

Fabaceae Lindley
 (= Leguminosae A. L. de Jussieu)
 (Legume or Bean Family)

Herbs, shrubs, trees, or vines/lianas climbing by twining or tendrils; with a high nitrogen metabolism and unusual amino acids, often with root nodules containing nitrogen-fixing bacteria (Rhizobium); sometimes with secretory canals or cavities; tannins usually present; often with alkaloids; sometimes cyanogenic; sieve cell plastids with protein crystals and usually also starch grains. Hairs various. Leaves usually alternate, pinnately (or twice pinnately) compound, to palmately compound, trifoliolate, or unifoliolate; entire to occasionally serrate, with pinnate venation, occasionally leaflets modified into tendrils; pulvinus of leaf and individual leaflets well developed, and leaf axis and leaflets usually showing sleep movements; stipules present, inconspicuous to leaflike, occasionally forming spines. Inflorescences almost always indeterminate, sometimes reduced to a single flower, terminal or axillary. Flowers usually bisexual, radial to bilateral, with a short, usually cup-shaped hypanthium. Sepals usually 5, distinct to more commonly connate. Petals usually 5, distinct or connate, valvate or imbricate, all alike, or the uppermost petal differentiated in size, shape, or coloration (i.e., forming a banner or standard), and positioned internally or externally in bud, the 2 lower petals often connate or sticking together and forming a keel, or widely flaring. Stamens 1 to numerous, but usually 10, hidden by the perianth to long-exserted, and sometimes showy; filaments distinct to connate, then commonly monadelphous or diadelphous (with 9 connate and 1, the uppermost, ± distinct); pollen grains tricolporate, tricolpate, or triporate, usually borne in monads, but occasionally in tetrads or polyads. Carpel almost always 1, distinct, usually elongate and with a short gynophore; ovary superior, with

parietal placentation; style 1, arching upward, sometimes hairy; stigma 1, small. Ovules 1 to numerous per carpel, borne in 2 rows along an upper placenta, often campylotropous. Nectar usually produced by inner surface of hypanthium or an intrastaminal disk. Fruit usually a legume, sometimes a samara, loment, follicle, indehiscent pod, achene, drupe, or berry; seeds often with hard coat with hourglass-shaped cells, sometimes arillate, and sometimes with a U-shaped line (pleurogram); embryo usually curved; endosperm often lacking (Figures 8.66-8.68; Table 8.2).

Floral formula: X or $*$, $\overline{5}$, $\overline{5}$, $\overline{10-\infty}$, $\underline{1}$; legume

Distribution and ecology: Nearly cosmopolitan; the third largest family of angiosperms; occurring in a wide range of habitats.

Genera/species: 630/18,000. **Major genera:** *Astragalus* (2000 spp.), *Acacia* (1000), *Indigofera* (700), *Crotalaria* (600), *Mimosa* (500), *Desmodium* (400), *Tephrosia* (400), *Trifolium* (300), *Chamaecrista* (260), *Senna* (250), *Inga* (250), *Bauhinia* (250), *Adesmia* (230), *Dalbergia* (200), *Lupinus* (200), *Rhynchosin* (200), *Pithecellobium* (170), *Dalea* (150), *Lathyrus* (150), *Calliandra* (150), *Aeschynomene* (150), *Vicia* (140), *Albizia* (130), *Swartzia* (130), *Lonchocarpus* (130), *Caesalpinia* (120), *Lotus* (100), *Millettia* (100), and *Erythrina* (100). Over a hundred genera occur in Canada and/or the continental United States; some of these are listed in Table 8.2.

Figure 8.68 Fabaceae, subfamily Faboideae. *Vicia ludoviciana*: (A) tip of vine with flowers and fruits (x 0.3); (B) side view of flower bud (x 5); (C) flower (x 5); (D) banner petal (x 5); (E) inner surface of wing petal (x5); (F) inner surface of keel petal (x5); (G) keel seen from front (x5); (H) androecium with nine stamens fused and one ± free (x7); (I) gynoecium of one carpel (x 7); (J) young fruit, with one valve removed to show ovules (x 1.5); (K) mature legume (x 3); (L) dehisced legume (x 2.5); (M, N) seeds, note hilum half encircling seed (x 6); (O) seed in cross-section, note hilar region (dashed lines), and large embryo, cotyledon, and curved axis (x 8); (P) seedling. (From Wood 1974, *A student's atlas of flowering plants*, p. 60.)

