

Fabae (19.01–19.05)

Genus: *Vicia* C. Linnaeus

Phylogenetic Number: 19.01.

Tribe: Fabae.

Species Studied—Species in Genus: 85 spp.—166 spp.

Fruit a legume; unilocular; $0.6\text{--}2.5 \times 0.2\text{--}3 \times 0.2\text{--}3$ cm; with persistent or deciduous calyx; with calyx shorter than fruit; without orifice formed by curving of fruit or fruit segments; straight to curved (to slightly curved); not plicate; not twisted; asymmetrical; linear, falcate, or rhombic; when asymmetrical with both sutures nearly straight; inflated (*V. faba*) or not inflated; compressed, terete, or flattened; without or with beak; straight; with solid beak the same color and texture as fruit; short tapered to tapered to rounded at apex; apex aligned or oblique (slightly) with longitudinal axis of fruit; short tapered to tapered to long tapered to rounded at base; base oblique or aligned with longitudinal axis of fruit; with the apex and base uniform in texture; coriaceous or leathery; seed chambers externally invisible or visible; with the raised seed chambers not torulose or torulose. Fruit margin not constricted or constricted; slightly constricted along both margins to constricted along both margins or slightly constricted only on 1 margin; without sulcus; plain. Fruit wings absent. Fruit nonstipitate or substipitate. Fruit with all layers dehiscent; splitting along sutures. Dehiscence of valves along both sutures; apical and down; active; with valves twisting (tightly or loosely). Replum invisible. Epicarp dull; monochrome; brown (various shades and in combination with other colors), tan, or black; glabrous or pubescent and indurate to pubescent but soon deciduous; with 1 type of pubescence; puberulent or pilose; with pubescence gray or golden; with simple or glandular hairs; pliable; with hair bases swollen or plain; glandular; with glandular hairs; without spines; not smooth; with elevated or recessed features; reticulately veined; not tuberculate or tuberculate; with solid tubercles (widely scattered) on each valve; pustulate (indurate bases of hairs) or tuberculate (scattered and rarely); occasionally punctate; not exfoliating; without cracks. Mesocarp thin; surface not veined; 1-layered; without balsamic vesicles; without fibers; solid; coriaceous. Endocarp dull; monochrome; tan; smooth; nonseptate (New World spp.) or septate (some Old World spp.); with septa thin (tissue paper-like), flexible

or thicker than paper, firm; chartaceous; not exfoliating; remaining fused to mesocarp and epicarp; entire. Seeds 1–16; length parallel with fruit length (without regard to hilum position in *V. faba*); neither overlapping nor touching or touching; in 1 series. Funiculus measured; up to 2 mm long; of 1 length only; thick or flattened; straight or S-curved. Aril absent or present (not a true aril, but an expanded funiculus); fleshy; expanded funiculus; covering less than 1/2 of seed; tan or white.

Seed 1.5–30.5 (without regard to hilum position in *V. faba*) $\times 1.4\text{--}17 \times 1.3\text{--}9$ mm; not overgrown; not angular or angular; asymmetrical or symmetrical; circular, oblong, ovate, quadrangular, or triangular; terete or compressed; without visible radicle and cotyledon lobes; with umbo on seed faces. Testa not adhering to endocarp; dull, glossy, or velvet; not modified or modified by a bloom; colored; monochrome or mottled and streaked; with frequent mottles; with frequent streaks; brown (including most shades and combinations with other colors), tan (reddish, greenish), or black (purplish); with black, brown (including most shades and combinations with other colors), or red overlay; glabrous; smooth or not smooth; with elevated features; tuberculate; osseous or coriaceous. Fracture lines absent. Rim absent. Wings absent. Raphe not visible. Hilum visible, partially concealed, or fully concealed; concealed by funiculus, funicular remnant, or aril; with faboid split; with the lips of the faboid split lighter colored than the rest of the hilum and therefore conspicuous or the same color as the rest of the hilum; larger than punctiform or punctiform; 0.3–12 mm long; with curved, angular, or straight outline; circular, wedge-shaped, linear, or oblong; marginal according to radicle tip; flush; not within corona, halo, or rim or within halo. Hilum halo color lighter than testa. Lens discernible or not discernible; equal to or greater than 0.5 mm or less than 0.5 mm in length; 0.7–4 mm long; with margins straight or curved; irregular, linear, or circular; not in groove of raphe; adjacent to, confluent with, 180 degrees from, or 270 degrees from hilum; up to 13 mm from hilum (longest distances in *V. faba*); mounded; dissimilar color from, similar color to, or same color as testa; darker than testa; black, brown, or tan; not within corona, halo, or rim. Endosperm thin; covering entire embryo; adnate to testa (enclosing radicle in sheath). Cotyledons smooth; both outer faces convex; both the same thickness; both more or less of equal length; not folded; margin entire 180 degrees from base of radicle; similar at apex; not concealing radicle; split over radicle; with lobes; with lobes not touching; with the

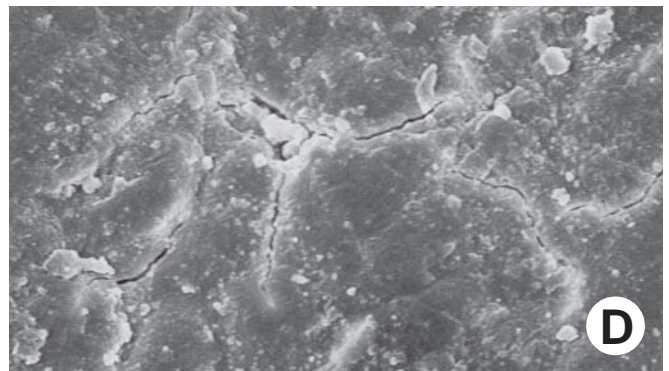
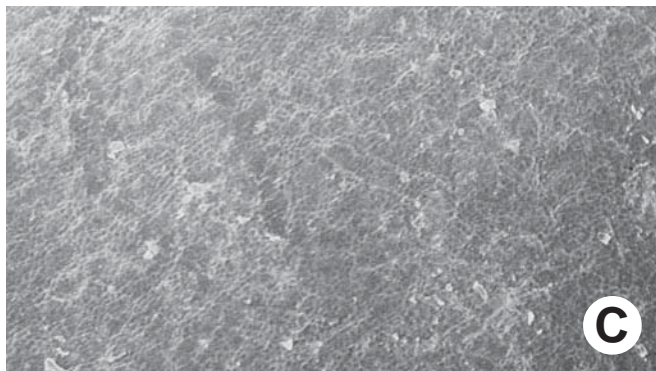
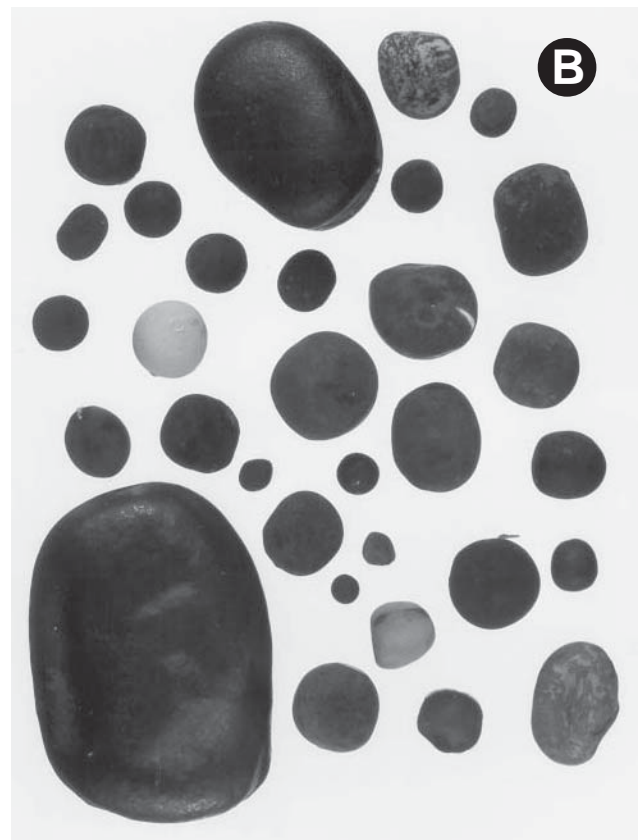
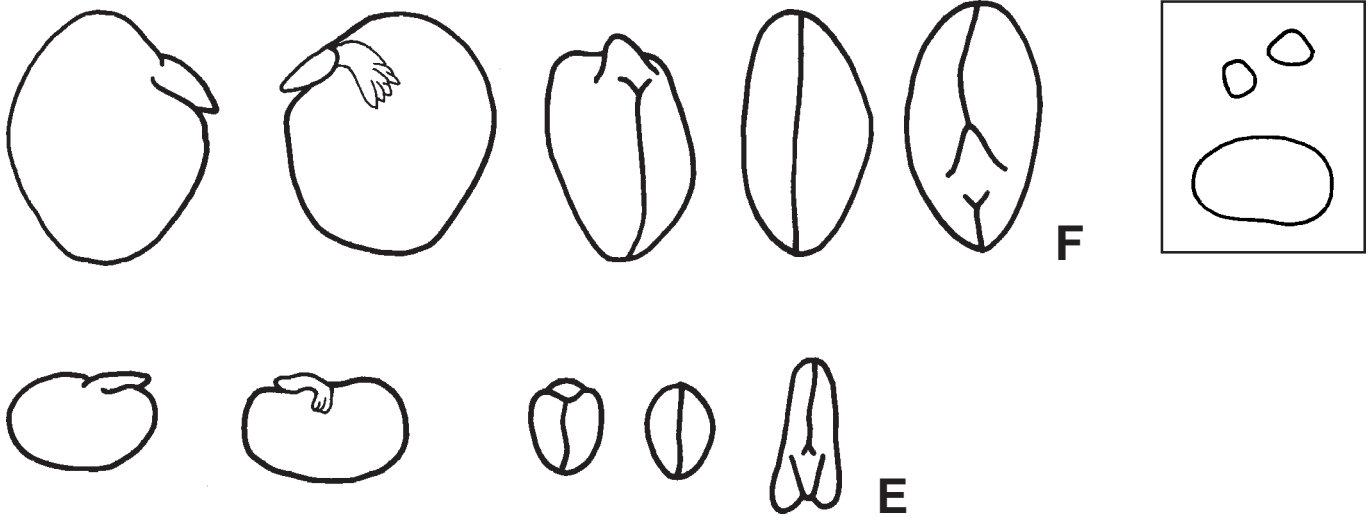
interface division terminating at base of radicle; without margins recessed; white or yellow; inner face flat; glabrous around base of radicle. Embryonic axis deflexed; oblique to length of seed. Radicle triangular; deflexed and parallel to cotyledon length or width; centered between cotyledons; less than 1/2 length of cotyledons. Plumule well developed; glabrous.

Distribution: North and South America, Europe, Canary Islands, North and East Africa, Asia, and Hawaii.

Notes: This tribe has traditionally been called Viciae.

Article 19.4 of the *International Code of Botanical Nomenclature* (Greuter et al. 1994) states that, "The name of any subdivision of a family that includes the type of the adopted, legitimate name of the family to which it is assigned is to be based on the generic name equivalent to the type." *Faba* P. Miller is the type of Fabaceae and is synonymous with *Vicia*. Therefore because *Faba* is included in this tribe, the tribe must be called Fabeae. After performing a cladistic analysis using morphological characters, including internal seed morphology, Endo and Ohashi (1997) proposed that Cicereae (20) and Fabeae (Viciae) formed a monophyletic group whose sister group is Trifolieae (21). Kupicha (1976) treated, for the first time, *Vicia* on a worldwide basis. She recognized two subgenera and twenty-two sections, and some fruit and seed characters have value as sectional characters. Maxted (1993, 1995) revised *Vicia* subgen. *Vicia* and proposed nine sections and nine series. He distinguished *Vicia* sect. *Hypechusa* (F.G.C. Alefeld) P.F.A. Acherson & K.O.R.P.P. Graebner by its seed characteristics and revised the section with Colin Douglas (Maxted and Douglas 1997), recognizing two series, 14 species, and six subspecies in the section. Potokina (1997) revised the *V. sativa* aggregate for the former U.S.S.R. Like *Lens* (19.03) and *Pisum* (19.04), a few species of *Vicia*, such as *V. faba* and *V. ervilia* (C. Linnaeus) C.L. von Willdenow, appeared "in the Neolithic and Bronze Age cultures in the Near East and Europe" (Zohary and Hopf 1973). Hermann (1960) treated the genus in the United States; Gunn (1979) treated the genus in Mexico and Central America; Lassetter and Gunn (1979) monographed *V. menziesii* C.P.J. Sprengel, a native species of the island of Hawaii; and Bastos and Miotto (1996) revised the native Brazilian species of *Vicia*. Gunn (1970a,b, 1971) and Žertová (1962) studied the seed morphology of *Vicia*, and Gunn (1968) provided a key and diagrams for the seeds of 100 species of *Vicia*. *Vicia sativa* subsp. *amphicarpa* (C. Linnaeus) J.A. Battandier produces both aerial and subterranean fruits.

Vicia: *V. faba* C. Linnaeus (*C–E*), *V. sativa* C. Linnaeus (*F*),
V. spp. (*A–B*). *A*, Fruits (intact and dehisced) ($\times 1.1$);
B, seeds ($\times 2.4$); *C–D*, testa ($\times 50$, $\times 1000$); *E*,
embryos ($\times 1$); *F*, embryos ($\times 5$).



Genus: *Lathyrus* C. Linnaeus

Phylogenetic Number: 19.02.

Tribe: Fabaeae.

Species Studied—Species in Genus: 75 spp.—161 spp.

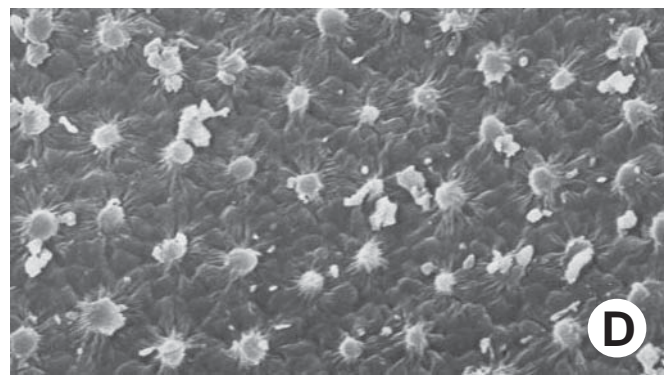
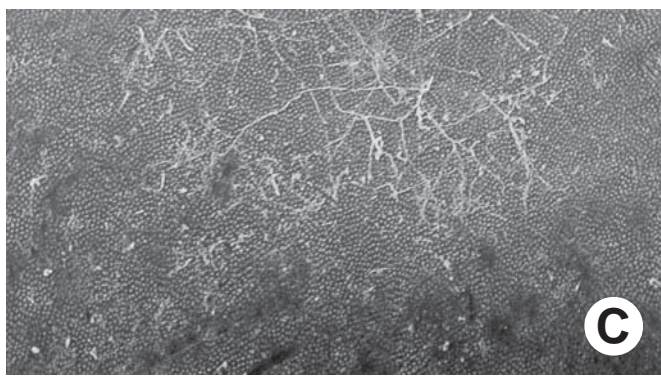
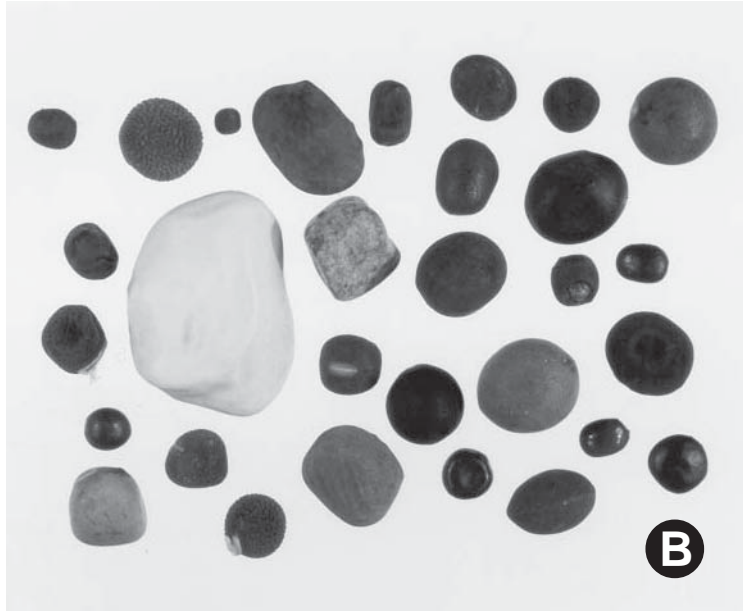
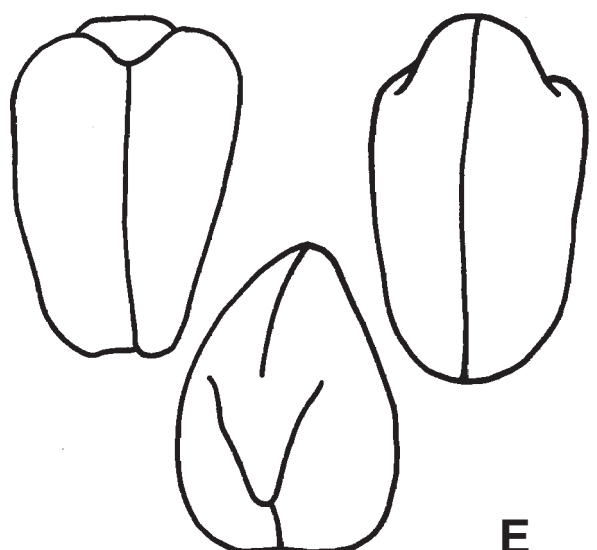
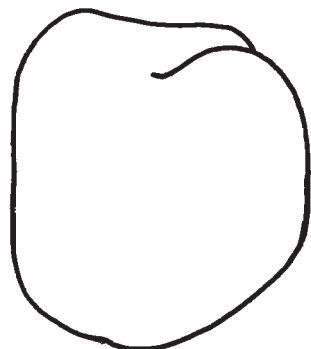
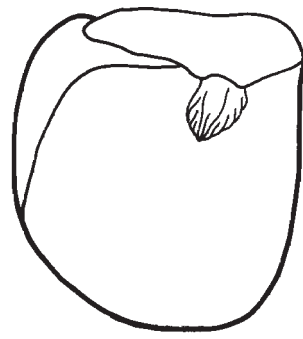
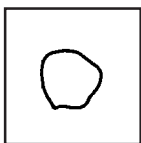
Fruit a legume; unilocular; 2.5–10 × 0.2–1 × 0.15–0.4 cm; with deciduous calyx; without orifice formed by curving of fruit or fruit segments; straight or curved (slightly); not plicate; not twisted; asymmetrical or symmetrical; linear to rhombic (linear); when asymmetrical with both sutures nearly straight; not inflated; flattened or compressed; without beak; short tapered at apex; apex aligned or oblique with longitudinal axis of fruit; long tapered or short tapered at base; base aligned or oblique with longitudinal axis of fruit; with the apex and base uniform in texture; coriaceous, membranous, chartaceous, or ligneous (*L. lentiformis* U. Plitman); seed chambers externally visible (faintly to visible) or invisible; with the raised seed chambers not torulose or torulose. Fruit margin not constricted; without sulcus; plain or embellished. Fruit wings absent or present; sutural or valvular (occasionally); on both valves; on both sutures. Fruit nonstipitate or stipitate (infrequent, see *L. setifolius* C. Linnaeus). Fruit with all layers dehiscent or indehiscent (*L. lentiformis*); splitting along sutures. Dehiscence of valves along both sutures; apical and down; active; with valves twisting. Replum invisible. Epicarp dull; monochrome; reddish brown or tan; glabrous or pubescent and indurate; with hairs erect or appressed; with 1 type of pubescence; pilose; with pubescence gray; with simple hairs; pliable; with hair bases swollen or plain; glandular; with glandular hairs (*L. cassius* P.E. Boissier); without spines; not smooth; with elevated features; reticulately veined; not tuberculate; papillose (*L. hirsutus* C. Linnaeus) or glandular dotted (section *Orobus* (C. Linnaeus) J.G. Baker); not exfoliating; without cracks. Mesocarp thin; surface not veined; 1-layered; without balsamic vesicles; without fibers; solid; coriaceous or chartaceous. Endocarp dull; monochrome; tan; smooth; nonseptate or septate; with septa thin (tissue paper-like), flexible; with septa eglandular; chartaceous; not exfoliating; remaining fused to mesocarp and epicarp; entire. Seeds 1–25; length parallel with or transverse to fruit length; touching; in 1 series. Funiculus less than 0.5 mm long; of 1 length only; thick; straight. Aril absent (funiculus may be expanded and remain over hilum and is not an aril).

Seed 1.5–10 × 1.5–10 × 1.3–7 mm; not overgrown; not angular or angular; symmetrical or asymmetrical (with or without dents because of adjacent seed pressures); oblong, circular (to subcircular), rectangular, quadrangular, triangular (compressed), or irregular (angular); terete or compressed (rarely); without visible radicle and cotyledon lobes; without umbo on seed faces. Testa not adhering to endocarp; dull or glossy; not modified or modified by a bloom; colored; monochrome or mottled; with frequent mottles; brown (diverse shades and in combinations with other colors), black (with or without purplish tinge), or tan; with brown (blackish) overlay; glabrous; smooth or not smooth; with elevated features; tuberculate (either aligned or not in rows or united into short ridges or not) or wrinkled (faintly); coriaceous. Fracture lines absent. Rim absent. Wings absent. Raphe not visible or visible; from hilum through lens and base of seed to point opposite hilum; not bifurcating; darker than testa; black (color of mottles). Hilum visible, partially concealed, or fully concealed; concealed by funiculus or funicular remnant; with faboid split; with the lips of the faboid split lighter colored than the rest of the hilum and therefore conspicuous; larger than punctiform; up to 5 mm long; with curved, angular, or straight outline; circular, elliptic, wedge-shaped, oblong, or linear; subapical or marginal according to radicle tip; flush or recessed; not within corona, halo, or rim (though some species with light colored seeds with mottles concentrated around hilum somewhat like a necklace). Lens discernible; less than 0.5 mm or equal to or greater than 0.5 mm in length; up to 1.5 mm long; with margins straight or curved; oblong, linear, triangular, rhombic, or circular; not in groove of raphe; adjacent to or confluent with hilum; touching to 1 mm from hilum; mounded or recessed; dissimilar color from testa; darker than testa; reddish brown, black, or red; not within corona, halo, or rim. Endosperm absent or present; thin; covering entire embryo; adnate to testa (but enclosing radicle). Cotyledons not smooth; both outer faces convex; both the same thickness or 1 thicker than the other; both more or less of equal length; not folded; margin entire 180 degrees from base of radicle; similar at apex; not concealing radicle; entire over radicle; without lobes; with the interface division terminating at base of radicle; without margins recessed; tan; inner face flat; glabrous around base of radicle. Embryonic axis deflexed; oblique to length of seed. Radicle linear or bulbous; deflexed and parallel to cotyledon width; centered between cotyledons; less than 1/2 length of cotyledons. Plumule well developed; glabrous.

Distribution: North and South America; Europe; North, East, and tropical Africa; and Asia.

Notes: Kupicha (1983) classified the Old World and New World species and recognized 13 sections. Asmussen and Liston (1998) conducted cladistic analyses of 42 *Lathyrus* species from 12 of Kupicha's sections using chloroplast DNA. Their results indicated that *Lathyrus* should be organized in 6–8 sections, not 13. Hitchcock (1952) monographed the North American species. Bässler (1966, 1971, 1981) studied some of the Old World species, and Hung-Pin (1984) extended his studies to China. Butler (1986) investigated the testa of *Lathyrus* using the scanning electron microscope, and her results are published in the Kaul and Combes (1986) book "*Lathyrus* and Lathyrism." Lathyrism is an animal expression of the toxic components of *Lathyrus* species, especially *L. sativus*. Several species produce aerial and subterranean fruits; for example, *L. amphicarpos* C. Linnaeus and *L. ciliolatus* K. H. Rechinger. Kupicha discussed the fruits of *Lathyrus* and illustrated their external variations in a full-page plate. The drawing of *L. lentiformis* fruit is especially interesting (fig. 5, k). Kupicha also recorded the relative hilum lengths for the 13 sections. The number of species is from Asmussen and Liston (1998).

Lathyrus: *L. sativus* C. Linnaeus (*C-E*), *L. spp.* (*A-B*). *A*,
Fruits (intact and dehisced) ($\times 1$); *B*, seeds ($\times 2.3$);
C-D, testa ($\times 50$, $\times 1000$); *E*, embryos ($\times 5$).



Genus: *Lens* P. Miller

Phylogenetic Number: 19.03.

Tribe: Fabaeae.

Species Studied—Species in Genus: 2 spp.—6 spp.
(Maxted, personal communication, 1998).

Fruit a legume; unilocular; $0.9\text{--}1.6 \times 0.4\text{--}1.2 \times 0.15\text{--}0.2$ cm; with persistent or deciduous calyx; with calyx shorter than fruit; without orifice formed by curving of fruit or fruit segments; straight; not plicate; not twisted; asymmetrical; oblong; when asymmetrical with both sutures nearly straight; not inflated; compressed; without beak; short tapered at apex; apex aligned with longitudinal axis of fruit; short tapered at base; base oblique with longitudinal axis of fruit; with the apex and base uniform in texture; chartaceous; seed chambers externally visible or invisible; with the raised seed chambers not torulose. Fruit margin not constricted; without sulcus; plain. Fruit wings absent. Fruit substipitate. Fruit with all layers dehiscent; splitting along sutures. Dehiscence of valves along both sutures; apical and down; active or passive; with valves enrolling or twisting. Replum invisible. Epicarp dull; monochrome; reddish brown or tan; glabrous or pubescent and indurate; with 1 type of pubescence; puberulent; with pubescence gray; pliable; with hair bases plain; eglandular; without spines; not smooth; with elevated features; reticulately veined; not tuberculate; not exfoliating; without cracks. Mesocarp thin; surface not veined; 1-layered; without balsamic vesicles; without fibers; solid; chartaceous. Endocarp dull; monochrome; tan; smooth; nonseptate; chartaceous; not exfoliating; remaining fused to mesocarp and epicarp; entire. Seeds (1–)2; length parallel with fruit length; neither overlapping nor touching; in 1 series. Funiculus measured; 1 mm long; of 1 length only; filiform; straight. Aril absent (funiculus dilated).

Seed $3\text{--}8 \times 3\text{--}8 \times 1.5\text{--}3$ mm; not overgrown; not angular; symmetrical; circular; compressed; without visible radicle and cotyledon lobes; without umbo on seed faces. Testa not adhering to endocarp; dull; colored; monochrome or mottled and streaked (mainly streaks); with frequent mottles; with frequent streaks; reddish brown or tan (cream); with black overlay; glabrous; smooth; coriaceous. Fracture lines absent. Rim absent. Wings absent. Raphe not visible. Hilum visible; with faboid split; with the lips of the faboid split lighter colored than the rest of the hilum and therefore con-

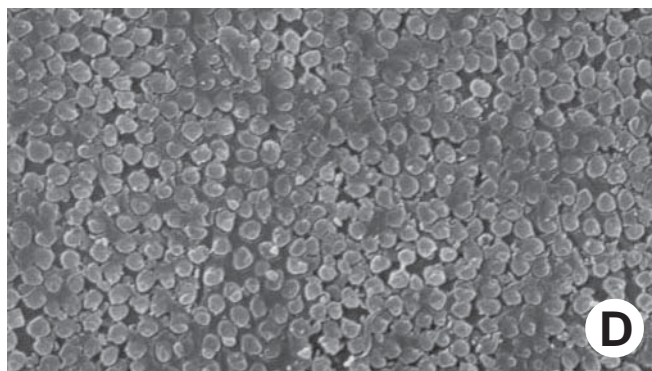
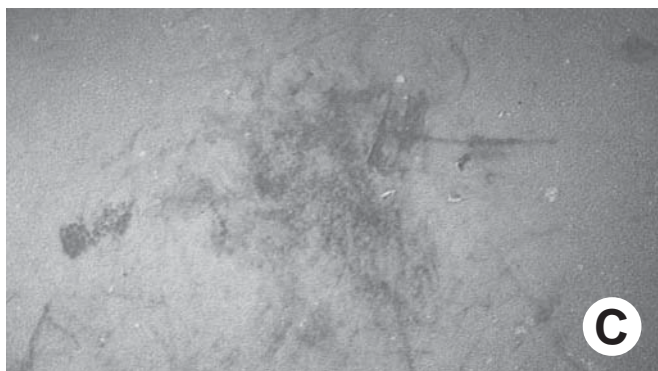
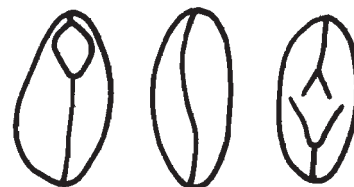
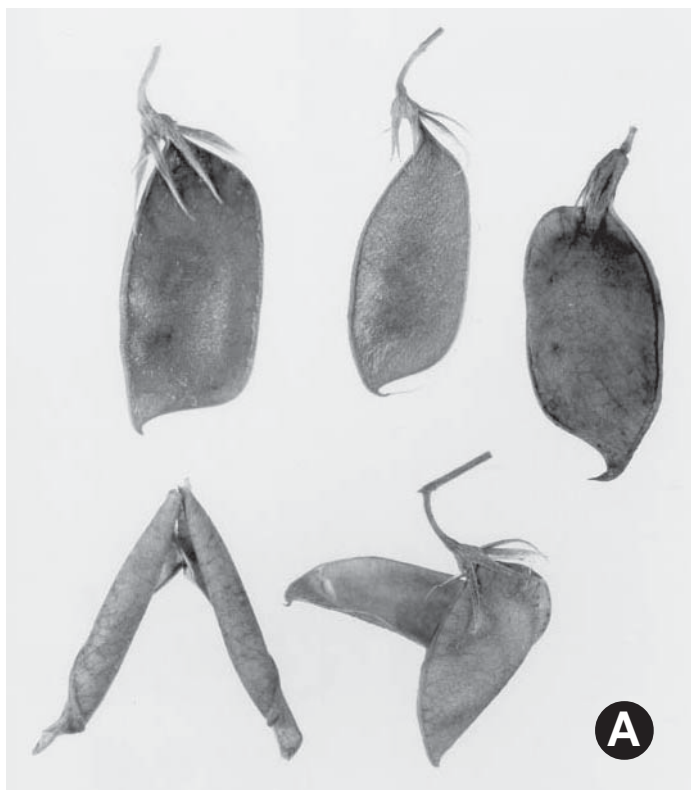
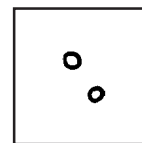
spicuous; larger than punctiform; 1–1.5 mm long; with straight outline; linear; marginal according to radicle tip; flush; not within corona, halo, or rim. Lens discernible; equal to or greater than 0.5 mm to less than 0.5 mm in length; 0.3–0.7 mm long; with margins straight or curved; linear or circular; not in groove of raphe; adjacent to hilum; 0.5–1.2 mm from hilum; mounded; dissimilar color from testa; darker than testa; black; not within corona, halo, or rim. Endosperm trace; restricted to region of embryo (around radicle area); adnate to testa. Cotyledons smooth; both outer faces convex; both the same thickness; both more or less of equal length; not folded; margin entire 180 degrees from base of radicle; similar at apex; not concealing radicle; split over radicle; with lobes; with lobes not touching; with the interface division terminating at base of radicle; without margins recessed; white, yellow, or orange; inner face flat; glabrous around base of radicle. Embryonic axis deflexed; oblique to length of seed. Radicle linear; deflexed and parallel to cotyledon length (more or less); centered between cotyledons; less than 1/2 length of cotyledons. Plumule well developed; glabrous.

Distribution: Mediterranean region, West and Central Asia, Ethiopia, and Zaire, and now widely cultivated.

Notes: The number of species in this genus has been open to question for many years. Most authors recognized the cultivated and commercially important lentil, *L. culinaris* F.C. Medikus. In the past, at least three wild species have been recognized. Ladizinsky et al. (1984), using extensive crossability and cytological studies, recognized one additional species, *L. nigricans* (F.A. Marchall von Bieberstein) D.A. Godman. The two other often recognized species of *Lens*, *L. ervoides* and *L. orientalis* (P.E. Boissier) H. Handel-Mazzetti, are now *L. nigricans* subsp. *ervoides* (G. de Brignoli di Brunnhoff) G. Ladizinsky and *L. culinaris* subsp. *orientalis* (P.E. Boissier) B.S. Williams, respectively. The fifth species, *L. montbretii* (F.E.L. von Fischer & C.A.A. von Meyer) P.H. Davis & U. Plitmann, had been assigned to *Lens* (Barulina 1930, Davis and Plitmann 1970), but Ladizinsky and Sakar (1982) provided morphological and karyological data suggesting that this species be returned to *Vicia* (19.01) where it was originally placed as *V. montbretii* (Hoffman et al. 1986). Ladizinsky (1997) described a new species of *Lens* from southeastern Turkey, *L. tomentosus* G. Ladizinsky, using evidence from morphological, crossing, and cpDNA studies. Our species count of five follows the count of Maxted (personal communication,

1998) for this genus. The history of *L. culinaris* extends as far back as agriculture itself. Like *Pisum* (19.04), *Lens* has been closely associated with grain cultivation in the Near East (Zohary and Hopf 1973).

Lens: *L. ervoides* (G. de Brignoli di Brunnhoff) L. Grande (C-E), *L. spp.* (A-B). A, Fruits (intact and dehisced) ($\times 3.9$); B, seeds ($\times 4.9$); C-D, testa ($\times 50$, $\times 1000$); E, embryos ($\times 8$).



Genus: *Pisum* C. Linnaeus

Phylogenetic Number: 19.04.

Tribe: Fabaeae.

Species Studied—Species in Genus: 2 spp.—2 spp.

Fruit a legume; unilocular; 3–12 × 0.8–2.5 × 0.25–0.5 cm; with persistent calyx; with calyx shorter than fruit; without orifice formed by curving of fruit or fruit segments; straight or curved (slightly); not plicate; not twisted; asymmetrical; oblong or linear; when asymmetrical with both sutures nearly straight or both sutures parallelly curved; not inflated or inflated; terete or compressed; without beak; short tapered at apex; apex aligned with longitudinal axis of fruit; long tapered at base; base aligned with longitudinal axis of fruit; with the apex and base uniform in texture; coriaceous; seed chambers externally invisible or visible; with the raised seed chambers not torulose. Fruit margin not constricted; without sulcus; plain. Fruit wings absent. Fruit nonstipitate. Fruit with all layers dehiscent; splitting along sutures. Dehiscence of valves along both sutures; apical and down; active; with valves twisting. Replum invisible. Epicarp dull; monochrome; brown, yellow, or green; glabrous; eglandular; without spines; not smooth; with elevated features; reticulately veined; not tuberculate; not exfoliating; without cracks. Mesocarp thin; surface not veined; 1-layered; without balsamic vesicles; without fibers; solid; coriaceous. Endocarp dull; monochrome; brown; smooth; nonseptate; chartaceous; not exfoliating; remaining fused to mesocarp and epicarp; entire. Seeds up to 10; length parallel with fruit length; touching; in 1 series. Funiculus less than 0.5 mm long; of 1 length only; thick; straight. Aril absent (funiculus dilated at apex).

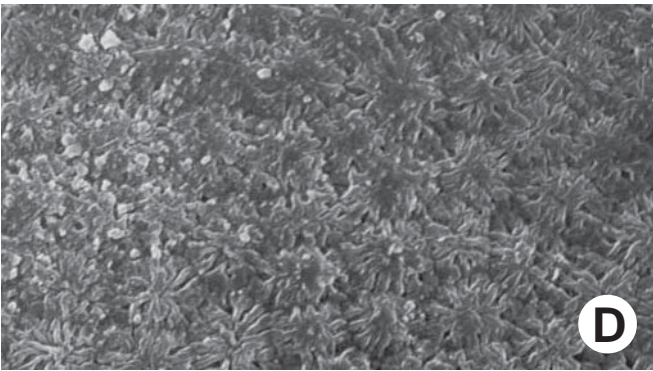
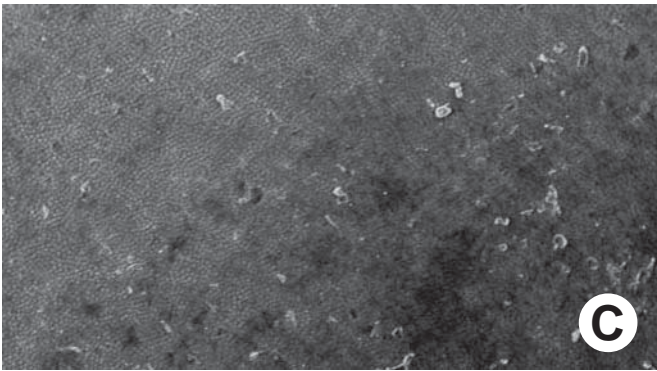
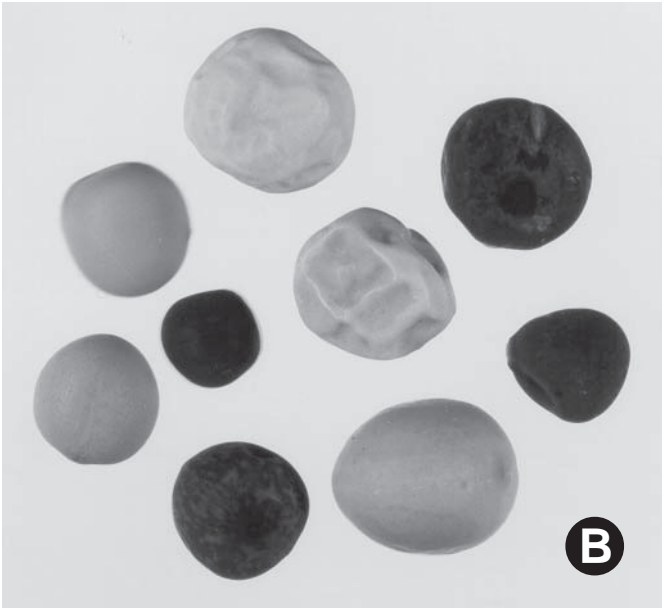
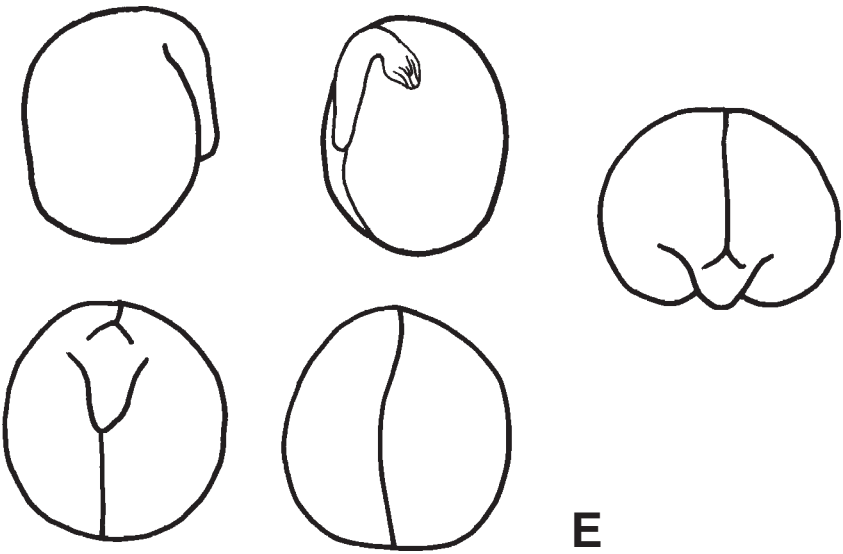
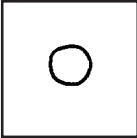
Seed 3.7–9 × 3.7–9 × 3.7–7 mm; not overgrown; angular or not angular; symmetrical or asymmetrical; circular or irregular (angular); terete; without visible radicle and cotyledon lobes; without umbo on seed faces. Testa not adhering to endocarp; dull; not modified or modified by a bloom; colored; monochrome or mottled and streaked; with frequent mottles; with frequent streaks; dark or dark reddish brown, tan (to greenish), red, or green; with brown (dark reddish) overlay; glabrous; smooth or not smooth; with elevated features; rugose, tuberculate (minutely), or wrinkled; chartaceous or coriaceous. Fracture lines absent. Rim absent. Wings absent. Raphe not visible. Hilum visible or partially concealed; concealed by funicular remnant; with faboid

split; with the lips of the faboid split the same color as the rest of the hilum or lighter colored than the rest of the hilum and therefore conspicuous; larger than punctiform; 1.6–2.1 mm long; with curved outline; elliptic; marginal according to radicle tip; flush; not within corona, halo, or rim. Lens discernible; equal to or greater than 0.5 mm in length; 1–2 mm long; with margins curved; circular or elliptic; not in groove of raphe; adjacent to hilum; 1.5–2 mm from hilum; mounded; dissimilar color from testa; darker than testa; black, brown, or tan; not within corona, halo, or rim. Endosperm thin; covering entire embryo (and forming sheath around radicle); adnate to testa. Cotyledons smooth; both outer faces convex; both the same thickness; both more or less of equal length; not folded; margin entire 180 degrees from base of radicle; similar at apex; not concealing radicle; split over radicle; with lobes; with the interface division terminating at base of radicle; without margins recessed; white or tan; inner face flat; glabrous around base of radicle. Embryonic axis deflexed; oblique to length of seed. Radicle bulbous; deflexed and parallel to cotyledon length; centered between cotyledons; 1/2 to nearly length of cotyledons. Plumule well developed; glabrous.

Distribution: Mediterranean region and now widely cultivated.

Notes: The past literature on the genus *Pisum* is replete with numerous scientific names used at various taxonomic levels because of the intense breeding of the pea, *P. sativum*, a major crop. Currently only two species of *Pisum* are recognized, and the other species is *P. fulvum* J. Sibthorp & J.E. Smith. *Pisum fulvum* can have both aerial and subterranean fruits. *Pisum sativum* was cultivated in “early Neolithic farming villages of the Near East (7,000 to 6,000 B.C.)” (Zohary and Hopf 1973).

Pisum: *P. sativum* C. Linnaeus subsp. *elatius* (C. von Steven ex F.A.M. von Bieberstein) P.F.A. Ascherson & K.O.R.P.P. Graebner (*C–E*), *P. spp.* (*A–B*). *A*, Fruits (× 0.6); *B*, seeds (× 3); *C–D*, testa (× 50, × 1000); *E*, embryos (× 5).



Genus: *Vavilovia* A.A. Fedorov

Phylogenetic Number: 19.05.

Tribe: Fabaeae.

Species Studied—Species in Genus: 1 sp.—1 sp.

Fruit a legume; unilocular; $1.5\text{--}3.5 \times 0.8\text{--}0.9 \times 0.8\text{--}0.9$ (assumed) cm; with persistent calyx; with calyx shorter than fruit; without orifice formed by curving of fruit or fruit segments; straight; not plicate; not twisted; asymmetrical; linear; when asymmetrical with both sutures nearly straight; not inflated; terete; without beak; rounded at apex; apex aligned with longitudinal axis of fruit; short tapered at base; base aligned with longitudinal axis of fruit; with the apex and base uniform in texture; coriaceous; seed chambers externally invisible. Fruit margin not constricted; without sulcus; plain. Fruit wings absent. Fruit nonstipitate. Fruit with all layers dehiscing; splitting along sutures. Dehiscence of valves along both sutures; apical and down; active; with valves enrolling. Replum invisible. Epicarp dull; monochrome; reddish brown or tan; glabrous; eglandular; without spines; not smooth; with elevated features; reticulately veined; not tuberculate; not exfoliating; without cracks. Mesocarp thin; surface not veined; 1-layered; without balsamic vesicles; without fibers; solid; coriaceous. Endocarp dull; monochrome; reddish brown or tan; smooth; nonseptate; chartaceous; not exfoliating; remaining fused to mesocarp and epicarp; entire. Seeds 2–5; length parallel with fruit length; neither overlapping nor touching; in 1 series. Funiculus less than 0.5 mm long; of 1 length only; thick; straight. Aril absent.

Seed $4\text{--}5 \times 3.3\text{--}4 \times 1.7\text{--}2.7$ mm; not overgrown; not angular; symmetrical; oblong; compressed; without visible radicle and cotyledon lobes; without umbo on seed faces. Testa not adhering to endocarp; dull; not modified by a bloom; colored; monochrome or mottled; with frequent mottles; reddish brown; with black overlay; glabrous; smooth; chartaceous. Fracture lines absent. Rim absent. Wings absent. Raphe not visible. Hilum visible or partially concealed; concealed by funicular remnant; with faboid split; with the lips of the faboid split lighter colored than the rest of the hilum and therefore conspicuous; larger than punctiform; 0.7 mm long; with curved outline; elliptic; marginal according to radicle tip; flush; not within corona, halo, or rim. Lens faintly discernible or not discernible; less than 0.5 mm in length; with margins curved; circular;

not in groove of raphe; adjacent to hilum; 0.7 mm from hilum; mounded; dissimilar color from testa; darker than testa; black; not within corona, halo, or rim. Endosperm absent. Cotyledons smooth; both the same thickness; both more or less of equal length; not folded; margin entire 180 degrees from base of radicle; similar at apex; partially concealing radicle; entire over radicle; without lobes; with the interface division terminating at base of radicle; without margins recessed; brown; inner face flat; glabrous around base of radicle. Embryonic axis straight; almost perpendicular to length of seed; without a joint evident between the radicle and the cotyledons. Radicle differentiated from cotyledon; triangular; lobe tip straight; straight with embryonic axis; centered between cotyledons; less than 1/2 length of cotyledons. Plumule rudimentary; glabrous.

Distribution: Turkey, Lebanon, Iraq, Iran, Russia, Georgia, and Armenia.

Notes: *Vavilovia formosa* has been placed in *Orobus* C. Linnaeus (now *Lathyrus*, 19.02) and a segregate genus, *Alophotropis* (H.F. Jaubert & É. Spach) A.A. Grossheim, now a synonym of *Vavilovia*. We were unable to obtain an intact fruit, and our studied seeds were flattened during pressing.

Vavilovia: *V. formosa* (C. von Steven) A.A. Federov (A–E). A, Fruits (dehiscid) ($\times 3.1$); B, seeds ($\times 4$); C–D, testa ($\times 50$, $\times 1000$); E, embryos ($\times 8$).

