000 (*39*). Pungency due to capsaicin located only in placental tissue. Drugs include capsaicin and solasodine. Heiser and Pickersgill (*21*) discussed the validity of the species concept and name. Economic and historical aspects of capsicum peppers are summarized by Rosengarten (*34*), and their ornamental uses are discussed by Corley and Dempsey (*8*). $2n=12, 24$ (*15*).

Capsicum frutescens L.

(tabasco pepper)



PN-3132

Capsicum frutescens L., F. B. Gaffney 49, greenhouse grown, (US), seeds X 7.

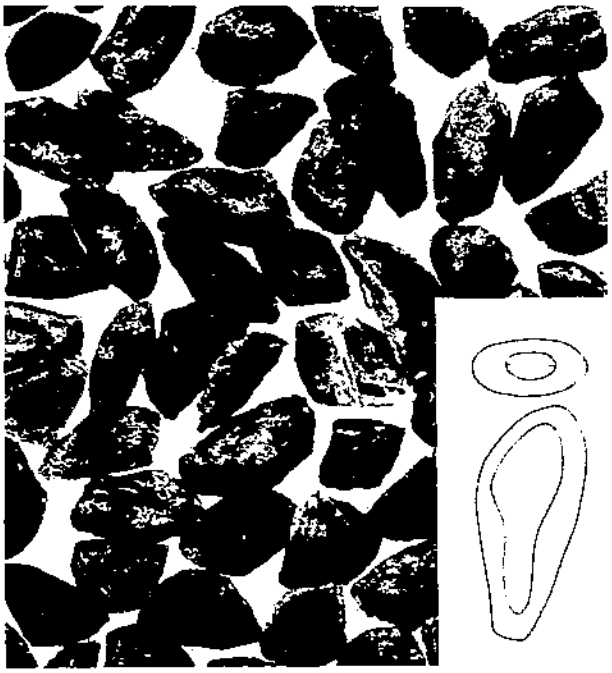
Seed characters identical to those of *C. annuum*.

Fruit lustrous fleshy berry, subglobose to conic or oblong-ovoid, 1-3 cm. long, 0.5-1 cm. in diameter, green or yellow to red, glabrous, smooth, two- to nine-seeded. Mature fruit naked.

Notes: Native of the Amazon region of South America, cultivated in United States, and escaped in Florida and Mexico. The cultivar 'Tabasco' introduced from Mexico to Louisiana is used as a spice, especially in tabasco sauce. Heiser and Pickersgill (*21*) discussed the validity of the species concept and name. $2n=24$ (*15*).

Cestrum diurnum L.

(jessamine)



PN–3133

Cestrum diurnum L., F. B. Gaffney 15, Palm Beach Co., Fla., (US), seeds X 7.

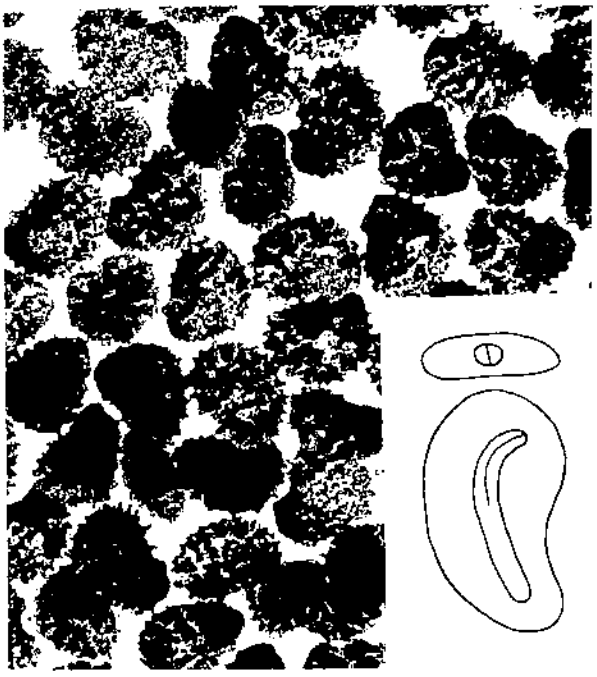
Seed 2.5-3.5 X 1.5-2 X 0.5-1 mm., linear-angular, dark gray to grayish yellow, minutely and irregularly reticulate (30 X), often bearing tan flattened pustules. Hilum conspicuous, centered on ventral seed face, color of seedcoat to lighter or darker, elliptical, about 0.5 X 0.3 mm., flush but area around hilum slightly depressed. Embryo spatulate, straight, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit dry berry, 6-7 mm. long, 2-3 mm. in diameter, ellipsoid, black, glabrous, smooth, six- to 15-seeded. Mature fruit naked.

Notes: Native of West Indies, escaped in Texas and Florida. This shrub is occasionally cultivated for its fragrant blooms. The plant when eaten is poisonous to animals (*27*). $2n=16$ (*15*).

Chamaesaracha coronopus A. Gray

(false nightshade, small groundcherry)



PN–3134

Chamaesaracha coronopus A. Gray, F. B. Gaffney 100, Ariz., (NA, US), seeds X 7.

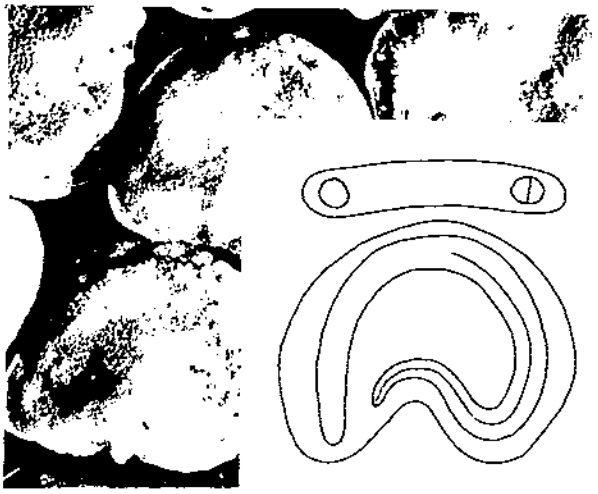
Seed 2-2.5 X 1.5-2 X 1 mm., C-shaped, flattened, medium brown, reticulate, reticulum well defined at 10 X with straight, thin walls and seed strongly fringed because some walls up to 0.2 mm. in height. Hilum inconspicuous, marginal, subbasal, on radicle lobe (not in poorly defined notch), whitish, linear, about 0.3 mm. long, flush. Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit dry or nearly dry berry, 5-8 mm. in diameter, globose, tannish green, glabrous, smooth, 35- to 40-seeded. All but apex of mature fruit enclosed by enlarged, tightly fitting calyx.

Notes: Native of northern South America to western United States as far north as Kansas and Utah. Usually found in thickets. Berries were eaten by Navaho and Hopi Indians (*26*). $2n=24$ (*15*).

Datura meteloides Dunal

(angel-trumpet, sacred datura)



PN-3135

Datura meteloides Dunal, F. B. Gaffney 31, Cape May Co., N.J., (NA, US), seeds X 7.

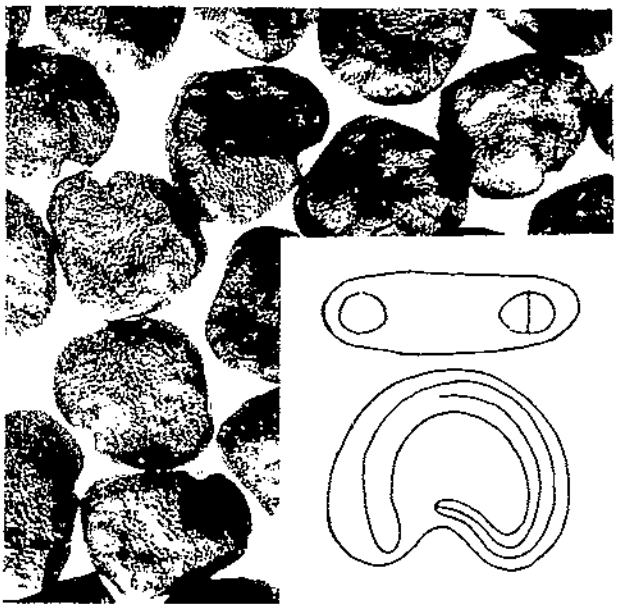
Seed 3.5-5.5 X 3-4.5 X 1-1.2 mm., C-shaped, flattened, occasionally slightly bent, dull ocher, smooth to faintly reticulate at 20 X, well-defined rim about 0.5 mm. wide encompassing seed. Hilum conspicuous, marginal, in notch of seed and extending atop radicle lobe, color of seedcoat, oblong, 1.5-2 X 0.5-0.7 mm., flush, usually covered by white parenchyma (remnants of funiculus). Embryo linear, annular, seen twice in seed cross section. Seedcoat extending about 0.5 mm. beyond endosperm (width of rim).

Fruit capsule, 30-40 mm. in all dimensions, globose, brownish, spiny (spines 5-7 mm. long), dehiscing from apex by four valves, about 350-seeded. Mature fruit naked, indurate basal part of calyx reflexed at maturity.

Notes: Native of Mexico and southwestern United States as far north as Colorado and Utah. This species is grown as an ornamental for its large white flowers and has escaped to waste areas. Southwestern American Indians had ceremonial uses for this species (*20*). Plants are regarded as poisonous (*27*). For additional data on *Datura* seeds, consult Avery et al. (*1*). Correll and Johnston (*11*) referred to this species as *D. wrightii* Regel. $2n=24$ (*15*).

Datura stramonium L.

(jimsonweed, thornapple)



PN-3136

Datura stramonium L., F. B. Gaffney 20, Prince Georges Co., Md., (US), seeds X 7.

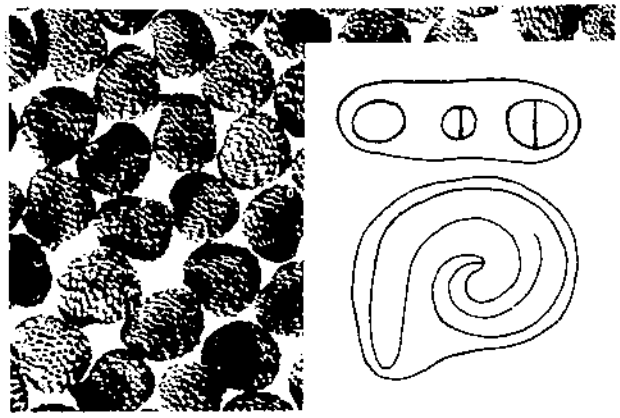
Seed 2.5-3.5 X 2.5-3 X 1.2-1.4 mm., C- or D-shaped and lumpy in outline, flattened, black, reticulate, reticulum noticeable at 10 X with wavy, moderately thick to thick, irregular walls. Hilum conspicuous, marginal, in notch of seed, tan, triangular, 0.4-0.8 mm. in length and width, recessed to flush. Embryo linear, annular, seen twice in seed cross section. Inner margin of seedcoat appressed to dark-brown endosperm.

Fruit capsule, 25-50 mm. long, 20-35 mm. in diameter, subglobose to ovoid, brown, puberulent to glabrate, usually spiny (spines 3-15 mm. long), rarely spineless, dehiscing from apex by four valves, about 450-seeded. Mature fruit naked, indurate basal part of calyx reflexed at maturity.

Notes: Generally thought to be a native of Asia, now established throughout United States in waste or cultivated areas. Various parts of the plant are poisonous and possess a rank odor. This plant is classified as a weed but has been used in research to establish fundamental biological principles (*1*, *20*). $2n=24$, 48 (*15*).

Hyoscyamus niger L.

(black henbane)



PN-3137

Hyoscyamus niger L., F. B. Gaffney 50, greenhouse grown, (US), seeds X 7.

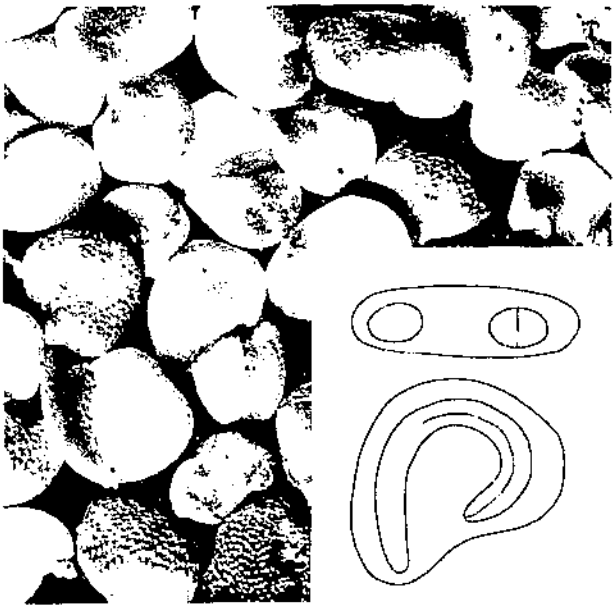
Seed 1.3-1.7 X 1.1-1.6 X 0.4-0.6 mm., C- or D-shaped or oblong, flattened, dull light brown, reticulate, reticulum definite at 10 X with straight to slightly wavy, thin walls, regularly marked with vertical lines of reddish brown, which may be united at base by a horizontal line, slightly tuberculate especially on rim and forming a fringe visible in seed profile view at 10 X. Hilum inconspicuous, marginal, subbasal, usually color of seedcoat, circular, 0.1 mm. in diameter, flush to almost nipplelike. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit thin-walled capsule, 10-15 mm. long, 10-11 mm. in diameter, brownish, glabrous, smooth, 200- to 300-seeded, dehiscing circumscissilely in the upper quarter of capsule. Mature fruit enveloped in thickened, vase-shaped calyx, which is about twice as long as capsule.

Notes: Native of Mediterranean region and naturalized throughout United States along roadsides and in waste places. Cultivated for alkaloids, primarily hyoscyamine and scopolamine, which are used as hypnotic or sedative drugs (*23*). Various parts of the plant, especially the seeds and leaves, are poisonous (*27*). Because of its poisonous nature and undesirable odor, this species is not recommended as an ornamental. $2n=34$ (*15*).

Lycium halimifolium Mill.

(matrimonyvine, wolfberry)



PN-3138

Lycium halimifolium Mill., F. B. Gaffney 2, Prince Georges Co., Md., (NA, US), seeds X 7.

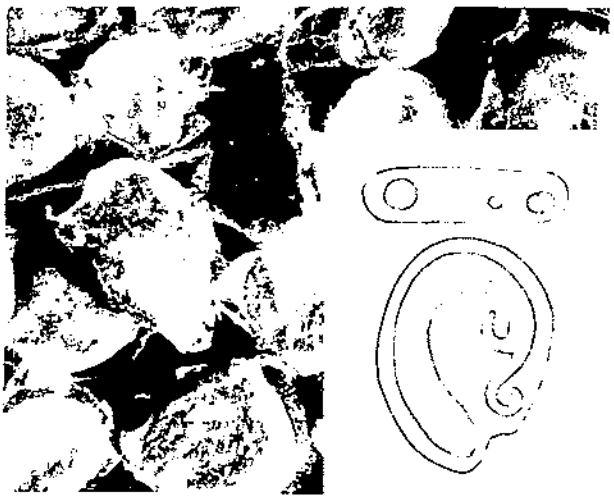
Seed 2-3 X 1.5-2.5 X 0.4-0.5 mm., C-shaped to slightly irregular in outline, strongly flattened, somewhat bent, pale amber to light brown, reticulate (rarely smooth), reticulum well defined to barely discernible at 10 X with wavy, thick to thin walls. Hilum conspicuous, marginal, in notch of seed, color of seedcoat to darker, circular or twisted linear, 0.2 mm. in diameter, recessed or nipplelike. Embryo linear, annular, seen twice in cross section. Inner margin of seedcoat appressed to endosperm.

Fruit fleshy berry, 10-20 mm. long, 0.5-0.7 mm. wide, ovoid to ellipsoid, orange red to scarlet, glabrous, smooth, 10- to 20-seeded. Mature fruit naked.

Notes: Native of Asia and southeastern Europe, naturalized in southwestern United States, and adventive in northern United States, especially roadsides, thickets, and waste ground. Grown as an ornamental shrub throughout most of the United States and parts of Mexico, especially well suited for dry regions. The plant is poisonous (*18, 27*). The genus was monographed by Hitchcock (*22*). $2n=24$ (*15*).

***Lycopersicon esculentum* Mill.**

(tomato, loveapple)



PN–3139

Lycopersicon esculentum Mill., F. B Gaffney 29, Prince Georges Co., Md., (US), seeds X 7.

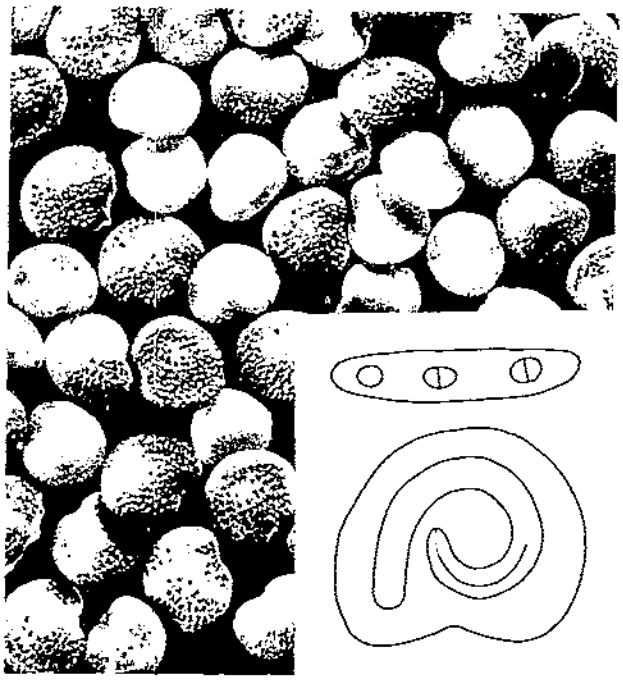
Seed 3-4 X 2.2-2.5 X 0.3-0.6 mm., obovate, flattened, dull straw colored, finely reticulate (straight walls) at 30 X, partially or almost completely covered with hairs, some of which may be fused together with fruit tissue to form a transparent wing along the margin. Hilum inconspicuous, subbasal, marginal, color of seedcoat, linear to keyhole shaped, about 1 mm. long, recessed, occasionally flush. Embryo linear, annular, seen twice in seed cross section. Tips of cotyledons may be recurved as shown in figure 3. Thus the tip of one cotyledon may appear in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy fleshy berry, 3-10 cm. or more in diameter, globose and depressed, ovate, pyriform, or oblong, red, yellowish, or whitish, glabrous, smooth, 25- to 280-seeded. Mature fruit naked.

Notes: Native of western South America and Mexico, escaped in southern United States. Cultivated for its fruits. U.S. statistics for 1969: 60,470 hectares yielding 14,780 kg. per hectare, with a total value of $394,822,000 (*39*). Plants are poisonous to livestock (*27*). Additional data on tomatoes are available in Bailey (*2*), Muller (*32*), and Skrdla et al. (*37*). $2n$=12, 36, 48 (*15*).

***Margaranthus solanaceus* Schlect.**

(netted globeberry)



PN–3140

Margaranthus solanaceus Schlect., E. O. Wooton, Dona Ana Co., N. Mex., (US), seeds X 7.

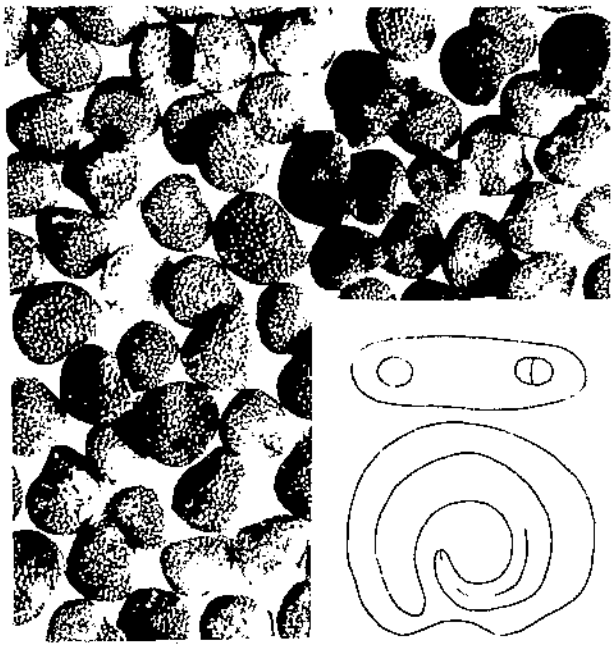
Seed 1.6-1.8 X 1.3-1.5 X 0.4-0.5 mm., C-shaped, flattened, slightly bent, bright ocher, reticulate, reticulum well defined at 10 X with wavy, thin walls, darker than interstices. Hilum inconspicuous, marginal, in notch, color of seedcoat, elongate to keyhole shaped, about 0.8 mm. long, or circular and about 0.3 mm. in diameter, flush or rarely recessed. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit thin walled, dry berry, 5-6 mm. in diameter, globose, brown, glabrous, smooth, 20- to 30-seeded. Mature fruit enclosed in an inflated papery calyx with a connivent apex.

Notes: Native of Sonora Desert, Texas to Arizona and south into Mexico, found in shaded habitats, especially canyons, streamsides, and slopes, often on alluvial soil. $2n$=24 (*15*).

Nicandra physalodes (L.) *Gaertn.*

(apple-of-Peru, fly-poison plant)



PN-3141

Nicandra physalodes (L.) Gaertn., F. B. Gaffney 54, greenhouse grown, (NA, US), seeds X 7.

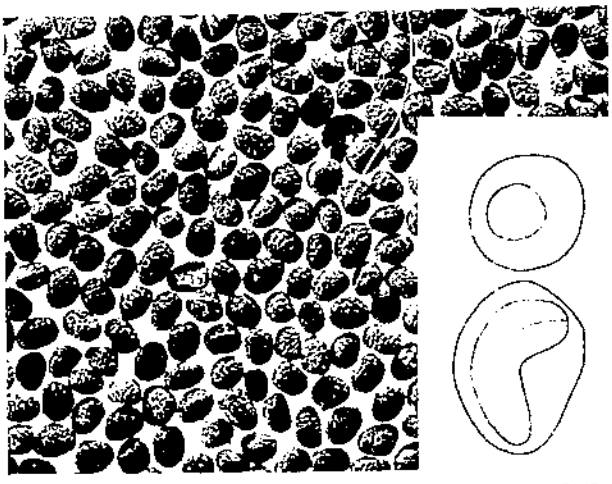
Seed 1.5-2 X 1.2-1.7 X 0.2-0.3 mm., C- or D-shaped or obovate, strongly flattened, medium dark brown, reticulate, reticulum well defined at 10 X with straight to slightly wavy, moderately thick walls. Hilum conspicuous, marginal, subbasal, whitish, linear, 1 mm. long, 0.5 mm. wide, flush. Embryo linear, imbricate, seen twice in cross section. Inner margin of seedcoat appressed to endosperm.

Fruit fleshy berry, 10-20 mm. in diameter, globose, tan to yellow, glabrous, smooth, 30- to 360-seeded. Mature fruit enclosed in an inflated, papery calyx with five well-developed auricles, invaginate at base and connivent at apex.

Notes: Native of Peru, escaped and naturalized in fields, waste areas, and abandoned gardens throughout eastern United States and Canada. Available as an ornamental in flower seed-packet trade, occasionally grown for its ability to kill house flies. Fresh stems are beaten to a pulp and moistened with a little milk. Flies feeding on the mixture die within one-half hour (*38*). $2n=19, 20$ (*15*).

Nicotiana alata Link & Otto

(flowering tobacco)



PN-3142

Nicotiana alata Link & Otto, F. B. Gaffney 16, Prince Georges Co., Md., (US), seeds X 7.

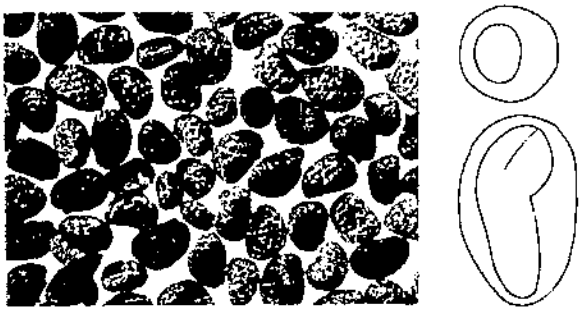
Seed 0.6-0.9 mm. in all dimensions (length usually 0.1 mm. longer than width or thickness), ovate to oblong, dull dark brown, reticulate, reticulum noticeable at 10 X with wavy, thin walls often darker than interstices (reticulum around hilum straight sided radiating like spokes of a wheel). Hilum conspicuous, subbasal, color of seedcoat, nipplelike, minute (best seen in profile view at 10 X). Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 12-17 mm. long, 4-6 mm. in diameter, ovoid to oblong, brown, glabrous, smooth, 140- to 370-seeded, dehiscing at apex by two bifid valves. Mature fruit, except apex, enclosed in a strongly 10-ribbed, glandular-pubescent, papery calyx with an open apex and rounded base.

Notes: Native of southern Brazil, Uruguay, and Paraguay, cultivated throughout most of United States for its abundant showy flowers. White-flowered cultivars are fragrant and often are grown for their scent, whereas red-flowered cultivars are not fragrant. Like other tobaccos, this species contains nicotine and other alkaloids. Additional data on members of the genus *Nicotiana* are available in Goodspeed (*16*). $2n=16, 18, 18\text{-}20$ (*15*).

Nicotiana rustica L.

(wild tobacco)



PN-3143

Nicotiana rustica L., F. B. Gaffney 18, greenhouse grown, (US), seeds X 7.

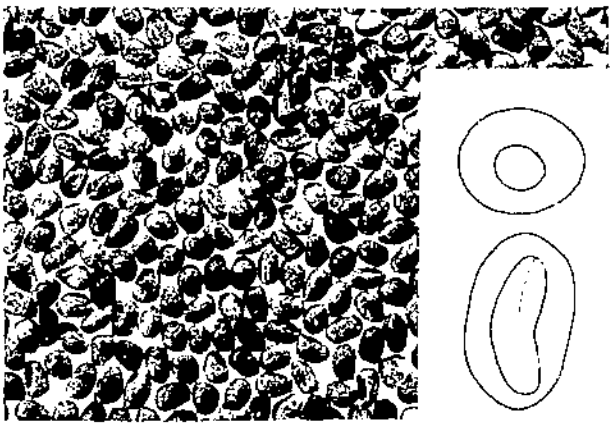
Seed 1-1.3 mm. long, 0.5-0.9 mm. in diameter, oblong, dark brown, reticulate, reticulum noticeable at 10 X with wavy, thin walls often darker than interstices. Hilum conspicuous, subbasal, color of seedcoat, nipplelike, minute (best seen in profile view at 10 X). Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 7-16 mm. long, 6-10 mm in diameter, elliptic-ovoid to subglobose, brown, glabrous, smooth, 450- to 710-seeded, dehiscing by widely spreading valves, or tardily dehiscent to indehiscent. Mature fruit, except for apex, enclosed by a tight-fitting, glandular-pubescent, papery calyx with an open apex and rounded base.

Notes: Native of north-central Peru, escaped and occasionally naturalized throughout most of the United States, especially in southern United States and Mexico. *N. rustica* was established in eastern United States by American Indians prior to the English colonization of Virginia. This species was the first tobacco to be used widely in Europe. Its popularity as a smoking tobacco soon waned in both America and Europe as more introductions of *N. tabacum* became available. Like other species in the genus, wild tobacco contains nicotine and other alkaloids. The nicotine content of wild tobacco is higher than in *N. tabacum*. Several races of wild tobacco are recognized. Additional data on members of the genus *Nicotiana* are available in Goodspeed (*16*). $2n$=48 (*15*).

Nicotiana tabacum L.

(tobacco)



PN-3144

Nicotiana tabacum L., F. B. Gaffney 23, Prince Georges Co., Md., (NA, US), seeds X 7.

Seed 0.6-0.8 mm. long, 0.3-0.4 mm. in diameter, ovate to oblong, bright light to medium bright brown, reticulate, reticulum noticeable at 10 X with wavy, thin walls often darker than interstices (reticulum around hilum straight sided, radiating like spokes of a wheel). Hilum conspicuous, subbasal, color of seedcoat, nipplelike, minute (best seen in profile view at 10 X). Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 15-20 mm. long, 8-12 mm. in diameter, narrowly elliptic, ovoid, or orbicular, acute or blunt at apex, brown, glabrous, smooth, about 3,500-seeded, dehiscing at apex by two bifid valves. Mature fruit, except for upper quarter, enclosed in a tight-fitting, glandular-pubescent calyx with an open apex and rounded base.

Notes: Native of South America, *N. tabacum* is not known in a wild state. It has been a man-propagated crop since pre-Columbian time for its leaves and stems, which are used in making smoking, chewing, and snuffing tobacco. United States, world's largest producer, in 1969 harvested 373,365 hectares yielding 2,195 kg. per hectare, with a total value of $1,296,781,000 (*39*). Additional data on members of the genus *Nicotiana* are available in Goodspeed (*16*). $2n$=24, 48, 72 (*15*).

Nierembergia hippomanica Miers var. *coerulea* (Miers) Millan

(cupflower)

PN 3145

Nierembergia hippomanica Miers var. *coerulea* (Miers) Millan, F. B. Gaffney 58, greenhouse grown, (NA, US), seeds X 7.

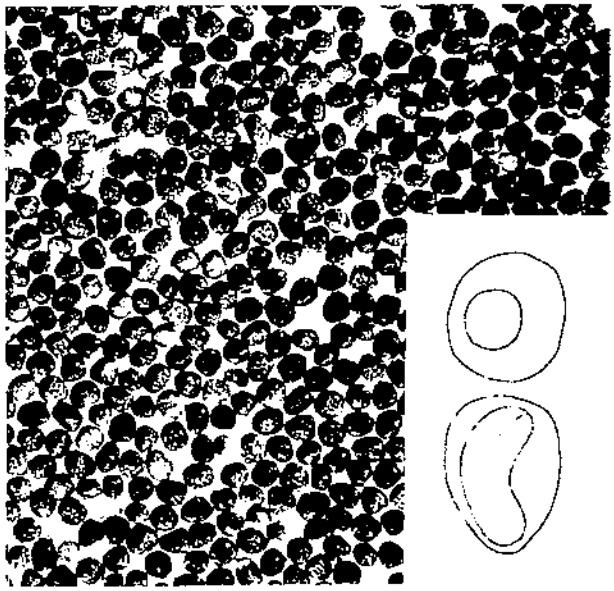
Seed 0.8-1.4 X 0.5-0.7 X 0.3-0.6 mm., angular, cuboidal to slightly flattened, dark brown, reticulate, reticulum well defined at 10 X with straight, moderately thick walls. Hilum inconspicuous, centered on ventral face, color of seedcoat or lighter, ovate to linear, 0.2-0.6 mm. long, flush. Embryo purple, nearly linear, straight or nearly so, seen once in seed cross section. Inner margin of seedcoat appressed to purplish endosperm.

Fruit capsule, 4-6 mm. long, 1-1.5 mm. in diameter, nearly fusiform, straw colored, glabrous, smooth, four- to 12-seeded, dehiscing by two valves. Mature fruit enclosed in a strongly five-toothed, five-ribbed calyx, which is 12-14 mm. in length, open at apex, tapering to base.

Notes: Native of Argentina, introduced into the United States as an ornamental, escaped in Texas (*11*). Seeds of this species are available from flower seed-packet companies.

Petunia axillaris (Lam.) B.S.P.

(whitemoon petunia)



PN-3146

Petunia axillaris (Lam.) B.S.P., F. B. Gaffney 60, greenhouse grown, (NA, US), seeds X 7.

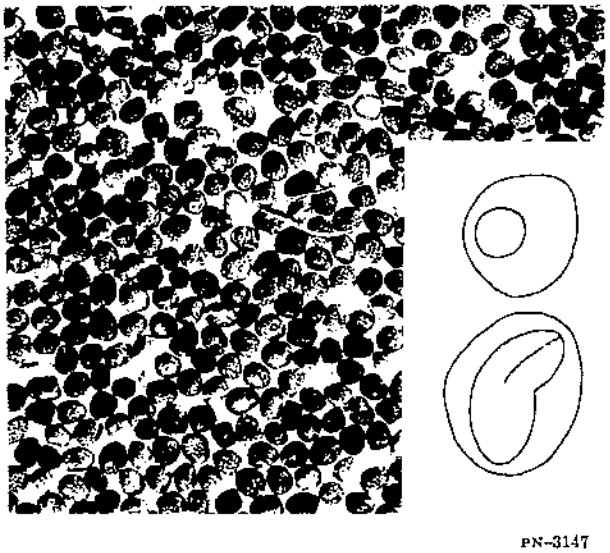
Seed 0.5-0.7 mm. in all dimensions, spheroidal-angular, dark brown, reticulate, reticulum well defined at 10 X with apparently straight, thin walls, darker colored than interstices (at 30 X, walls have a pinked appearance). Hilum conspicuous, subbasal, color of seedcoat, nipple-like, minute (best seen in profile view at 10 X). Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 13-14 mm. long, 7-8 mm. in diameter, conic, widest at flattened base, strongly tapering to apex, brown, glabrous, smooth, 500- to 1,060-seeded, dehiscing by two valves. Mature fruit surrounded by enlarged, glandular-hairy calyx composed of five strap-shaped lobes, which are up to twice as long as capsule and often leaflike.

Notes: Native of Argentina, escaped from cultivation, and naturalized in eastern United States. This species and *P. violacea* Lindl. have been replaced in seed-packet trade by *P. hybrida*. Both are believed to have contributed genes to *P. hybrida* (*2*). Germ plasm of *P. violacea* is thought to be lost. $2n=14$ (*15*).

***Petunia hybrida* Vilm.**

(common petunia, hybrid petunia)



PN-3147

Petunia hybrida Vilm., F. B. Gaffney 61, greenhouse grown, (US), seeds X 7.

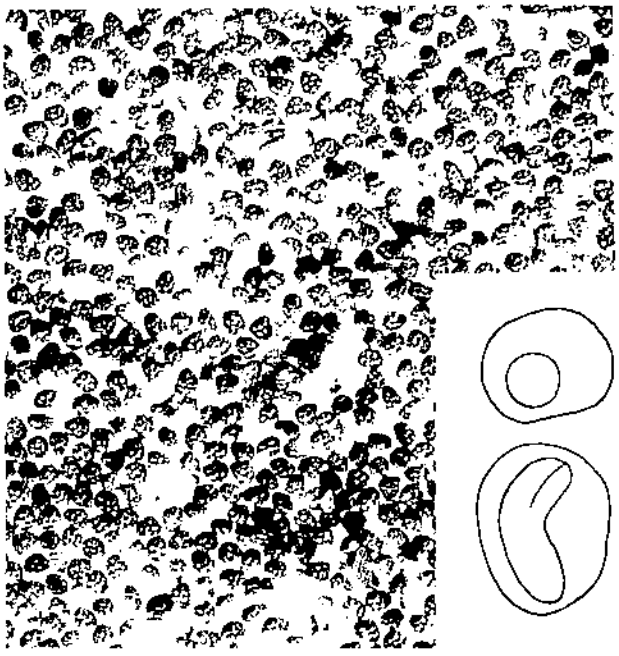
Seed 0.6-0.7 mm. long, 0.5-0.6 mm. in diameter, spheroidal-angular, light to dark brown, reticulate, reticulum well defined at 10 X with apparently straight, thin walls, darker colored than interstices (at 60 X, walls have a minute, moniliform appearance). Hilum conspicuous, subbasal, color of seedcoat, nipplelike, minute (best seen in profile view at 10 X). Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 11-13 mm. long, 7-8 mm. in diameter, conic, widest at flattened base, strongly tapering to apex, brown, glabrous, smooth, about 1,000-seeded, dehiscing by two valves. Mature fruit surrounded by enlarged, glandular-hairy calyx composed of five strap-shaped lobes, which equal or are slightly longer than capsule.

Notes: Probably a hybrid between *P. axillaris* and *P. violacea* (*2*). Selected into a number of named cultivars, this species is a commonly cultivated ornamental, which would not persist without man's assistance. This is an important bedding plant, sold by nurserymen as potted plants, or sold as seed in flower seed-packet trade. $2n$=14, 21, 28 (*15*).

***Petunia parviflora* Juss.**

(wild petunia, seaside petunia)



PN-3148

Petunia parviflora Juss., F. B. Gaffney 65, greenhouse grown, (NA, US), seeds X 7.

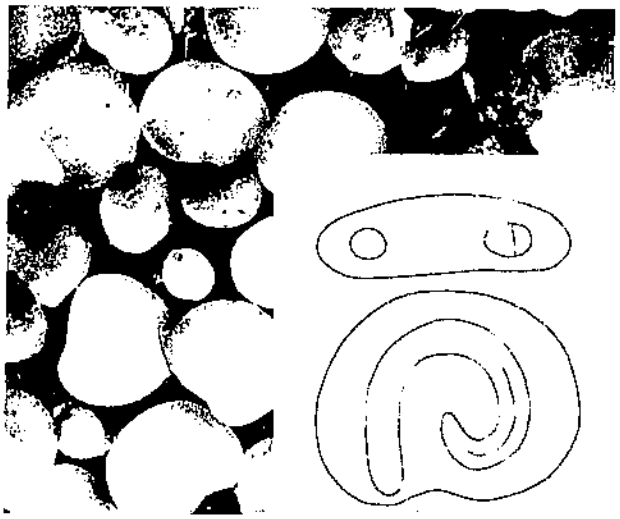
Seed 0.5-0.6 X 0.4 mm. in diameter, spheroidal-angular, brown, reticulate, reticulum well defined at 10 X with apparently straight, thin walls, darker colored than interstices (at 60 X, walls have a minute, pinked appearance). Hilum conspicuous, subbasal, color of seedcoat, nipplelike, minute (best seen in profile view at 10 X). Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 2-4 mm. long, 2-3 mm. in diameter, ovoid to ellipsoid, acute at apex, rounded at base, yellowish to whitish, glabrous, smooth, about 130-seeded, dehiscing by two valves. Mature fruit surrounded by enlarged, glandular-hairy calyx composed of five strap-shaped lobes, which are twice as long as capsule and leaflike.

Notes: Native of South America, escaped and established throughout southern United States. Wild petunia is found in waste or cultivated areas, on alluvial soils, and along ocean beaches. $2n$=18 (*15*).

Physalis alkekengi L.

(Chinese lantern, winter-cherry, bladder-cherry, strawberry-tomato)



PN-3149

Physalis alkekengi L., F. B. Gaffney 121, Prince Georges Co., Md., (US), seeds X 7.

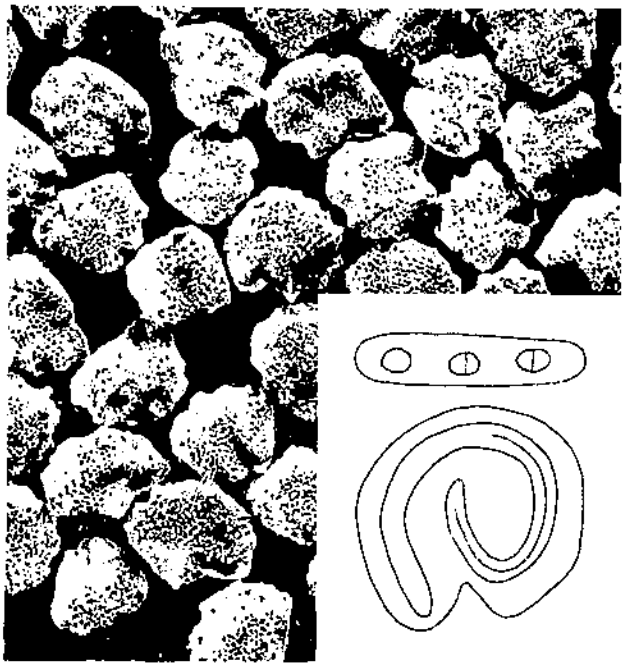
Seed 1.5-2.5 X 1.4-2.2 X 0.3-0.8 mm., C-shaped, strongly flattened, light bright (lustrous) yellow, faintly reticulate, reticulum noticeable at 10 X with slightly wavy, moderately thick walls. Hilum inconspicuous, marginal, in notch of seed and extending to top of radicle lobe, color of seedcoat, elongate or keyhole shaped, 0.5 mm. long, 0.1 mm. wide, slightly recessed. Embryo linear, imbricate, seen twice in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 10-12 mm. in diameter, globose, red, glabrous, smooth, 25- to 35-seeded, 20-30 sclerotic granules present. Mature fruit enclosed in a much inflated, papery, blood-red to orange, showy calyx, which is 4-5 cm. long, connivent at apex, and deeply invaginate at base.

Notes: Origin unknown, though it is usually thought to be southeastern Europe or Japan. Chinese lantern has spread from cultivation, becoming naturalized in all except northern United States. It is grown for its colorful bladders and is used in fall arrangements and to a less extent for its edible fruit. Seeds sold in flower seed-packet trade. $2n=25$ (*15*).

Physalis lobata Torrey

(purple groundcherry)



PN-3150

Physalis lobata Torrey, J. Reverchon, Dallas Co., Tex., (US), seeds X 7.

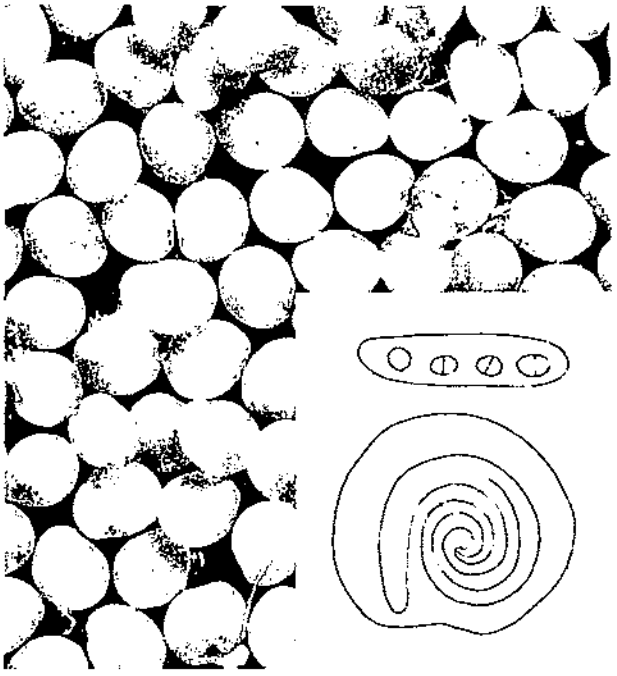
Seed 1.8-2.3 X 1.7-2 X 0.6-0.7 mm., C-shaped, lumpy in outline, strongly flattened, dull light ocher, strongly reticulate (honeycomb in appearance) with lateral walls lighter colored than interstices, thus giving appearance of a lacelike network, which may be sloughed off. Hilum inconspicuous, marginal, on radicle lobe (not in notch), color of seedcoat, keyhole shaped, 0.5-0.8 mm. long, circular end of hilum pitlike. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 4-7 mm. in diameter, globose to ovoid, brown, glabrous, smooth, 10- to 12-seeded. Mature fruit enclosed in an inflated, papery calyx, which is nearly connivent at apex, invaginated at base, and about twice as long as berry.

Notes: Native of southern United States and Mexico. This perennial species has weedy tendencies and is included in the Colorado noxious-weed seed list.

***Physalis peruviana* L.**

(cape-gooseberry, husk-tomato)



PN-3151

Physalis peruviana L., F. B. Gaffney 26, Fairfield Co., Conn., (US), seeds X 7.

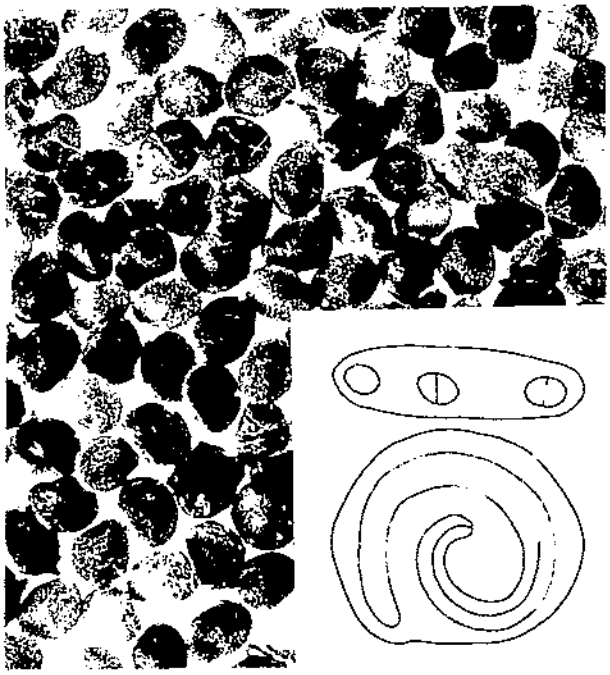
Seed 1.5-2 X 1.3-1.5 X 0.3-0.5 mm., C-shaped, strongly flattened, pale straw colored, reticulate, reticulum noticeable at 10 X with slightly wavy, moderately thick walls. Hilum inconspicuous, marginal, between radicle and cotyledon lobes (no notch present), color of seedcoat, keyhole shaped to slitlike, 0.4 X 0.1 mm., usually recessed. Embryo linear, coiled, seen four times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 10-12 mm. in diameter, globose, yellow, glabrous, smooth, 110- to 150-seeded. Mature fruit enclosed in an inflated, papery calyx with a connivent apex and slightly invaginated base.

Notes: Native of South America, introduced for its edible fruits, now escaped to wasteland. Fruits seldom used in United States; may be eaten raw or made into pies, puddings, or preserves. Seeds are not easily found in seed-packet trade. $2n=24, 48$ (*15*).

***Physalis pubescens* L.**

(dwarf cape-gooseberry, husk-tomato)



PN-3152

Physalis pubescens L., E. Palmer 140, Chihuahua, Mex., (US), seeds X 7.

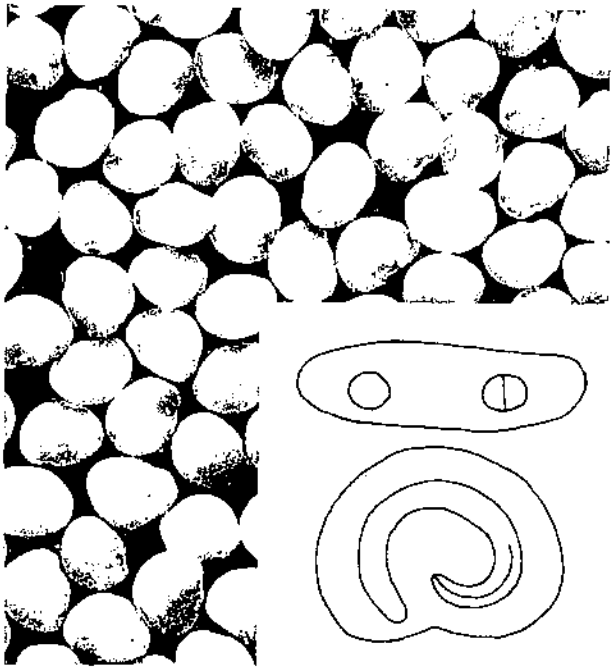
Seed 1.2-1.4 X 0.9-1.1 X 0.3-0.4 mm., D-shaped, strongly flattened, light to dark ocher, reticulate, reticulum noticeable at 10 X with wavy, moderately thick walls. Hilum inconspicuous, marginal, in notch of seed, color of seedcoat, keyhole shaped to linear, 0.3 mm. long, flush or nearly so. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 8-18 mm. in diameter, globose, yellow, glabrous, smooth, 150- to 180-seeded. Mature fruit enclosed in an inflated, papery calyx, 20-40 mm. long, 15-22 mm. in diameter, nearly connivent at apex and with five well-developed auricles above invaginate base.

Notes: Native of South America, introduced for its edible fruits, now escaped in wasteland throughout southern and central United States. Regarded by some as a better quality fruit than *P. peruviana.*

Physalis virginiana Mill.

(groundcherry)



PN-3153

Physalis virginiana Mill., F. B. Gaffney 7, Prince Georges Co., Md., (NA, US), seeds X 7.

Seed 1.6-2 X 1.3-1.5 X 0.5-0.6 mm., C-shaped, strongly flattened, slightly bent and irregular in outline, pale yellow, reticulate, reticulum barely discernible at 10 X with wavy, moderately thick walls (30 X). Hilum inconspicuous, marginal, in notch of seed, color of seedcoat, keyhole shaped, 0.4 X 0.1 mm., flush or nearly so. Embryo linear, imbricate, seen twice in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 10-12 mm. in diameter, globose, red, glabrous, smooth, 30- to 150-seeded. Mature fruit enclosed in an inflated, papery calyx, which is connivent at apex, invaginate at base, and twice as long as fruit.

Notes: Native of Canada and the United States except in extreme southwestern States. This species is generally regarded as a weed, though its fruits are edible (*38*). $2n=24$ (*15*).

Salpichroa origanifolia (Lam.) Thellung

(cocks-eggs, lily-of-the-valley vine)

PN-3154

Salpichroa origanifolia (Lam.) Thellung, F. B. Gaffney 72, greenhouse grown, (NA, US), seeds X 7.

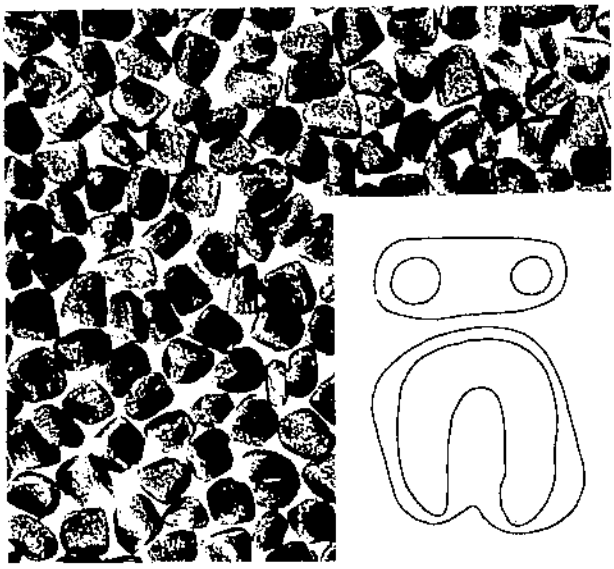
Seed 2.3-2.5 X 1.8-2.2 X 0.6-0.8 mm., C-shaped, occasionally D-shaped, flattened, brownish ocher, darker colored outer rim about 0.5 mm. wide surrounds seed, usually covered by yellowish hairs about 0.4 mm. long, reticulate, reticulum barely discernible at 10 X, reticulum of rim forming concentric circles with wavy, thin walls and reticulum of inner face poorly defined and irregular (30 X). Hilum inconspicuous, marginal, in obscure notch of seed, color of seedcoat or lighter, often covered by hairs, linear, 0.5-1 mm. long, flush. Embryo somewhat linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit berry, 13-25 mm. long, 10-14 mm. wide, oblong to ellipsoid, apiculate at apex with persistent base of style, bright scarlet red or yellowish to white, 16- to 20-seeded. Mature fruit naked, subtended by a five-lobed calyx.

Notes: Native of South America, escaped in Texas and southern coastal States of eastern and western United States. Grown as an ornamental climber, rarely for its edible but poorly flavored fruit. This species has escaped and become a weed especially in the cismontane area of California. $2n=24$ (*15*).

***Salpiglossis sinuata* Ruiz & Pav.**

(painted tongue, velvetflower)



PN-3155

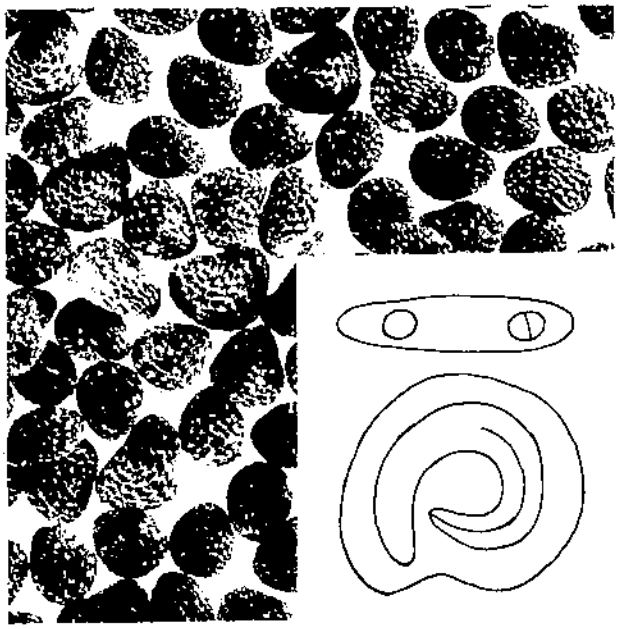
Salpiglossis sinuata Ruiz & Pav., F. B. Gaffney 74, greenhouse grown, (NA, US), seeds X 7.

Seed 0.8-1.2 X 0.5-1 X 0.4-0.5 mm., angular, cuboidal, light to dark brown, reticulate, reticulum well defined at 10 X with straight, thin walls (30 X), at 20-30 X seedcoat appears tuberculate, because of raised end walls of reticulum, tubercles forming concentric circles. Hilum conspicuous, subbasal, color of seedcoat, circular, about 0.1 mm. in diameter, often nipplelike. Embryo purplish green, linear, hippocrepiform, seen twice in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 9-11 mm. long, 4.5-5 mm. in diameter, oblong to ovoid, tapering to apex, rounded at base, brown, glabrous, smooth, about 200-seeded, dehiscing by two bifid valves. Mature fruit enclosed in a tight-fitting, glandular-pubescent, papery calyx about as long as capsule, open at apex, rounded at base.

Notes: Native of Chile, cultivated in United States for its large colorful flowers. Named cultivars and mixtures are available from flower seed-packet trade. This species is not so popular as the hybrid petunia, which it resembles. Little breeding research has been done on painted tongue. $2n=44$ (*15*).

***Saracha procumbens* (Cav.) Ruiz & Pav.**



PN-3156

Saracha procumbens (Cav.) Ruiz & Pav., M. N. Young 101, field grown, Clarke Co., Va., (US), seeds X 7.

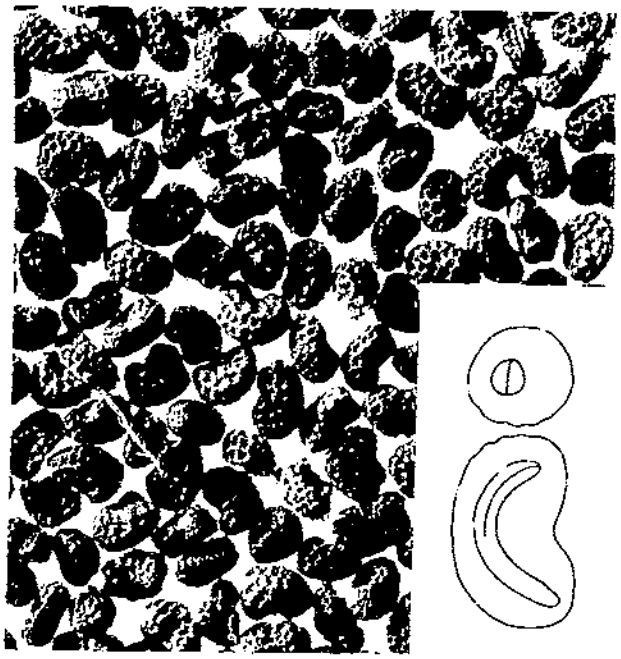
Seed 1.4-1.7 X 1.1-1.4 X 0.4-0.6 mm., C-shaped to obovate, strongly flattened, light brown, reticulate, reticulum well defined at 10 X with wavy, thin walls and forming a fringe visible in seed profile view at 10 X. Hilum inconspicuous or conspicuous when lighter colored, marginal, subbasal, color of seedcoat or lighter, linear, 0.3-0.4 X 0.1 mm., flush. Embryo linear, annular, seen twice in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 5-10 mm. in diameter, globose, dark purple, glabrous, smooth, 110- to 200-seeded, with 0-8 sclerotic granules. Mature fruit naked. Enlarged calyx strongly five-parted, reflexed, or not surrounding fruit.

Notes: Native of North and South America. This is only member of genus found in United States, where it is confined to Arizona. $2n=24$ (*15*).

***Schizanthus pinnatus* Ruiz & Pav.**

(butterflyflower, poor-man's orchid, angel's wings, fringeflower)



PN-3157

Schizanthus pinnatus Ruiz & Pav., F. B. Gaffney 79, greenhouse grown, (NA, US), seeds X 7.

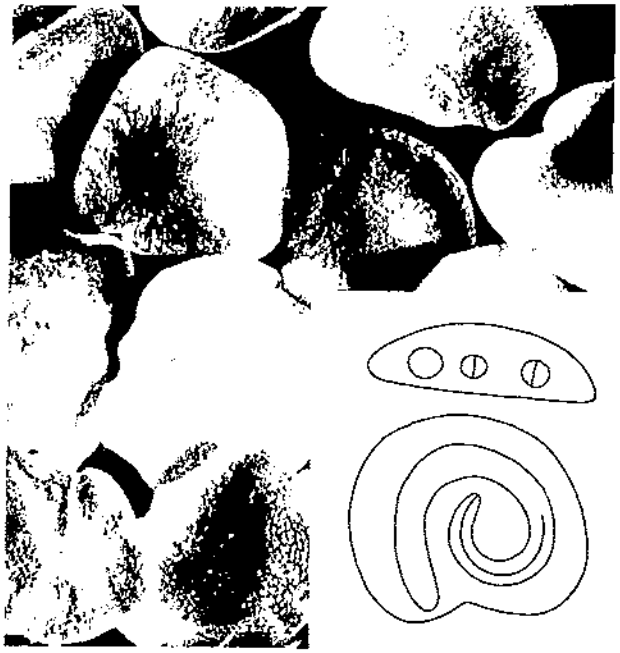
Seed 1-1.6 X 1-1.2 X 0.9-1 mm., reniform to angular, brownish black, reticulate, reticulum well defined at 10 X with straight, thick walls. Hilum inconspicuous, marginal, in notch on a poorly defined flange between the lobes, color of seedcoat, either pinched and irregularly shaped or circular, less than 0.1 mm. in diameter, subtended by a minute collar, nipplelike. Embryo linear, bent, seen once in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit capsule, 4-7 mm. long, 2-3 mm. in diameter, ovoid, tan, lustrous, glabrous, smooth, five- to 25-seeded, dehiscing by two bifid valves. Mature fruit surrounded by glandular-pubescent, five-lobed calyx, which is loose fitting and 1½ times as long as capsule.

Notes: Native of Chile, introduced into the United States as an ornamental, and available in flower seed-packet trade. A fine ornamental with several cultivars, often overlooked by flower gardeners. $2n=20$ (*15*).

***Solanum aculeatissimum* Jacq.**

(cockroachberry, soda-apple nightshade, devil's-apple)



PN-3158

Solanum aculeatissimum Jacq., F. B. Gaffney 17, greenhouse grown, (NA, US), seeds X 7.

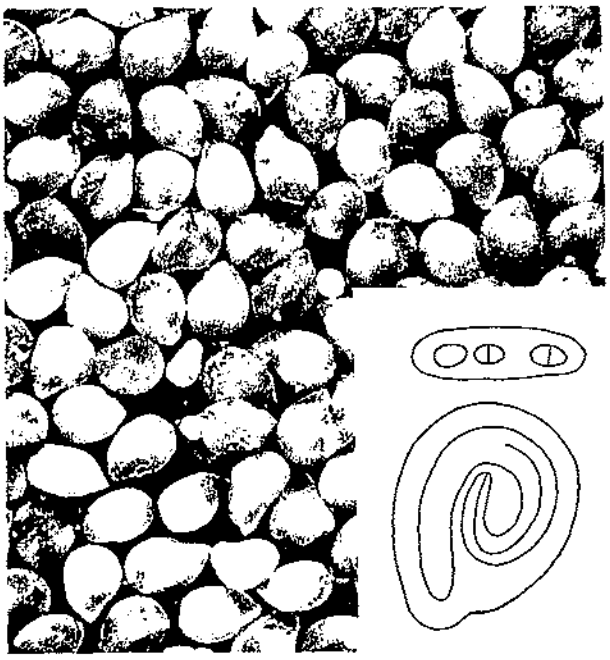
Seed 4-5 X 4 X 0.4-0.5 mm., irregularly circular, strongly flattened, notched at hilum, often bent, bearing a conspicuous wing 1.5 mm. wide, light to dark ocher, reticulate, reticulum noticeable at 10 X with straight, moderately thickened to thin walls. Hilum inconspicuous, marginal, in notch of seed, color of seedcoat, linear, 0.2 mm. long, flush. Embryo linear, imbricate, seen three times in seed cross section. Seedcoat, except wing area, appressed to endosperm.

Fruit dry berry, 25-35 mm. in diameter, globose, somewhat flattened at each end, scarlet, orange, or yellow, glabrous, smooth, 125- to 300-seeded. Mature fruit naked.

Notes: Native of South America, introduced into United States as an ornamental, and now locally escaped in waste areas and onto alluvial soils. Used by florists in dried arrangements. Fruits have been recorded as being toxic, but this has been somewhat discounted (*27*). $2n=24$ (*15*).

Solanum americanum L.

(American black nightshade)



PN-3159

Solanum americanum L., P. C. Standley 1283, Lee Co., Fla., (US), seeds X 7.

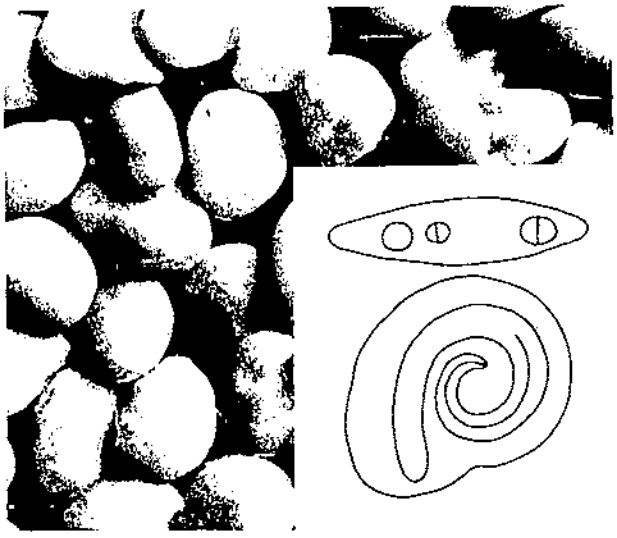
Seed 1.5-1.7 X 1-1.2 X 0.5 mm., strongly flattened, obovate, dull light to dark ocher, reticulate, reticulum noticeable at 10 X with wavy, thin to moderately thickened walls (30 X). Hilum inconspicuous, marginal, nearly basal (seed appears to be drawn out to hilum), color of seedcoat, linear, 0.4-0.6 mm. long, flush. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 5–9 mm. in diameter, globose, lustrous black, glabrous, smooth, 70- to 150-seeded, four to 13 sclerotic granules present. Mature fruit naked.

Notes: Native of eastern and central Canada and United States, south to Florida and Texas, and usually found in open woods, alluvial soil, or waste areas. Often reported in old American literature as *S. nigrum*. Although *S. americanum* is not a troublesome weed, fresh plants and green fruits are poisonous (*27*). Ripe (black) berries may be eaten raw or cooked for preserves or pies (*38*). $2n$=24, 48 (*15*).

Solanum carolinense L.

(horsenettle)



PN-3160

Solanum carolinense L., F. B. Gaffney 11, Prince Georges Co., Md., (US), seeds X 7.

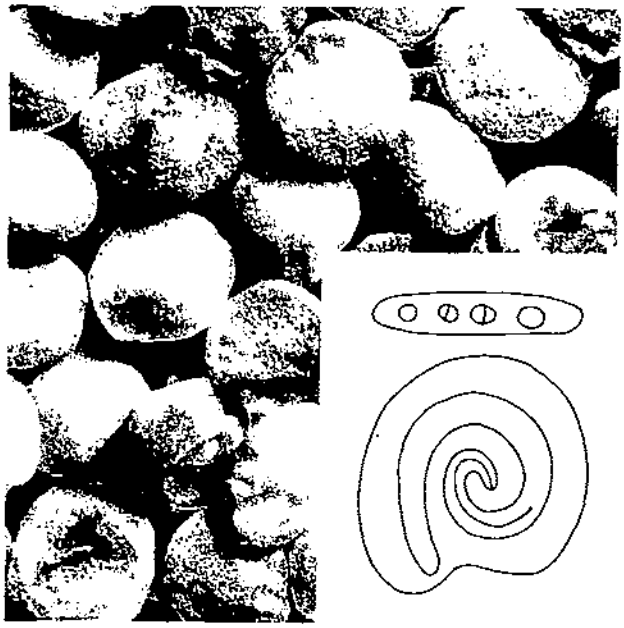
Seed 2.2-2.7 X 1.6-2.3 X 0.7-0.9 mm., C-shaped, obovate to ovate (truncate at hilum in profile view), strongly flattened, fresh pale straw colored, discolored and stained if remaining in fruit, essentially smooth to finely reticulate, reticulum visible at 10 X with thickened walls, outer forming concentric lines along margin, inner irregularly organized. Hilum conspicuous, marginal, subbasal, lighter colored than seedcoat within, keyhole shaped, 0.5-1 mm. long, 0.2 mm. wide, recessed. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 10-20 mm. in diameter, globose or essentially so, orange yellow, glabrous, smooth, 40- to 170-seeded. Mature fruit naked.

Notes: Native of eastern United States and now spread over most of United States and Canada along roadsides, fields, and waste areas. Regarded as a noxious-weed seed, because plant is perennial, spiny, and poisonous. Mature fruits are especially poisonous because solanine content of plant increases tenfold at maturity (*27*). One of a few native, problem weeds in United States. $2n$=24 (*15*).

Solanum dulcamara L.

(European bittersweet, climbing nightshade)



PN-3161

Solanum dulcamara L., F. B. Gaffney 32, Baltimore Co., Md., (NA, US), seeds X 7.

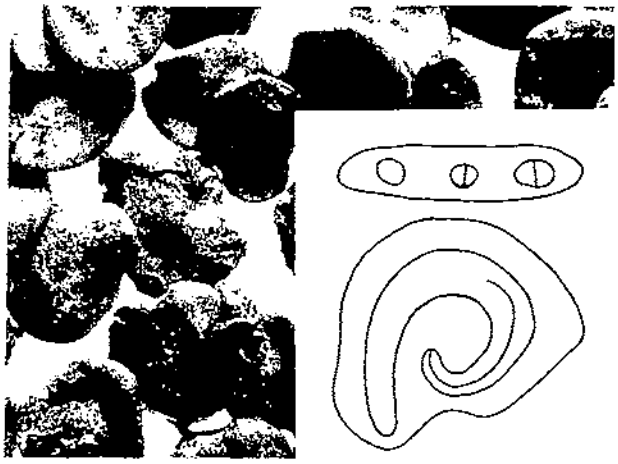
Seed 2-3 X 1.7-2.5 X 0.7-1 mm., C-shaped, obovate to ovate, strongly flattened, light to dark ocher, reticulate, reticulum noticeable at 10 X (giving seed a sugary appearance which may be rubbed off) with straight to slightly wavy, thin walls (30 X), parts of fruit may adhere to seeds. Hilum conspicuous, marginal, subbasal to nearly medial, color of seedcoat, keyhole shaped, 0.5 X 0.1 mm., flush with central part sunken. Embryo linear, coiled, seen four times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 8-11 mm. in diameter, ovoid to ellipsoid, bright lustrous red or rarely yellowish green, glabrous, smooth, 40- to 60-seeded. Mature fruit naked.

Notes: Native of Europe, introduced into United States and Canada as an ornamental and medicinal plant, now naturalized, especially in northern United States along roadsides, fence rows, and margins of woodlands. Any medicinal or ornamental values are offset by poisonous properties of plant and berries. $2n=24$, 28, 48, 72 (*15*).

Solanum elaeagnifolium Cav.

(silverleaf horsenettle, white horsenettle, trompillo)



PN-3162

Solanum elaeagnifolium Cav., F. B. Gaffney 92, greenhouse grown, (NA, US), seeds X 7.

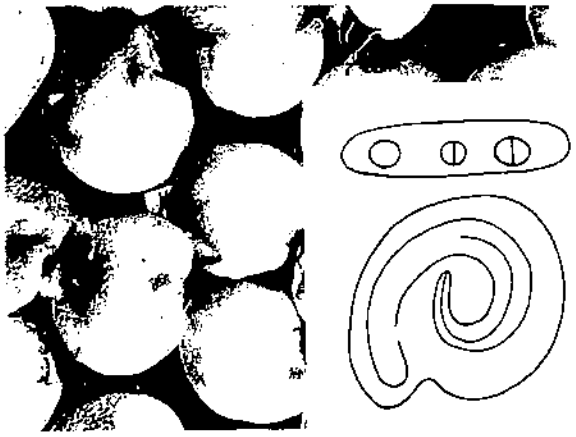
Seed 2.5-3.5 X 2.5-2.8 X 0.6-0.8 mm., obovate to ovate, occasionally reniform, C-shaped, strongly flattened and slightly angular, bent, dark brownish gray to blackish, smooth to faintly reticulate, reticulum barely visible at 30 X. Hilum conspicuous, marginal, in notch, color of seedcoat, keyhole shaped, 0.5-0.7 X 0.2 mm., recessed. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 10-15 mm. in diameter, globose, yellow to brownish, 30- to 40-seeded. Mature fruit naked but subtended by a conspicuous, persistent calyx.

Notes: Native of Mexico and southwestern United States and spreading east and north. Silverleaf horsenettle is declared a noxious-weed seed in 21 States, because it is perennial, spiny, and poisonous. Pima Indians added crushed berries to milk when making cheese (*26*). A protein-digesting enzyme resembling papain is present in fruits. A related species, *S. dimidiatum* Raf. (western horsenettle), primarily of Kansas, Missouri, Arkansas, and Texas, is becoming more of an agricultural problem because it is perennial, spiny, and slightly toxic. It hybridizes with *S. elaeagnifolium*, and the hybrid seeds are intermediate.

Solanum melongena L.

(eggplant)



PN-3163

Solanum melongena L., F. B. Gaffney 19, field grown, Prince Georges Co., Md., (US), seeds X 7.

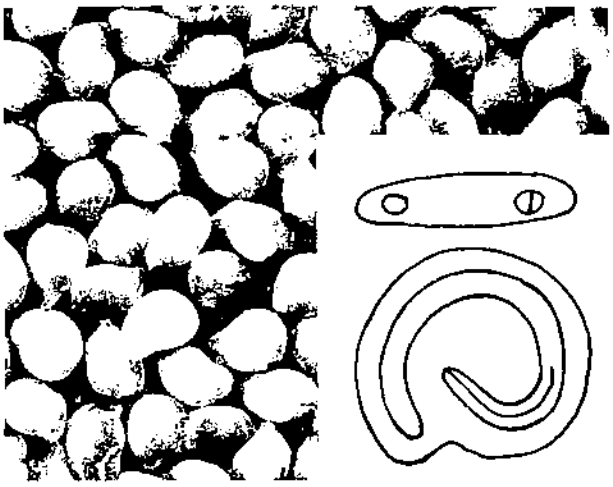
Seed 2.8-3.9 X 2.5-3.5 X 0.6-1 mm., C-shaped, occasionally somewhat angular, flattened, dull ocher, faintly reticulate to nearly smooth, reticulum discernible at 10 X with wavy, thick walls, outer forming concentric lines along margin, inner irregularly organized. Hilum conspicuous, marginal in notch of seed, color of seedcoat, nearly circular with some tending to taper to a keyhole shape, 0.5 mm. in diameter, recessed (chamberlike). Embryo linear, imbricate, seen three times in seed cross section. Endosperm difficult to clear. Inner margin of seedcoat appressed to endosperm, except in area of sunken hilum.

Fruit fleshy berry, variable, 15-20 cm. long, 5-15 cm. in diameter, oblong, ovoid, ovate, or pyriform (much elongated and curled at the tip in one cultivar), purple, white, yellowish, or striped, glabrous, smooth, 12,000- to 15,000-seeded. Mature fruit naked.

Notes: Probably native of southwestern Asia, introduced in United States as a cultivated vegetable, occasionally escaped in Florida and Texas. Several cultivars have been selected. U.S. statistics for 1969: 1,500 hectares yielding 16,015 kg. per hectare, with a total value of $4,570,000 (*39*). Although fruit contains solanaceous alkaloids, it is not known to be poisonous. However, vines may be poisonous when used as livestock feed (*27*). $2n$=24, 36, 48 (*15*).

Solanum nigrum L.

(black nightshade)



PN-3164

Solanum nigrum L., F. B. Gaffney 6, Prince Georges Co., Md., (NA, US), seeds X 7.

Seed 1-2 X 0.9-1.7 X 0.4-0.6 mm., obovate to C-shaped, strongly flattened, yellowish green, faintly reticulate, reticulum discernible at 10 X with straight, thin walls (30 X). Hilum inconspicuous, marginal, nearly basal (seed appears to be drawn out to hilum), color of seedcoat, linear, 0.2 mm., flush. Embryo linear, imbricate, seen two times in seed cross section. Inner margin of seedcoat appressed to endosperm.

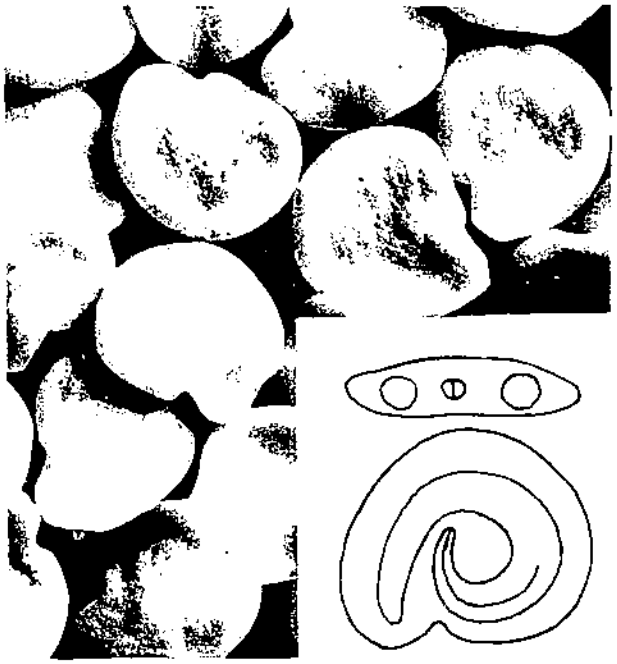
Fruit juicy berry, 8-13 mm. in diameter, globose, dull black, glabrous, smooth, 70- to 100-seeded. Mature fruit naked.

Notes: Native of Europe and naturalized throughout United States. Numerous cases of black nightshade poisoning from eating leaves and green fruits have been reported, though ripe (black) fruits with a low solanine content may be eaten raw (*27*). Heiser[3] concluded that most "*S. nigrum*" currently cultivated in the United States is *S. melanocerasum* All. (synonym *S. intrusum* Soria). This species is sold under the common names of garden huckleberry, golden huckleberry, sunberry, and wonderberry. Heiser (*20*) summarized the interesting history of black nightshade and its cultivated relative. $2n$=24, 36, 40, 48, 72, 96 (*15*).

[3] Heiser, C. B., personal communication, Mar. 4, 1972.

Solanum pseudocapsicum L.

(Jerusalem-cherry)



PN-3166

Solanum pseudocapsicum L., F. B. Gaffney 3, greenhouse grown, (US), seeds X 7.

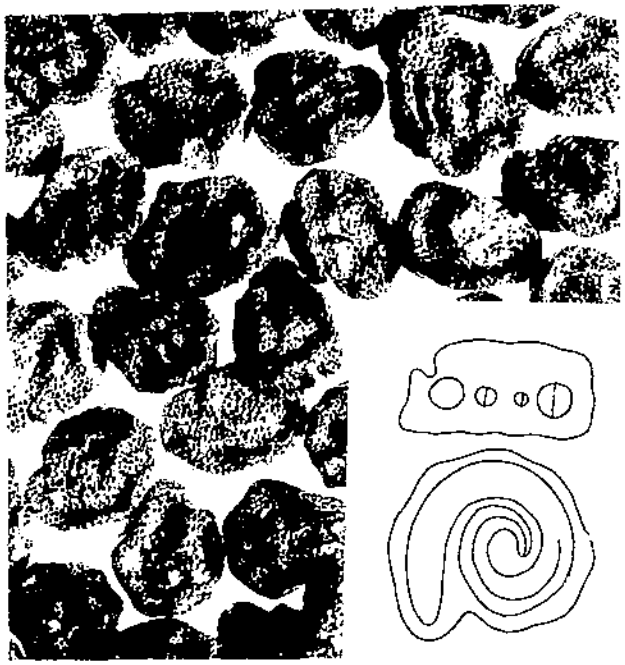
Seed 3-4 X 2-3 X 0.2-0.4 mm., C-shaped, strongly flattened, some slightly bent, bright yellow, smooth (faintly reticulate at 30 X), definite rim about 0.5 mm. wide around seed. Hilum conspicuous, marginal, in notch of seed, color of seedcoat, keyhole shaped, 0.5-0.7 X 0.2 mm. (circular section pitlike). Embryo linear, imbricate, seen three times in seed cross section. Seedcoat extending about 0.5 mm. beyond endosperm (width of rim).

Fruit fleshy berry, 13-30 mm. in diameter, globose, scarlet to orange or yellow, glabrous, smooth, 30- to 90-seeded. Mature fruit naked.

Notes: Native of Old World, naturalized throughout tropic and subtropic regions, established in Florida and Texas in fields and waste areas. Usually grown as a pot plant and often sold at Christmas for its colorful fruit. This species is regarded as toxic, but there are no documented cases (*27*). $2n=24$ (*15*).

Solanum rostratum Dunal

(buffalobur, Kansas thistle)



PN-3165

Solanum rostratum Dunal, F. B. Gaffney 87, greenhouse grown, (NA, US), seeds X 7.

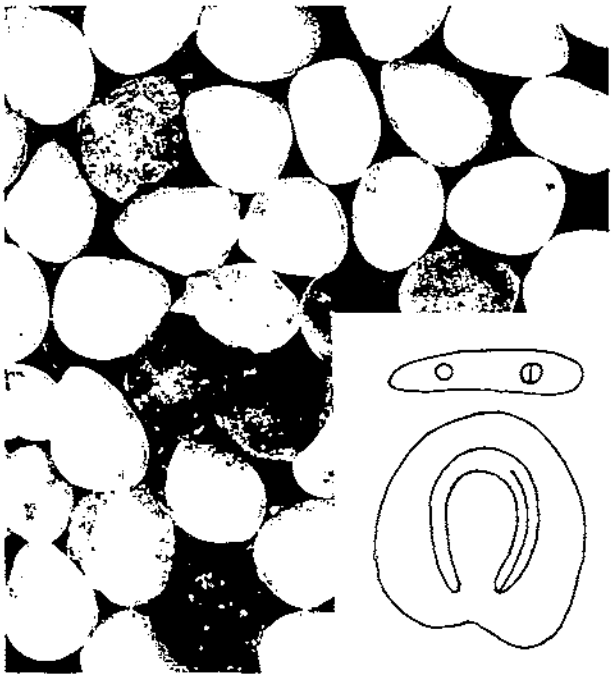
Seed 2.2-2.3 X 2-2.4 X 0.9-1 mm., lumpy in outline or occasionally C-shaped, flattened, grayish black, reticulate, reticulum well defined at 10 X, with slightly wavy, moderately thick walls (reticulum may be masked by presence of outer cell wall). Hilum conspicuous, marginal, in notch of seed, color of seedcoat, circular, 0.2-0.3 mm. in diameter, recessed. Embryo coiled, seen four times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit fleshy berry, 9-10 mm. in diameter, globose, brownish, glabrous, smooth, 50- to 120-seeded. Mature fruit entirely enclosed by a tight-fitting, pubescent, spiny, beaked, often adherent calyx.

Notes: Native of western United States and spreading eastward, in fields and waste areas. This plant is poisonous but seldom eaten because of spines that may cause mechanical injury to grazing animals. Fruit burs lower value of fleece. Ten States have designated this species as a noxious-weed seed. $2n=24$ (*15*).

Solanum torvum Swartz

(turkeyberry, terongan)



PN-3167

Solanum torvum Swartz, F. B. Gaffney 112, Maui, Hawaii, (US), seeds X 7.

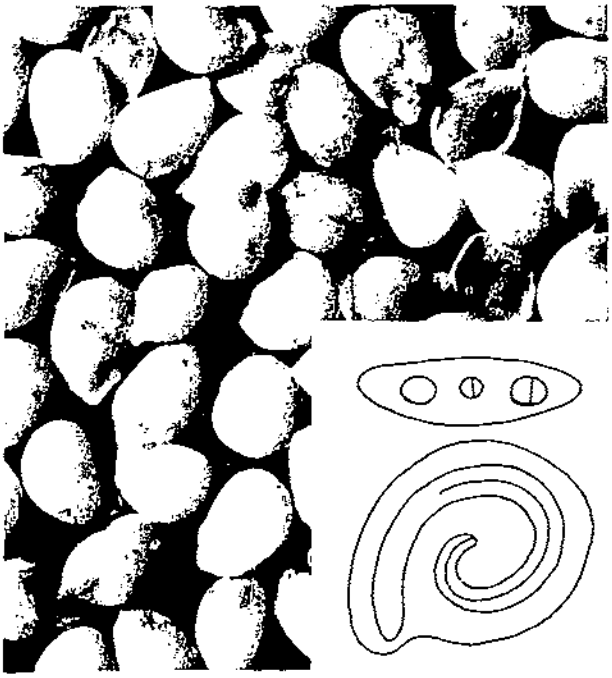
Seed 2-2.5 X 1.5-2 X 0.4-0.5 mm., obovate or infrequently C-shaped, strongly flattened, dull light to dark ocher, nearly smooth to faintly reticulate, reticulum discernible at 10 X with wavy, thin walls (30 X). Hilum conspicuous, subbasal, marginal, color of seedcoat, linear, 0.5-0.8 mm. long, flush to slightly recessed. Embryo linear, hippocrepiform, seen twice in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit fleshy berry, 11-13 mm. in diameter, globose, brown, glabrous, smooth, 210- to 220-seeded. Mature fruit naked.

Notes: Native of West Indies, established in swamps and along roadsides of southern Florida. Hawaii has declared this a noxious-weed seed. $2n=24$ (*15*).

Solanum triflorum Nutt.

(cutleaf nightshade)



PN-3168

Solanum triflorum Nutt., P. C. Standley 6911, San Juan Co., N. Mex., (US), seeds X 7.

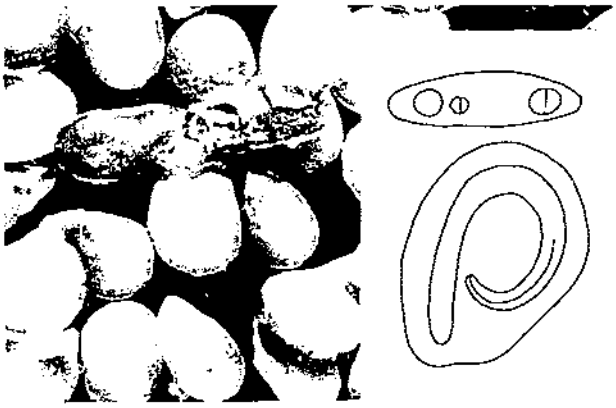
Seed 2-2.8 X 1.5-1.8 X 0.7-0.8 mm., obovate, strongly flattened, straw colored, reticulate, reticulum discernible at 10 X with wavy, thin walls (30 X). Hilum inconspicuous, subbasal, marginal, color of seedcoat to lighter, linear, 0.8-1 mm. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 6-15 mm. in diameter, globose, sublustrous, greenish, glabrous, smooth, 60- to 80-seeded, 10-15 sclerotic granules present. Mature fruit naked, subtended by somewhat enlarged, deeply five-lobed calyx.

Notes: Native of the Great Plains, now spread throughout United States and Canada in dry sandy soils along roadsides, streams, and waste areas. Fruits of this annual weed are poisonous (solanaceous alkaloids). Cutleaf nightshade berries are not easily separated from peas and if found in commercial pea-canning operations, the product is condemned for human consumption (*27*). $2n=24$ (*15*).

Solanum tuberosum L.

(potato, Irish potato)



PN-3169

Solanum tuberosum L., F. B. Gaffney 13, greenhouse grown, (US), seeds X 7.

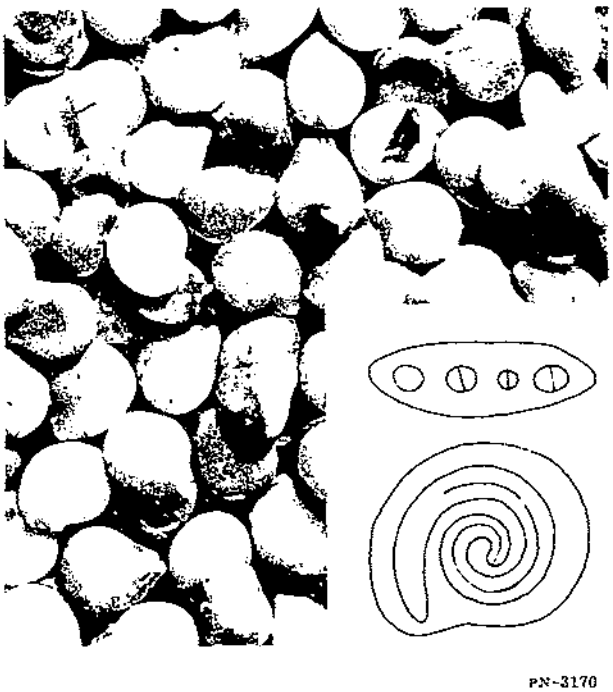
Seed 1.5-2.5 X 1.3-1.7 X 0.2-0.5 mm., obovate to oblong, strongly flattened, light brown, smooth to finely reticulate (30 X) with a small wing best developed around hilum. Hilum inconspicuous, subbasal (on wing), color of seedcoat, linear, 0.7-1 mm. long. Embryo linear, imbricate, seen three times in seed cross section. Inner margin of seedcoat appressed to endosperm. A small wing is usually present and best developed at base of seed.

Fruit juicy berry, 15-25 mm. in diameter, globose, lustrous, yellowish, glabrous, smooth, 300- to 500-seeded. Mature fruit naked.

Notes: Native of temperate Andes (Peru and Bolivia), now introduced throughout temperate world as a major food crop, rarely escaped from cultivation in United States. U.S. statistics for 1969: 568,620 hectares yielding 24,530 kg. per hectare, with a total value of $616,320,000 (*39*). Most cultivars are partially sterile, therefore seldom set fruit. Though potato is a major human food, vines, sprouts, peelings, or sunburned or spoiled potatoes may be poisonous to livestock and humans. Sprouts and sungreened peels of tubers are especially high in solanine, the poisonous principle. Toxicity of spoiled potatoes may be caused by bacteria and fungi. Ordinarily edible tubers contain about 0.009 percent solanine (peelings contain a higher percentage). A 0.04 percent solanine level is associated with poisoning (*27*). Additional information about potatoes and their relatives may be found in Correll (*9, 10*) and Hawkes and Hjerting (*19*). $2n$=24, 36, 72, 96 (*15*).

Solanum villosum Mill.

(hairy nightshade)



PN-3170

Solanum villosum Mill., L. C. Wheeler 3994, Modoc Co., Calif., (US), seeds X 7.

Seed 1.5-2.2 X 1.4-1.6 X 0.5-0.6 mm., C-shaped to obovate, some seeds slightly bent, strongly flattened, light to greenish ocher, reticulate, reticulum discernible at 10 X with wavy, thin walls (30 X). Hilum inconspicuous, subbasal, marginal, color of seedcoat, linear, 0.2-0.3 mm. long. Embryo linear, coiled, seen four times in seed cross section. Inner margin of seedcoat appressed to endosperm.

Fruit juicy berry, 5-6 mm. in diameter, globose, yellow or red, 20- to 30-seeded. Mature fruit naked.

Notes: Native of Eurasia, locally established over most of United States. Resembling *S. americanum*, hairy nightshade is found in waste areas and along railroad tracks. Plants contain toxic solanaceous alkaloids (*27*). $2n$=48 (*15*).

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COMMON NAME INDEX

American black nightshade	*Solanum americanum* L.
angel's wings	*Schizanthus pinnatus* Ruiz & Pav.
angel-trumpet	*Datura meteloides* Dunal
apple-of-Peru	*Nicandra physalodes* (L.) Gaertn.
belladonna	*Atropa belladonna* L.
black henbane	*Hyoscyamus niger* L.
black nightshade	*Solanum nigrum* L.
bladder-cherry	*Physalis alkekengi* L.
buffalobur	*Solanum rostratum* Dunal
butterflyflower	*Schizanthus pinnatus* Ruiz & Pav.
cape-gooseberry	*Physalis peruviana* L.
capsicum pepper, chili pepper	*Capsicum annuum* L.
Chinese lantern	*Physalis alkekengi* L.
climbing nightshade	*Solanum dulcamara* L.
cockroachberry	*Solanum aculeatissimum* Jacq.
cocks-eggs	*Salpichroa origanifolia* (Lam.) Thellung
common petunia	*Petunia hybrida* Vilm.
cupflower	*Nierembergia hippomanica* Miers var. *coerulea* (Miers) Millan
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deadly nightshade	*Atropa belladonna* L.
devil's-apple	*Solanum aculeatissimum* Jacq.
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fly-poison plant	*Nicandra physalodes* (L.) Gaertn.
fringeflower	*Schizanthus pinnatus* Ruiz & Pav.
garden huckleberry, golden huckleberry	see Notes under *Solanum nigrum* L.
green pepper	*Capsicum annuum* L.
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hairy nightshade	*Solanum villosum* Mill.
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husk-tomato	*Physalis peruviana* L. *Physalis pubescens* L.
hybrid petunia	*Petunia hybrida* Vilm.
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jessamine	*Cestrum diurnum* L.
jimsonweed	*Datura stramonium* L.
Kansas thistle	*Solanum rostratum* Dunal
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matrimonyvine	*Lycium halimifolium* Mill.
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tabasco pepper	*Capsicum frutescens* L.
terongan	*Solanum torvum* Swartz
thornapple	*Datura stramonium* L.
tobacco	*Nicotiana tabacum* L.
tomato	*Lycopersicon esculentum* Mill.
trompillo	*Solanum elaeagnifolium* Cav.
turkeyberry	*Solanum torvum* Swartz

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wonderberry ..... see Notes under *Solanum nigrum* L.

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