

H. abramsiana (C.B. Wolf) Bartel SANTA CRUZ CYPRESS Tree 6–10(15) m. ST: bark fibrous, thin, broken in thick vertical strips or plates, gray-brown; ultimate branches 0.9–1.2 mm diam, cylindrical. LF: light bright to deep green. POLLEN CONE: 3–4 mm, 2 mm diam, ± 4-sided; scales 10–16; pollen sacs 4–6 per scale. SEED CONE: 16–30(35) mm, spheric to gen widely elliptic, brown; scales 8–10. SEED: 3–5 mm, glaucous or not, gen dull brown to iridescent black, rough; attachment scar conspicuous. [*Cupressus a.* C.B. Wolf]

var. *abramsiana* SEED CONE: (14)16–25 mm, 14–22 mm diam. Yellow-pine, closed-cone-pine/cypress forests; 370–760 m. SnFrB (Santa Cruz Mtns, Santa Cruz Co.). ★

var. *butanoensis* (Silba) Bartel & R.P. Adams (p. 141) SEED CONE: 22–32(35) mm, 22–31 mm diam. Redwood, closed-cone-pine/cypress forests; 400–490 m. SnFrB (Santa Cruz Mtns, San Mateo Co.). [*Cupressus a.* subsp. *b.* Silba] ★

H. bakeri (Jeps.) Bartel (p. 141) BAKER CYPRESS, SISKIYOU CYPRESS Tree 7–30(40) m. ST: bark peeling in irregular plates, ± red- or cherry-brown, aging gray-brown; ultimate branches 0.7–1 mm diam, cylindrical. LF: dark to gray-green, resin not copious. POLLEN CONE: 2–3 mm, gen spheric; scales 6–10; pollen sacs 3–5 per scale. SEED CONE: 10–18(25) mm, spheric; surface warty, silvery to dull brown; scales 4–8. SEED: (2.4)3–4 mm, gen glaucous, tan to dull red-brown, gen with many wart-like pitch pockets; attachment scar conspicuous. Mixed-evergreen forest, open slopes, flats, often on serpentine; 1100–1800 m. KR, CaRH, n SNH, MP; sw OR. [*Cupressus b.* Jeps.; *Callitropsis b.* (Jeps.) D.P. Little] ★

H. forbesii (Jeps.) Bartel (p. 141) TECATE CYPRESS Shrub or tree < 10 m, multi-trunked, gen without dominant terminal shoot. ST: bark peeling in thin plates, smooth, polished, cherry-red or mahogany-brown; ultimate branches 0.9–1.1 mm diam, cylindrical. LF: light green to dull green. POLLEN CONE: 3–4 mm, ± 2 mm diam, ± 4-sided; scales 12–14; pollen sacs 3–5 per scale. SEED CONE: (17)20–32(35) mm, gen spheric, dull brown or gray; scales 6–10. SEED: 3–6 mm, dark to dull red-brown, gen with many wart-like pitch pockets; attachment scar conspicuous. $2n=22(23)$. Chaparral; 450–1500 m. w PR, planted outside native range in SW mtns; nw Baja CA. [*Cupressus f.* Jeps.; *C. guadalupensis* S. Watson var. *f.* (Jeps.) Little; *Callitropsis f.* (Jeps.) D.P. Little] ★

H. goveniana (Gordon) Bartel (p. 141) GOWEN CYPRESS Tree 5–7 m, without long, whip-like terminal shoot. ST: bark fibrous, peeling in linear strips or irregular-shaped plates, smooth, aging rough, brown to gray; ultimate branches 0.8–1.1 mm diam, cylindrical. LF: of 1 kind, bright- to yellow-green, resin 0. SEED CONE: (10)14–20 mm, ± spheric, brown to gray-brown, often green beneath surface; scales 6–10. SEED: 2–4.5 mm, glaucous or not, dark brown to ± black; attachment scar often inconspicuous. Closed-cone-pine/cypress forests, mixed-evergreen forest, maritime chaparral, coastal terraces; 50–160 m. c CCo (Monterey Peninsula). [*Cupressus g.* Gordon; *Callitropsis g.* (Gordon) D.P. Little] ★

H. macnabiana (A. Murray bis) Bartel (p. 141) MCNAB CYPRESS Large shrub 3–10 m (multi-trunked tree 10–18 m). ST: bark fibrous, gray-brown; ultimate branches 0.8–1.1 mm diam, ± 4-sided, ultimate 2 orders of shoots in 1 plane. LF: blue- to dull gray-green to gray; resin copious, sticky when fresh. POLLEN CONE: 2–3 mm, 2 mm diam; scales gen 8; pollen sacs 3–5 per scale. SEED CONE: 15–21(25) mm, gen longer than wide, gray to red-brown; scales gen 6, projection conic, pointing upward to incurved. SEED: 3–5 mm,

± glaucous, dull brown; attachment scar conspicuous. Dry slopes, flats, chaparral, pine/oak woodland, often on serpentine; 300–1460 m. NCoR, CaRF, n SNF; reported from sw OR. [*Cupressus m.* A. Murray bis; *Callitropsis m.* (A. Murray bis) D.P. Little]

H. macrocarpa (Hartw.) Bartel (p. 141) MONTEREY CYPRESS Tree 18–25 m; crown asymmetric, often open, flat-topped to widely conic in age. ST: bark fibrous, rich brown aging ash-gray; ultimate branches 0.9–1.2 mm diam, cylindrical. LF: bright to dark green, not glaucous. SEED CONE: 20–32(38) mm, spheric to elliptic, brown; scales 8–12, shiny when fresh; ± opening at maturity. SEED: 2.5–5 mm, not glaucous, dull red-brown to black; attachment scar ± white, conspicuous. Closed-cone-pine/cypress forests; < 50 m in native range. NCo, CCo, SCo (native to Monterey Peninsula, Point Lobos), widely planted, naturalized outside native range. [*Cupressus m.* Hartw.; *Callitropsis m.* (Hartw.) D.P. Little] ★

H. nevadensis (Abrams) Bartel (p. 141) PIUTE CYPRESS Tree 5–12(25) m. ST: bark fibrous, not peeling, gray- to red-brown to cherry-red; ultimate branches 1–1.2 mm diam, cylindrical. LF: dull to gray-green; resin covering glands, conspicuous. SEED CONE: 20–30(35) mm, ovoid, often silver-gray in age; scales 6–8, projection less visible in age. SEED: 3–6 mm, gen glaucous, light to red-brown, attachment ± inconspicuous. $2n=22(23)$. Pinyon/juniper or oak/pine woodland, chaparral, closed-cone-cypress forest; 750–1800 m. s SN (Kern, Tulare cos.). [*Cupressus macnabiana* A. Murray var. *n.* Abrams; *Callitropsis n.* (Abrams) D.P. Little; *Cupressus arizonica* Greene subsp. *n.* (Abrams) A.E. Murray] ★

H. pygmaea (Lemmon) Bartel PYGMY CYPRESS Shrub or tree, 1–2 m on sterile soil, 10–20(50) m on rich soil; with long whip-like ultimate shoot. ST: bark fibrous, gray-brown; ultimate branches 0.9–1.1 mm diam, cylindrical. LF: gen dark dull green, resin 0. SEED CONE: 12–27(35) mm, spheric to gen widely elliptic, tan aging gray; scales 6–10. SEED: 2.5–4.7(5.5) mm, not glaucous, dark red-brown to black, shiny or not; attachment scar inconspicuous. Closed-cone-pine/cypress forests, mixed-evergreen forest, coastal terraces; 50–200(300) m. s NCo (Mendocino, Sonoma cos.); reported from sw OR. [*Cupressus goveniana* Gordon var. *p.* Lemmon; *Callitropsis p.* (Lemmon) D.P. Little; *Cupressus goveniana* subsp. *p.* (Lemmon) A. Camus; *Cupressus goveniana* subsp. *pygmaea*, orth. var.] ★

H. sargentii (Jeps.) Bartel (p. 141) SARGENT CYPRESS Tree 6–20 m. ST: bark fibrous, thick, gray or dark brown; ultimate branches 0.9–1.2 mm diam, cylindrical to 4-sided. LF: dull, glaucous or not, dusty- to gray-green. SEED CONE: 15–25(30) mm, spheric, rough-surfaced, dull brown to gray, scales 6–10. SEED: 3–5.3 mm, ± glaucous, dark brown; attachment scar gen conspicuous. Closed-cone-pine/cypress, yellow-pine forests, chaparral, on serpentine; 60–1370 m. NCoR, SnFrB, SCoR; reported from sw OR. [*Cupressus s.* Jeps.; *Callitropsis s.* (Jeps.) D.P. Little]

H. stephensonii (C.B. Wolf) Bartel (p. 141) CUYAMACA CYPRESS Tree (5)10–16 m. ST: bark smooth, thin, peeling in thin strips or plates, red-brown to cherry-red; ultimate branches 1–1.3 mm diam, cylindrical. LF: of 1 kind, gray-green; glands gen inactive, conspicuous or not, resin 0. SEED CONE: 17–27(30) mm, spheric, dull gray to brown; scales 6–8(10), projection conspicuous and conic. SEED: 3.6–6(8) mm, glaucous or not, dark to red-brown; attachment scar conspicuous. $2n=22(23,24)$. Chaparral; 910–1800 m. sw PR (Cuyamaca Mtns); nw Baja CA. [*Cupressus arizonica* subsp. *a.*, misappl.] ★

JUNIPERUS JUNIPER

Robert P. Adams & Jim A. Bartel

Shrub, tree; gen dioecious. ST: bark thin, peeling in strips; young shoots 4-angled to cylindrical. LF: opposite (4-ranked) or whorled in 3s (6-ranked), scale-like to less often awl- or needle-like. POLLEN CONE: gen terminal; pollen sacs 2–6 per scale. SEED CONE: gen terminal, 5–18 mm, ± spheric, ± fleshy, berry-like, glaucous or not, dry or resinous, gen maturing 2nd yr, surrounded at base by minute scale-like bracts; scales 3–8, fused, opposite or whorled in 3s. SEED: 1–3 per cone, ± flat, unwinged, often not angled, gen animal-dispersed over 2 yrs; cotyledons 2–6. 67 spp., 28 var.: n hemisphere exc ne Afr. (Latin: juniper) [Adams & Nguyen 2007 *Phytologia* 89:43–57; Adams et al. 2006 *Phytologia* 88:299–309]

1. Lf awl- or needle-like, suberect to spreading but not appressed; pollen, seed cones axillary; shrub < 1 m (sect. *Juniperus*)..... *J. communis*
2. Lf 10–20+ mm; glaucous stomatal band $\pm 1-1.5 \times$ as wide as green lf margin var. *depressa*
- 2' Lf 5–10(12) mm; glaucous stomatal band $2-4 \times$ as wide as green lf margin
3. Mature seed cone elongate to \pm spheric; glaucous stomatal band $3-4 \times$ as wide as green lf margin var. *jackii*
- 3' Mature seed cone spheric; glaucous stomatal band $2 \times$ as wide as green lf margin var. *saxatilis*
- 1' Lf gen scale-like, closely appressed; pollen, seed cones terminal; tree, shrub > 1 m (sect. *Sabina*)
4. Seed cone maturing blue-black; tree 5–15(30) m
5. Bark red-brown; lvs gen whorled in 3s; gen dioecious; NCoRH, SNH, SnGb, SnBr, SNE, DMtns *J. grandis*
- 5' Bark brown; lvs opposite or whorled in 3s; gen \pm monoecious; CaRH, MP *J. occidentalis*
- 4' Seed cone maturing red-brown; shrub, tree 1–8(10) m
6. Lf gland obvious; trunks several at base; gen dioecious..... *J. californica*
- 6' Lf gland obscure; trunk gen 1 at base; monoecious *J. osteosperma*

J. californica Carrière (p. 141) CALIFORNIA JUNIPER Shrub, tree 1–4(10) m; gen dioecious. ST: trunks several at base; bark gray, thin, outer layers persistent. LF: gen whorled in 3s, 6-ranked; scale-like, closely appressed; gland obvious. POLLEN CONE: 2–3 mm, oblong. SEED CONE: 7–12 mm, spheric to ovoid, \pm blue maturing red-brown, dry. SEED: 5–7 mm, pointed, angled, brown. Dry slopes, flats, pinyon/juniper woodland; 50–1500 m. NCoRI, SNF, ScV (Sutter Buttes), SnFrB, SCoR, TR, PR, DMtns; s NV, nw AZ, Baja CA (Cedros, Guadalupe islands).

J. communis L. COMMON JUNIPER Shrub < 1 m, gen \pm prostrate; gen dioecious. ST: bark brown, peeling in papery sheets. LF: gen whorled in 3s, 6-ranked; suberect to spreading, awl- or needle-like, jointed, not decurrent. POLLEN CONE: axillary, 4–5 mm. SEED CONE: axillary, 5–9 mm, green maturing bright blue to black, glaucous, resinous. SEED: 2–5 mm, ovoid, acute, gen 3-angled. 3 other vars. extend sp. range to incl Eur, Asia.

var. *depressa* Pursh DEPRESSED JUNIPER Low, occ spreading. LF: 10–20+ mm; glaucous stomatal band $\pm 1-1.5 \times$ as wide as green lf margin. SEED CONE: 6–9 mm. SEED: 3 per cone. Rocky soil, slopes, summits; < 2800 m. SNH; \pm to AK, ne N.Am.

var. *jackii* Rehder (p. 141) JACK'S JUNIPER Spreading, mat-like, occ erect. LF: 7–9(10) mm; glaucous stomatal band $3-4 \times$ as wide as green lf margin. SEED CONE: mature elongate to \pm spheric. SEED: 1(2) per cone. Rocky or wooded slopes, high-elevation forests, often on serpentine or lava; 1900–3400 m. KR, CaRH; OR. [*J. c. var. montana* Aiton, in part]

var. *saxatilis* Pall. MOUNTAIN JUNIPER Spreading, mat-like, occ erect. LF: 5–10(12) mm; glaucous stomatal band $2 \times$ as wide as green lf margin. SEED CONE: mature spheric. SEED: 1–3 per cone. Rocky areas; 600–2400 m. KR, SNH, Wrm; to YT, Eur, Asia. [*J. c. var. montana* Aiton, in part]

J. grandis R.P. Adams (p. 141) SIERRA JUNIPER, GRAND JUNIPER Tree 8–20(30) m; gen dioecious. ST: bark red-brown. LF: gen whorled in 3s, 6-ranked; closely appressed, scale-like. SEED CONE: 5–9 mm, blue-green maturing blue-black, resinous. SEED: cotyledons 2–4. $2n=22$. Exposed, dry, rocky slopes, flats, forest, pinyon/juniper woodland; 100–3100 m. NCoRH, SNH, SnGb, SnBr, SNE, DMtns; w NV. [*J. occidentalis* var. *australis* (Vasek) A.H. Holmgren & N.H. Holmgren]

J. occidentalis Hook. WESTERN JUNIPER Tree 5–15(20) m; gen \pm monoecious. ST: bark brown. LF: opposite, 4-ranked or whorled in 3s, 6-ranked. POLLEN CONE: 2–3 mm, oblong. SEED CONE: 7–12 mm, blue-green maturing blue-black, resinous. SEED: cotyledons gen 2. $2n=22$. Dry slopes, flats, sagebrush, juniper woodland; 700–2300 m. CaRH, MP; to WA, ID, w NV.

J. osteosperma (Torr.) Little (p. 141) UTAH JUNIPER Tree 1–8 m; monoecious. ST: trunk gen 1; bark thin, gray-brown aging ash-white. LF: gen opposite, 4-ranked; closely appressed, scale-like; gland obscure. POLLEN CONE: 2–3 mm, cylindric. SEED CONE: 5–13 mm, spheric, brown maturing red-brown, dry. SEED: 1(2), 3–4 mm, ovoid, strongly angled. Pinyon/juniper woodland; 1300–2600 m. SnGb, SnBr, GB, DMtns; to MT, NM.

SEQUIOIA REDWOOD

Steve Boyd & James R. Griffin

1 sp.: w N.Am. (Sequoyah, Cherokee chief, 1776?–1843)

S. sempervirens (D. Don) Endl. (p. 141) Tree, pl gen sprouting vigorously from base if cut, from entire crown if burned. ST: trunk < 110 m, to 9 m diam; old crown narrowly conic to \pm cylindrical, gen unbranched in lower 1/2; bark < 30 cm thick near base, fibrous, ridged, red-brown; branches downswep to \pm ascending; twigs persistent < 4 yrs. LF: alternate, green < 3 yrs, persistent < 4; of 2 kinds, those on sprouting, rapidly growing, or fertile sts appressed,

not ranked, < 8 mm, awl-like, others spreading, ± 2 -ranked, 5–25 mm, linear (to lance-linear), gen flat. POLLEN CONE: 2–5 mm, \pm spheric to ovoid. SEED CONE: 13–35 mm, \pm spheric, woody, maturing in 1 yr, persistent < 2; scales peltate, fused to bracts. SEED: 2–7 per scale, 3–6 mm, wings 2, narrow, lateral. $n=33$. Redwood forest; < 1100 m. w KR, NCoRO, w NCoRI, n&c CCo, SnFrB, n SCoRO; sw OR. Tallest trees in N.Am.

SEQUIADENDRON GIANT SEQUIOIA

Steve Boyd & James R. Griffin

1 sp.: CA. (Greek: sequoia tree)

S. giganteum (Lindl.) J. Buchholz (p. 141) Tree, gen not sprouting. ST: trunk < 90 m, to 11 m diam; old crown irregular, with large branches throughout; bark to ± 60 cm thick near base, fibrous, ridged, red-brown; branches spreading to downswep, ends upturned; twigs persistent < 20 yrs. LF: alternate, green < 4 yrs, persistent < 20; of 1 kind, appressed, ± 4 -ranked, < 15 mm, awl-like. POLLEN CONE:

4–8 mm, \pm spheric to ovoid. SEED CONE: 40–90 mm, oblong, woody, maturing in 2 yrs, persistent < 20; scales peltate, fused to bracts. SEED: 3–9 per scale, 3–6 mm, wings 2, unequal, lateral. $n=11$. Uncommon. Mixed-conifer forest, esp with favorable soil moisture; 825–2700 m. SNH. Most massive trunks in N.Am.