

BERBERIDACEAE BARBERRY FAMILY

Joseph E. Laferrière
 Marion Ownbey Herbarium
 Washington State University
 Pullman, WA 99164-4309

Perennial herbs, shrubs or small trees, glabrous or with unicellular hairs, occasionally glaucous. LEAVES mostly petiolate, alternate, simple, trifoliolate or odd-pinnate, persistent or deciduous, often spiny, mostly exstipulate. INFLORESCENCES 1-many-flowered, terminal or axillary, cymose, racemose, umbellate, or paniculate. FLOWERS actinomorphic, hypogynous, perfect, often involucrate; perianth 3(-5)-merous; sepals distinct, often petaloid, (4-)6(-many), in (1-)2(-4) series; petals free, (4-)6(-9), in 2(-3) series; stamens usually as many as and opposite petals (occasionally more), in (1-)2 series; filaments sometimes expanded; anthers 2-locular, longitudinally dehiscent, or sometimes with narrow laterally-hinged valves; carpels 2-3, united; ovary superior, 1-locular; placenta solitary, parietal or subbasal. FRUITS berries or indehiscent capsules. SEEDS oblong, straight to slightly curved, sometimes arillate. --Ca. 10-12 genera and approximately 600 spp., distributed throughout the N. Hemisphere and S. Amer. A single genus in Arizona.

Berberis L. Barberry

Shrubs or subshrubs; wood and inner bark yellow. LEAVES (in ours) odd-pinnate or trifoliolate, the leaflets thick, evergreen, spiny-toothed, more or less conspicuously reticulate-veined. INFLORESCENCES racemose to corymbose or umbellate, solitary in the leaf axils or in fascicles; ultimate branches of inflorescence (pseudopedicels) arising from the axils of a single bract; bracteoles 0-2, appressed to calyx or 0-1 cm below it. FLOWERS yellow; sepals 6 or 9, in 2 or 3 series; petals 6, in 2 series; stamens 6, in 2 series; filaments sometimes bearing 2 teeth at apex; anthers opening by 2 apical valves. FRUITS few-seeded berries. --Ca. 500 spp. widely distributed in Eurasia and the Western Hemisphere. All the Arizona species belong to the group often segregated as the genus *Mahonia* on the basis of compound leaves. Fruits of the members of this genus are edible and often made into jelly. Wood is used in folk medicine since it contains berberine, a compound with antimicrobial properties. A brilliant yellow dye has been obtained from roots and stems. Name apparently of Arabic origin.

1. Leaves trifoliolate; petiole unjointed.
 2. Leaflets lanceolate, the terminal one 1.5-2.0(-2.5) cm wide, in ours very glaucous and papillose (at 30X magnification); filaments not toothed; berries red *B. trifoliolata*
 - 2' Leaflets ovate, oblong, or elliptic, the terminal one 2.5-3.5 cm wide, epapillose, not or only slightly glaucous; filaments conspicuously bidentate at apex, with spurlike teeth; berries blue-black *B. harrisoniana*
- 1' Leaves odd-pinnate, usually with 5 or more leaflets; if trifoliolate then the ultimate leaflet stalked and the petiole jointed 1-5 mm above base.
 3. Inflorescences dense at anthesis; flowers more than 10 per raceme; leaves not or only slightly glaucous, the leaflets broadly oblong-ovate to nearly orbicular; berries ovoid or ellipsoid, blue-black and very glaucous when ripe.
 4. Vertical stems seldom more than 15 cm high; leaflet margin with 10 or more pairs of teeth *B. repens*
 - 4' Vertical stems generally more than 20 cm high; leaflet margin usually with fewer than 10 pairs of teeth *B. wilcoxii*
 - 3' Inflorescences open; flowers 10 or fewer per raceme; leaves glaucous; berries globose or nearly so, not or only slightly glaucous.

5. Berries yellow, red, or blue-black, sometimes becoming dry and more or less inflated at maturity; leaflets slightly glaucous, ovate or broadly oblong, the terminal one short-acuminate, seldom more than 2.5 cm long or more than twice as long as wide *B. fremontii*
- 5' Berries red, juicy; leaflets very glaucous, mostly lanceolate or oblong-lanceolate, the terminal one long-acuminate, commonly 3 or more cm long and 2-5 times as long as wide
..... *B. haematocarpa*

Berberis fremontii Torr. (for J. C. Frémont). --Shrubs to 3 m tall. LEAVES odd-pinnate, 3-10 cm long; leaflets (3-)5-7(-9), thick, rigid, ovate to lanceolate, slightly glaucous, dull gray-green, 10-25 mm long, 5-15 mm wide; veins obscure; teeth of leaflet margin 3-4(-6) pairs, 2-4 mm long, each tooth bearing a spine 1-3 mm long. INFLORESCENCES 3-10 flowered, racemose to subumbellate, 2-7 cm long; pseudopedicels (4-)8-12(-15) mm long; bracts 1-3 mm long; bracteoles 2, ovate, acute, reddish, 1.5 mm long, one appressed to the calyx, the other 4-6 mm below it. FLOWERS: sepals 6 or 9; outer sepals 0.50-1.75 mm long, ovate, subacute, whitish-yellow; inner sepals 6.5-7.0 mm long, obovate, rounded, slenderly clawed; petals 6, 3.5 mm long, the apices entire, the bases scarcely clawed or cuneate with oblong, acute, marginal glands; stamens 4 mm, subtruncate to slightly rounded; filaments with two lateral teeth at apex; ovules 5-8. FRUITS ovoid, yellow, red or blue-black, 1.5 cm long, sometimes becoming more or less dry and inflated at maturity, bearing sessile stigma. SEEDS ellipsoid, dull reddish-purple, 3 mm long. [*Mahonia fremontii* (Torr.) Fedde]. --Mts. of n and c AZ; Apache, Coconino, Gila, Mohave, Navajo, and Yavapai cos.; 1200-2150 m (4000-7000 ft); Apr-Jul; CA, CO, NM, UT.

Berberis haematocarpa Woot. (red-fruited). --Shrubs to 3 m tall. LEAVES odd-pinnate, 3-20 cm long; leaflets (3-)5-7, (if trifoliolate, then the ultimate leaflet stalked and the petiole jointed above base), thick, rigid, dull gray-green, very glaucous, narrowly oblong-ovate or oblong to lanceolate, sessile, 1.5-11 cm long; terminal leaflet longer than lateral ones, sessile or on a stalk up to 3 cm long; veins obscure; teeth of leaflet margin 2-4 pairs, 3-5 mm long, including a spine 1-2 mm long. INFLORESCENCES openly umbellate-racemose, 5-7-flowered; pseudopedicels 1-2 cm long; bracts 1-3 mm long; bracteoles 2, 1-2 mm long, both appressed to the calyx, or one appressed to the calyx, the other 0.5-1.0 cm below it. FLOWERS: sepals 9; outer sepals 4-6 mm long, broadly ovate; median and inner sepals 3-5 mm long, obovate; petals obovate, 2-4 mm long; stamens 3 mm long; filaments bearing two lateral teeth at apex. FRUITS ovoid-globose, red, estylose, 7-8 mm long. SEEDS ellipsoid to clavate, purple, 3-4 mm long. [*Mahonia haematocarpa* (Woot.) Fedde]. --Slopes and mesas: all cos. except Apache and Navajo; 900-1500 (-2300) m (3000-5000 [-7500] ft); Feb-May; NM, TX; Chih., Son., Mex.

Berberis harrisoniana Kearney & Peebles (for G. J. Harrison). --Shrubs 50-100 cm tall. LEAVES trifoliolate, 4-9 cm long; petiole 1-4 cm long; leaflets oblong, elliptic, ovate or obovate, sessile, coriaceous, light green but usually not very glaucous, scarcely paler below, 2.5-5.0 cm long, 2.0-3.5 cm wide; veins prominent; teeth of leaflet margin 1-2(-3) pairs, triangular to attenuate, 6-20 mm long, each bearing a spine. INFLORESCENCES 2-4 cm long, corymbiform to racemose, 3-10-flowered; bracts green, acuminate, ovate to rhombic, 1.0-2.0 mm long; bracteoles 2, opposite or with one appressed to calyx and the other 2-4 mm below it, ovate to lanceolate, 1.0-1.5 mm long. FLOWERS: sepals 9; outer sepals ovate, 1.5-2.0 mm long; middle sepals broadly ovate to lanceolate, 2.0-2.5 mm long; petals and inner sepals 6 mm long; stamens 2.5-3.0 mm long; filaments bearing 2 lateral spur-like teeth at apex. FRUIT globose to subglobose, black to dark blue, subglaucous, 5-6 mm long. SEEDS reddish-brown, fusiform, 3-5 mm long. --Mtn. canyons: Kofa Mts., La Paz and Yuma cos., and Ajo Mts., Pima Co.; 750-1050 m (2500-3500 ft); Feb-Mar; apparently endemic to AZ.

Berberis repens Lindl. (creeping). --Shrubs, stoloniferous, with vertical stems to 15 cm tall. LEAVES odd-pinnate, 15-30 cm long, dull above, papillose and paler green below; leaflets (3-)5-7, ovate, subequal, 20-75 mm long; bases rounded or subcordate, often asymmetrical; apices rounded or obtuse, rarely subacute; veins prominent; teeth of leaflet margin 6-10 pairs. INFLORESCENCES racemose, 5-8 cm long, (10-)15-

30-flowered; racemes 3-7 per leaf axil; pseudopedicels 5-8(-11) mm long; bracts 1.5 mm long; bracteoles absent. FLOWERS: outer sepals ovate, 2 mm long; median sepals oblong, 3-5 mm long; inner sepals obovate, 6-8 mm long; petals oblong-obovate, 5-7 mm long, the apices deeply incised with two acute lobes; filaments bearing 2 lateral teeth at apex. FRUITS globose, pruinose, blue, 8-9 mm long, 6-9 mm wide. SEEDS reniform, shiny, reddish-brown, 5-7 mm long. [*Mahonia repens* (Lindl.) G. Don.]. --Coniferous forests: Apache, Coconino, Gila, Graham, Greenlee, Navajo, and Yavapai cos.; 1500-2600 m (5000-8500 ft); Apr-Jun; WY and British Columbia, s to CA and NM.

Berberis trifoliolata Moric. (three-leaflets). --Shrubs 1.0-2.5 m tall. LEAVES trifoliolate, 3-8 cm long; leaflets narrowly lanceolate, attenuate, thick, rigid, 2-6 cm long; veins obscure; teeth of leaflet margin (0-)1-2(-3) pairs, 2.5-7 mm long including spine 1-2 mm long. INFLORESCENCES racemose, (1-)3-6-flowered, 1.0-2.5(-4) cm long; racemes 1-4 per leaf axil; pseudopedicels 5-8 mm long; bracts 1.0-2.0 mm long; bracteoles 2, opposite, appressed to calyx, or 2-4 mm below it, reddish, keeled, lanceolate, 1 mm long. FLOWERS: sepals 9; outer sepals ovate, obtuse, 2-3 mm long; middle sepals oblanceolate, 4-5 mm long; inner sepals ovate to suborbicular, 5-7 mm long; petals oblanceolate, 3-4 mm long; filaments lacking teeth. FRUITS red, pruinose, subglobose, 6-7 mm long, 4.5-5.0 mm wide, with persistent stigmas. SEEDS ellipsoid, shiny, reddish-brown, 3-5 mm long. [*Mahonia trifoliolata* (Moric.) Fedde]. --2 vars. TX to AZ, s to Hgo., Mex.

Var. ***glauca*** (I. M. Johnst.) M. C. Johnst. ex Lafer. (glaucous) --Leaflets glaucous, minutely papillose (under 30X magnification). [*B. trifoliata* Hartweg. ex Lindl.]. --Slopes and mesas: Santa Catalina and Rincon Mts. of e Pima Co.; 900-1050 m (3000-3500 ft); Mar-Apr; w TX and NM, s to Hgo., Mex.

Berberis wilcoxii Kearney (for T. E. Wilcox). --Shrubs to 2 m tall, glabrous; bark reddish-brown. LEAVES odd-pinnate, 12-16 cm long; leaflets 5-7, oblong-ovate to ovate-lanceolate, acuminate and spine-tipped or truncate at apex, cuneate to rounded or subcordate at base, 2.5-5.5 cm long, 2-3 cm wide; lateral leaflets sessile, unequal at base; terminal leaflet on a stalk 12-16 mm long; upper surface green and shining; lower surface pale but hardly glaucous; veins prominent on both surfaces; teeth of leaflet margin 5-11 pairs, spreading, spiny. INFLORESCENCES densely clustered racemes, 20-50-flowered, 2-5 cm long; pseudopedicels slender, glaucous, 4-12 mm long, dilated at summits; bract ovate, obtuse or acutish, membranaceous, persistent, 2-3 mm long; bracteoles absent. FLOWERS: sepals 9; outer sepals ovate, acute, 2.5-4.0 mm long; middle sepals ovate, 3.0-4.5 mm long; inner sepals and petals ovate to obovate, 5.0-6.5 mm long; stamens 3-4 mm long; filaments with two lateral teeth near apex; stigma sessile, persistent. FRUITS ovoid to subglobose, blue, glaucous, 1 cm long. SEEDS purplish-black, fusiform to clavate, 5-7 mm long. --Rocky canyons: Cochise, Gila, Graham, e Pima, and Santa Cruz cos.; 1700-2450 m (5500-8000 ft); Apr-May; NM and Son., Mex.