

VISCACEAE - MISTLETOE FAMILY

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Perennial shrubs, aerial parasites on dicotyledonous plants and conifers; implanted by means of a primary penetrating organ (haustorium), elaborating laterally in the water-conducting tissues of the host (through the endophytic system); dioecious (in ours) or monoecious. SHOOTS woody or nonwoody, brittle, densely branched. LEAVES simple, entire, decussate, or absent. INFLORESCENCES axillary spikes (in ours) or cymules (sometimes terminal). FLOWERS minute (2-4 mm), with a single series of 2-7 tepals; staminate flower with anthers opposite perianth segments; pistillate flower with an inferior ovary, the style unbranched. FRUIT a single-seeded mucilaginous berry. SEED without a thickened seed coat, eaten and distributed primarily by birds or dispersed explosively in *Arceuthobium*. --7 genera, 450 spp., north temperate, subtropical, or tropical regions. Includes the common European mistletoe, *Viscum album*. These mistletoes were formerly considered to be a subfamily of the Loranthaceae but family status for the Viscaceae is now generally recognized. Calder, M. and F. Bernhardt. 1983. *The Biology of Mistletoes*. Academic Press, Sydney.

- 1. Parasites on *Pinus*, *Abies*, *Pseudotsuga*, or *Picea*; stems greenish-yellow, yellow or brownish, leafless, usually less than 15 cm high, non-woody, quadrangular, at least when young; flowers on short pedicels, these recurved at maturity; berry compressed, bicolored (distal and basal portions of different shades), same color as shoots, 3-4 mm in diameter, explosive; anthers 1-loculed  
 ..... *Arceuthobium*
- 1' Parasites on woody dicots or *Juniperus*, *Cupressus*, or *Abies*; stems green, leafy or leafless, usually over 20 cm high, woody, terete; flowers sunken along the axis; berry globose, sessile, uniformly colored (white, pink, or reddish), 3-6 mm in diameter, not explosive; anthers 2-loculed  
 ..... *Phoradendron*

*Arceuthobium* M. Bieb. Dwarf Mistletoe

Aerial shrubs parasitic on Pinaceae, 2-25 cm high, glabrous, dioecious. SHOOTS variously colored, greenish-yellow to orange, reddish, and black, quadrangular, at least when young. LEAVES reduced to minute scales. INFLORESCENCES of axillary spikes. FLOWERS decussate (sometimes whorled), short pedicellate; staminate flowers with a central nectary, the perianth segments (2-)3-4(-5), each segment bearing a sessile, circular, uniloculate anther; pistillate flowers with a single style and rounded stigma, the perianth segments 2, persistent. FRUIT mostly 3-5 mm long, bicolored, dehiscing explosively (to 15 m); pedicels curved at maturity. --33 spp. in U.S. and Mex., 8 in the Old World. (Greek: *Arceuthos* = juniper + *bios* - living). Hawksworth, F.G., & D. Wiens. 1972. *Biology and Classification of Dwarf Mistletoes (Arceuthobium)*. U.S.D.A. Agricultural Handbook 401.

- 1. Pistillate plants 2-4 cm high, the shoots scattered along host stem near the apex; hosts forming systemic witches brooms; parasitic on *Pseudotsuga* ..... *A. douglasii*

- 1' Pistillate plants usually more than 4 cm high; shoots in individual clusters; host generally not forming systemic witches brooms; parasitic on *Abies*, *Picea*, and *Pinus*.
2. Flowering in spring (Mar-Jun); internodes usually less than 4 times as long as wide; parasitic on hard pines (*Pinus* subgenus *Pinus*).
3. Fruit markedly whitish-blue glaucous at base; shoots green; staminate plants often markedly divaricate, the pistillate plants erect; parasitic on *Pinus leiophylla* var. *chihuahuana* ..... *A. gillii*
- 3' Fruit not markedly glaucous at base; shoots orange; parasitic on *P. ponderosa*, *P. arizonica*, or *P. engelmannii* ..... *A. vaginatum* subsp. *cryptopodium*
- 2' Plants flowering in late summer (Aug-Sep); internodes at least 5 times as long as wide; parasitic on soft pines (*Pinus* subgenus *Strobus*), *Abies* or *Picea*.
4. Parasitic on *Pinus strobiformis* or pinyon pines.
5. Shoots olive green to brownish; parasitic on pinyon pines ..... *A. divaricatum*
- 5' Shoots generally yellowish green to light gray or purplish; parasitic on *Pinus strobiformis*.
6. Plants over 6 cm high; staminate spikes in summer over 10 mm long; shoots not densely clustered, straw to light gray; Huachuca Mts ..... *A. blumeri*
- 6' Plants under 5 cm high; staminate spikes in summer 5-7 mm long; shoots densely clustered, yellowish; c and se Arizona ..... *A. apachecum*
- 4' Parasitic on *P. aristata*, *Abies* or *Picea*.
7. Shoots yellowish; parasitic on *Abies*; mean height ca. 8 cm, up to 22 cm ..... *A. abietinum*
- 7' Shoots green or purple; parasitic on *Picea* or *Pinus aristata*; mean height ca. 5 cm, up to 10 cm ..... *A. microcarpum*

**Arceuthobium abietinum** Engelm. ex Munz (on *Abies*). Fir Dwarf Mistletoe. --SHOOTS 6-15(-22) cm high, 2-6 mm wide at base, yellow to yellow-green. STAMINATE FLOWERS ca. 2.5 mm in diameter; tepals 3(-4). FRUIT ca. 4 mm long, 2 mm wide. --2 formae specialis (host races). w U.S.; n Mex.

f. sp. **concoloris** Hawksworth and Wiens. SHOOT ca. 10(-22) mm long. HOSTS: *Abies concolor*, rarely associated *A. lasiocarpa*. [*A. campylopodum* Engelm. f. *abietinum* (Engelm.) L. S. Gill]. --Mixed conifer forests: Cochise Co.: Mormon Canyon, Chiricahua Mts.; Coconino Co.: n rim Grand Canyon, very rare s rim; Pima Co.: Marshall Gulch, Santa Catalina Mts; 2200-2900 m (7200-8800 ft); Aug-Sep; CA, NV, OR, s UT, s WA; Chih., Mex.

**Arceuthobium apachecum** Hawksw. & Wiens (of Apache). Apache Dwarf Mistletoe. --SHOOTS 3-4(-7) cm high, 1-2 mm wide at base, yellow-green. STAMINATE FLOWERS 2.7 mm in diameter; tepals 3-4. FRUIT 4 mm long, 2.5 mm wide. HOST: *Pinus strobiformis*. [*A. campylopodum* Engelm. f. *blumeri* (A. Nels.) L. S. Gill, in part]. --Mixed conifer forests: Apache, Cochise, Graham, Greenlee, Pima, Santa Cruz cos.; 2000-3000 m (6500-9800 ft); Sep; s NM; n Coah., Mex.

**Arceuthobium blumeri** A. Nelson (for J. C. Blumer). Blumer's Dwarf Mistletoe. --SHOOTS 5-7(-18) cm high, 1-3 mm wide at base, gray or straw-colored. STAMINATE FLOWERS 2.5-3 mm diameter; tepals 4-6. FRUIT 4 mm long, 2.5 mm wide. HOST: *Pinus strobiformis*. [*A. campylopodum* Engelm. f. *blumeri* (A. Nelson) L. S. Gill, in part]. --Mixed conifer forests: only in Huachuca Mts., Cochise Co., now quite rare because of recent host losses to destructive fires; 2100-2600 m (7000-8600 ft); Aug; Son., Chih., Dgo., Mex.

**Arceuthobium divaricatum** Engelm. (divaricate branching). Pinyon Dwarf Mistletoe. --SHOOTS 7-12 cm high, 2-4 mm wide at base, olive-green to brown. STAMINATE FLOWERS 2.5 mm in diameter; tepals 3. FRUIT 4 mm long, 2.5 mm wide. HOSTS: pinyon pines, mainly *Pinus edulis*, but also *P. discolor* and *P. californiarum* subsp. *fallax* (= *P. edulis* var. *fallax*). [*A. campylopodum* Engelm. f.

*divaricatum* (Engelm.) L. S. Gill]. --Pinyon-juniper woodlands: Apache, Coconino, Gila, Graham, Greenlee, Mohave, Navajo, and Yavapai cos.; 1400-2400 m (4600-7800 ft); Aug-Sep; CA, CO, NV, UT, w TX; Baja C., Mex.

***Arceuthobium douglasii* Engelm. (for David Douglas).** Douglas-fir Dwarf Mistletoe. --SHOOTS 2-3(-7) cm high, 1 mm wide at base, green. STAMINATE FLOWERS 2.3 mm in diameter; tepals 3(-4). PISTILLATE FLOWERS 1.5 mm in diameter. FRUIT olive green, 3.5-4.5 mm long, 1.5-2 mm wide. HOSTS: *Pseudotsuga menziesii*, rarely associated with *Abies concolor* and *A. lasiocarpa*. --Mixed conifer forests: Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Yavapai cos.; 1900-3000 m (6300-9800 ft); May-Jun; s British Columbia to CA and NM; Chih., Coah., Dgo., N.L., Mex.

***Arceuthobium gillii* Hawsw. & Wiens (for L. S. Gill).** Chihuahua Pine Dwarf Mistletoe. --SHOOTS 10-15(-25) cm high, 3-8 mm wide at base, greenish-yellow to dark brown; pistillate plants erect; staminate plants spreading. STAMINATE FLOWERS 3-3.5 mm long, 2-4 mm in diameter, the tepals 3. PISTILLATE FLOWERS ca. 1.5 mm long. FRUIT whitish-blue, glaucous on base, 4-5 mm long, 2-3 mm wide. HOST: *Pinus leiophylla* var. *chihuahuana*. --Chihuahua pine woodlands: Cochise, Pima, Santa Cruz cos.; 1700-2450 m (550-8000 ft); Mar-Apr; sw NM; Chih., Sin., e Son., Mex.

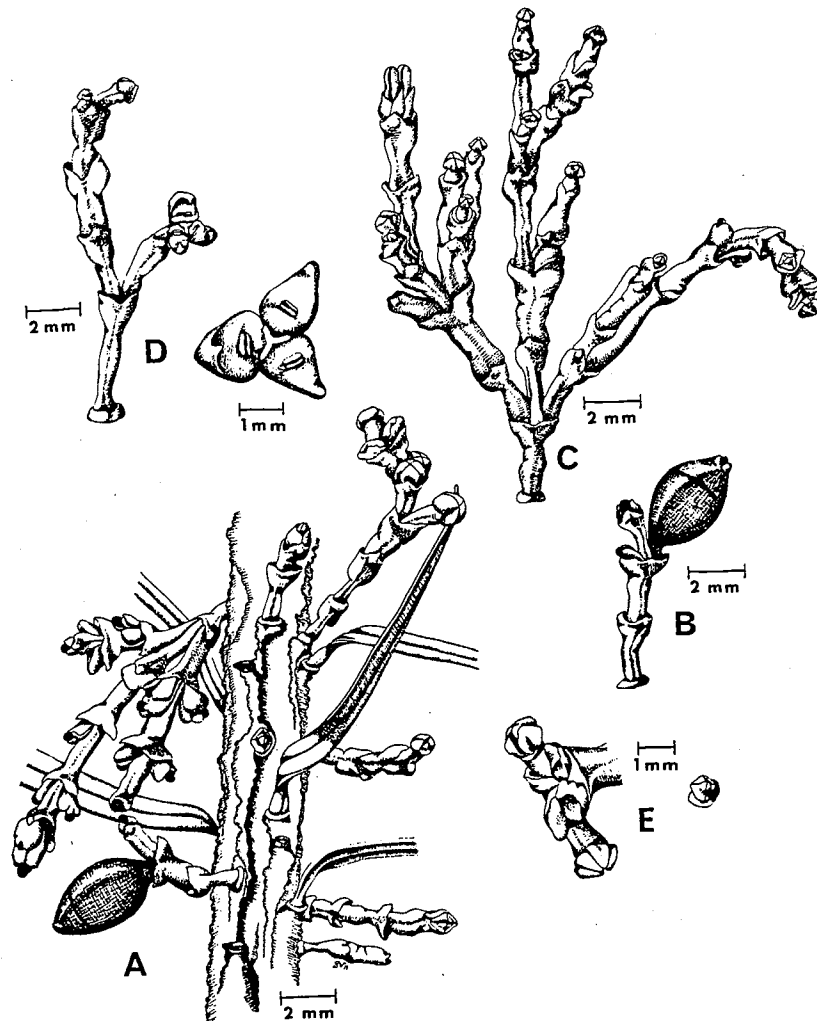


Figure 1. *Arceuthobium douglasii* in spring: A, pistillate (left) and staminate (right) plants on the same host twig; B, detail of nearly mature fruit; C, staminate shoot; D, staminate shoot with mature buds and open flower (left) and detail of open flower (right); E, staminate shoots showing characteristic rounded buds. Reproduced from Hawsworth and Wiens (1972), *Biology and Classification of Dwarf Mistletoes (Arceuthobium)*.

**Arceuthobium microcarpum** (Engelm.) Hawksworth & Wiens (small fruits). Western Spruce Dwarf Mistletoe. --SHOOTS 4-6(-10) cm high, 1.5-2.5 mm wide at base, green to purple. STAMINATE FLOWERS 2.3 mm in diameter, the tepals 3(-4). PISTILLATE FLOWERS 1 mm in diameter, 1 mm long. FRUIT 3.5 mm long, 2 mm wide. HOSTS: *Picea engelmannii* and *Picea pungens*, also on *Pinus aristata* on the San Francisco Peaks, Coconino Co. [*A. campylopodum* Engelm. f. *microcarpum* (Engelm.) Gill]. --Mixed conifer forests: Apache, Coconino, Graham, and Greenlee cos.; 2400-3150 m (7900-10400 ft); Aug-Sep; s NM.

**Arceuthobium vaginatum** (Willd.) Presl (sheathed, referring to shoots). --SHOOTS: 10-30(-50) cm high, 3-10 mm wide at base, bright orange, reddish, dark brown or black, densely branched, usually erect. STAMINATE FLOWERS 3.5 mm long, to 3.5 mm in diameter; tepals 3(-4). FRUIT 4-6 mm long, 2-3 mm wide, elliptic to obovate. --2 subsp; sw U.S.; w and c Mex.

subsp. **cryptopodum** (Engelm.) Hawksw. & Wiens. Southwestern Dwarf Mistletoe. --SHOOTS 10-20(-27) cm high, 3-10 mm wide at base, orange to reddish-brown. STAMINATE FLOWERS 2.5-3 mm in diameter. FRUIT 4.5-5.5 mm long. HOSTS: mainly *Pinus ponderosa*, but also *P. arizonica* and *P. engelmannii* in s AZ. [*A. vaginatum* f. *cryptopodum* (Engelm.) L. S. Gill]. --Ponderosa Pine forests: all AZ cos. except La Paz and Yuma; 1750-2950 m (5800-9700 ft); May-Jun; n CO to s NM, w TX, s UT; Son., Chih., Coah., Mex.

#### Phoradendron Nutt. Mistletoe

Aerial shrubs parasitic on dicot or coniferous shrubs and trees, 2-15 dm high, woody, glabrous or hairy, dioecious in AZ (some tropical species monoecious). SHOOTS usually some shade of green, but sometimes reddish. LEAVES simple, entire, decussate, but reduced to minute scales in 2 species. INFLORESCENCES axillary spikes with 1-7 fertile segments. FLOWERS sunken along the axis; perianth segments usually 3, persistent in fruit; staminate flower with a sessile minute (less than 2 mm), 2-chambered anther; pistillate flower with a single style and rounded stigma. FRUIT 3-6 mm in diameter, sessile, white, pink, or reddish; eaten and dispersed by birds. (Greek: *phor* = thief + *dendron* = tree). --ca. 200 spp. in the U.S., north temperate, tropical and subtropical distribution in the New World. Trelease, W. 1916. The Genus *Phoradendron*, Univ. Ill. Press; Wiens, D. 1964. Brittonia 16:11-54.

1. Plants with leaves reduced to minute scales.
  2. Parasitic mostly on desert legumes (*Prosopis*, *Olneya*, *Acacia*); shoots canescent, often reddish ..... *P. californicum*
  - 2' Parasitic on *Juniperus*; shoots glabrous, green ..... *P. juniperinum*
- 1' Plants with well developed leaves.
  3. Leaves less than 1 cm wide; parasitic on coniferous trees.
    4. Parasitic on *Abies*; leaves usually more than 3 cm long ..... *P. pauciflorum*
    - 4' Parasitic on *Juniperus* or *Cupressus*; leaves usually less than 3 cm long.
      5. Parasitic on *Juniperus*, leaves pubescent ..... *P. capitellatum*
      - 5' Parasitic on *Cupressus*, leaves glabrous ..... *P. densum*
  - 3' Leaves more than 1 cm wide; parasitic on broad-leaved angiosperm trees.
    6. Parasitic primarily on *Quercus*; leaves pubescent, 2-4 cm long ..... *P. coryae*
    - 6' Parasitic primarily on *Populus*, *Platanus*, *Salix*, and *Fraxinus*; leaves glabrous, 3-6 cm long ..... *P. macrophyllum*

**Phoradendron californicum** Nutt. (of California). Desert Mistletoe. --SHOOTS 4-10 dm high, often pendulous with age, green-reddish, with internodes ca. 2 cm long, canescent (especially apical internodes). LEAVES reduced to minute scales. INFLORESCENCES: staminate spikes with 2-3 fertile segments, ca. 6 flowers per fertile segment; pistillate spikes with ca. 3 fertile segments, 2-3 flowers per segment. FLOWERS moderately canescent. FRUIT white-reddish, glabrous, ca. 3 mm in diameter. HOSTS: *Prosopis*, *Cercidium*, *Olneya*, *Acacia*, *Condalia*, *Parkinsonia*, rarely *Larrea* and *Simmondsia*. --Sonoran Desert; all AZ cos. except Apache and Navajo; 15-1400 m (50-4600 ft); Jan-Mar; CA, s NV, sw UT; Baja

C., Sin., Son., Mex.

**Phoradendron capitellatum** Torr. (densely clustered). Hairy Mistletoe. --SHOOTS 3-8 dm high, often pendulous with age, yellow green, the internodes 7-12 mm long. LEAVES oblanceolate-linear, 1-1.5 cm long, 2-3 mm wide; densely pubescent. INFLORESCENCES: staminate spikes with 2-3 fertile segments, 6-10(-15) flowers per segment; pistillate spikes with usually 1 fertile segment, with 2-3 flowers per segment. FLOWERS pubescent. FRUIT pink-white, ca. 3 mm in diameter. HOST: *Juniperus*. [*P. bolleanum* (Seem.) Eichler var. *capitellatum* (Torr.) Kearney & Peebles]. --Pinyon-juniper woodlands: Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yavapai cos.; 800-1700 m (2800-5500 ft); Dec-Feb; se NM; n Chih., n Son., Mex.

**Phoradendron coryae** Trel. (for K. T. Cory). Oak Mistletoe. --SHOOTS up to 1 m high, mostly short pubescent, gray-green, the internodes 2-3 cm long. LEAVES obovate-elliptic to circular, 1.5-3 cm long, 1.5-2.5 cm wide, densely pubescent. INFLORESCENCES: staminate spikes with 2-3 fertile segments, with 25-40 flowers in 3 rows per segment; pistillate spikes with 2-3 fertile segments, with 6-10 flowers per segment. FLOWERS pubescent. FRUIT white, short hairy around the persistent perianth segments, ca. 3 mm in diameter. HOSTS: *Quercus*, rarely *Condalia*, *Berberis*, *Vaquelinia* and *Sideroxylon*. --Sub-Mogollon oak woodlands: all AZ cos. except Apache, La Paz, and Yuma; 1200-2700 m (4000-8800 ft); Jul-Sep; NM, w TX; Chih., Coah., Son., Mex.

**Phoradendron densum** Torr. (densely branched). Dense Mistletoe. --SHOOTS 3-5 dm high, green, glabrous, the internodes 8-15 mm long. LEAVES oblanceolate to oblong, sessile, 1.5-2.5 cm long, 2-3 mm wide, glabrous. INFLORESCENCES: staminate spikes with usually 1 fertile segment, with 6-10 flowers per segment; pistillate spikes with usually 1 fertile segment, with 2 flowers per segment. FLOWERS glabrous. FRUIT white-pinkish, glabrous, 4 mm in diameter. HOST: *Cupressus arizonica*. [*P. bolleanum* (Seem.) Eichler var. *densum* (Torrey) Fosberg]. --Arizona cypress forests: local in c AZ: Coconino, Gila, Maricopa, Yavapai cos.; 1050-1600 m (3500-5300 ft); Jun-Aug; CA, s OR; Baja C., Mex.

**Phoradendron juniperinum** Engelm. ex A. Gray (on juniper). Juniper Mistletoe. --SHOOTS 2-4 dm high, greenish, glabrous, the internodes 6-10 mm long. LEAVES reduced to minute scales. INFLORESCENCES: staminate spikes with usually 1 fertile segment, ca. 6 flowers per segment; pistillate spikes with 1 fertile segment, with 2 flowers. FLOWERS glabrous. FRUIT white-pinkish, glabrous, ca. 4 mm in diameter. HOSTS: *Juniperus*, rarely on *Cupressus* and very rarely on *Chamabaetiaria*. --Pinyon-juniper woodlands: all AZ cos. except La Paz, Yuma; 1000-2300 m (3200-7500 ft); Jun-Jul; s CA, CO, n NV, OR, n UT, w TX; Chih., Son., Mex.

**Phoradendron macrophyllum** (Engelm.) Cockerell (large-leaved). Big-leaf Mistletoe. --SHOOTS 1 m or more high, short-pubescent, especially near apices, green to pale-green, the internodes 3-4 cm long. LEAVES obovate to elliptic-circular 3-5 cm long, 1.5-3 cm wide, mostly glabrous. INFLORESCENCES: staminate spikes with 4-5(-7) fertile segments, with 20-40 flowers per segment in 3 rows; pistillate spikes with 3-5 fertile segments, with 6-15 flowers per segment. FLOWERS slightly pubescent. FRUIT white, glabrous, ca. 5 mm in diameter. HOSTS: *Populus*, *Salix*, *Platanus*, *Fraxinus*, *Alnus*, *Juglans*, and other deciduous trees. [*P. flavescens* (Pursh) Nutt., in part]. --Sub-Mogollon Riparian woodlands: all AZ cos. except Apache; 50-1700 m (100-5500 ft); Dec-Mar; CA, s NM, w TX; Baja C., Chih., Son., Mex.

**Phoradendron pauciflorum** Torr. (few flowered). Fir Mistletoe. --SHOOTS 3-6 dm long, glabrous, green; internodes 1-2 cm long. LEAVES oblanceolate, 1.5-3 cm long, 5-10 mm wide, glabrous. INFLORESCENCES: staminate spikes with usually 1-2 fertile segments, with 8-12 flowers; pistillate spikes with 1 fertile segment, with 2 flowers. FLOWERS glabrous. FRUIT white-pinkish, glabrous, ca. 4 mm in diameter. HOST: *Abies concolor*. [*P. bolleanum* (Seem.) Eichler var. *pauciflorum* (Torr.) Fosberg]. --Mixed conifer forests: in AZ known only in Pima Co. (Santa Catalina & Rincon Mts.); 2250-2600 m (7400-8500 ft); Jul-Aug; CA; Baja C., Mex.