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Biosystematic Studies in *Disporum* (Liliaceae–Asparagoideae–Polygonateae) VI. Recognition of the North American Section *Prosartes* as an Autonomous Genus

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Abstract The North American species of *Disporum*, all in section *Prosartes*, are recognized at the generic level based on a review of comparative data. Descriptions, distribution maps based on specimens and a key to the species are presented.

Key Words: *Prosartes*, *Disporum*, North America, Systematics, Liliaceae, Uvulariaceae

INTRODUCTION

This systematic account as part of a long term, team study of *Disporum* (Utech and Kawano 1974, 1976, 1977, Tamura *et al.* 1992; Shinwari *et al.* 1994a, 1994b; Tamura and Kawano 1995) and review by the senior author for the Flora of North America project updates Jones' (1951) work on the American species, i.e., section *Prosartes*, and compliments Hara's (1988) monographic work on the Asian species. A review of comparative evidence between the sections substantiates that the distinctiveness of the Asian and American species far exceeds present–day, sectional limits. Generic recognition of the North American species in *Disporum* section *Prosartes* as *Prosartes* is straight forward. All but one species were either originally described or a combination made in this genus.

Updated North American distribution maps are presented noting several significant range extensions, e.g. *Prosartes hookeri* into the upper peninsula of Michigan, *P. trachycarpa* into northwestern Ontario and the locally rare *P. maculata* into the ancient, Ozarkian uplands of Arkansas.

DISCUSSION

The historic and systematic association of *Disporum sensu lato* has been with

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numerous subfamilies and tribes within the broadly established Liliaceae (Cronquist 1981). The proper taxonomic assignment of *Disporum* within either a broadly conceived Liliaceae, i.e., one including mostly the petaloid Liliiflorae, or a more narrowly, defined segregate family is currently in flux as is the status of many other liliaceous genera. The following list shows some of the past associations of *Disporum*, though generic cohorts have varied considerably: Liliaceae–Uvularieae (Salisbury 1866, Bentham & Hooker 1883), Colchicaceae–Streptopeae (Baker 1875, 1879), Liliaceae–Polygonatae (Engler 1888, Krause 1930, Hutchinson 1934, 1973, Melchior 1954), Convallariaceae–Streptopopsideae (Nakai 1936), Convallariaceae–Polygonatae (Huber 1969, Takhtajan 1980), Asparagales–Convallariaceae (Dahlgren & Clifford 1982), Asparagales–Polygonatae (Schulze 1982), Tricyrtidaceae (Dahlgren & Rasmussen 1983), and Uvlariaceae–Uvularieae (Dahlgren *et al.* 1985, Conover 1982, 1983, 1991, Conran 1987, 1989).

Disporum has most frequently been associated with both *Uvularia* and *Streptopus* in the above schemes as well as with other temperate zone, berry fruited genera: *Clintonia*, *Convallaria*, *Maianthemum*, *Polygonatum* and *Smilacina*. Based on recent analysis of multiple character sets, e.g. Dahlgren *et al.* (1985) and Conran (1987, 1989), *Disporum*, including *Prosartes*, has been associated with the segregate liliaceous family Uvulariaceae.

The genus *Disporum* was first validly published in 1825 by D. Don and is based on the east Asian *D. pullum* Salisbury (= *D. cantoniense* (Loureiro) Merrill) (Jones 1951, Hara 1988). The North American species that were subsequently transferred to *Disporum* by Bentham and Hooker (1883) were described in *Prosartes* of D. Don (1839, 1841). In 1888, Britton reviewed the Genus *Disporum* as then circumscribed. Jones (1951) in recognizing the morphological and cytological differences between the Asian and American species followed tradition in creating two clearly differentiated sections, i.e., section *Disporum* (= *Eudisporum* ; Code: Article 21.3) for the Asian species and section *Prosartes* for the American species. He also felt that the differences were great enough to warrant genera separation. In broadly treating *Disporum*, Hara (1988) recognized section *Prosartes* and subdivided the Asian species into several additional sections. On the other hand, Cronquist (Gleason and Cronquist 1991) in treating the northeastern American species of *Disporum* mindfully questioned this generic status.

A significant list of sectional differences (Jones 1951) includes the following morphological characters. Section *Disporum* has dark blue to black berries, herbage which is glabrous throughout, ascending ovules, inflorescences that appear lateral, spurred perianth segments, and stigmas which are usually deeply three–parted, while section *Prosartes* has straw–colored to reddish berries, herbage which is more or less pubescent, pendulous or horizontal ovules, inflorescences that are strictly terminal, perianth segments marginally gibbous below, and stigmas which are entire or only slightly three–cleft. Consistent differences between the two sections in guard cell size and other micro–morphological leaf characters directed Conover's (1982, 1991) recommendation for generic separation.

Numerous cytological differences between the Asian *Disporum* and the American *Prosartes* species have been known for some time (Jones 1951, Therman 1956, Sen 1973, Utech and Kawano 1974, Tamura *et al.* 1992). In summary, they include the following (Tamura *et al.* 1992). The Asian species of *Disporum* have distinctly larger, mitotic, metaphase chromosomes, ranging from 4.3 to 19.5 um in length, compared to those in the North American *Prosartes* which range from 2.5 to 5.0 um. The former has an

homogeneously diffuse type of interphase chromosome, while the latter has a prochromosome type. In *Disporum*, the condensation pattern of the prophase chromosomes is of a continuous type compared to a proximal type in *Prosartes*. The nuclei and cells in *Disporum* are much larger than those in *Prosartes*. While the base numbers partially overlap, the actual karyotypes are vastly different between the sections (Tamura *et al.* 1992). Furthermore, *Disporum* has a fairly high number of chiasmata which do not terminalize, while the two or three chiasmata in *Prosartes* do terminalize (Therman 1956, Utech and Kawano 1976).

In *Disporum* and *Prosartes*, monocolpate pollen grains are typical and "uniform in shape, structure and sculpture" (Takahashi and Sohma 1980). These authors felt that the pollen variation exhibited little relationships to the sectional groups, yet their hypothetical diagram showed the American species peripheral with derived pollen subtypes and removed from the cluster of Asian species.

Genetic molecular comparisons between these two, Asian and American disjunct groups show very distinct restriction enzyme patterns for their cpDNA (Shinwari *et al.* 1994a). Also the sequencing patterns for their respective *rcb*L markers were clearly different between the sections.

CONCLUDING REMARKS

The formal recognition of the genus *Prosartes* is justified based on the various discussed lines of evidence. Such generic recognition of the North American species is taxonomically straight forward, since valid names exist for all but one species. For *Disporum smithii* (Hooker) Piper, a new combination in the genus *Prosartes* is required and has been made (Shinwari *et al.* 1994b).

Disjunctions of species pairs between eastern and western North American characterize *Prosartes* (Jones 1951, Wood, Jr. 1970). Two closely related species pairs exist: *P. maculata* (east) and *P. trachycarpa* (west), and *P. lanuginosa* (east) and *P. hookeri* (west). The major taxonomic relationships are inter–American and not of the classical pattern with eastern Asia.

Hara's (1988) monographic overview of *Disporum* deserves examination and comment with the removal of section *Prosartes*. Three Asian sections remain: section *Disporum*, section *Ovalia* Hara and section *Paradisporum* Hara. Section *Paradisporum*, imperfectly known from only the north Burmese type specimen of *D. acuminatum* C.H. Wright, is "an aberrant and unique species in the genus" (Hara 1988). Section *Ovalia* is also represented by a single species, *D. ovale* Ohwi (= Streptopus ovalis (Ohwi) Wang and Y.C. Tang), from Korea and north China. Recent morphological, karyological and palynological work on this species (Lee 1979, Lee & Lee 1984, Lee & Yeau 1990) supports its assignment to *Streptopus* (Wang and Tang 1978). South Korean material recently collected by the junior author (*Kawano et al.* 1993 KYO) clearly shows this species to be a *Streptopus* with its elongated pedicels, red berry fruits and generalized pubescence. The leaf margin cilia are very characteristic and similar to those of *Streptopus streptopoides* (Ledeb.) Frye and Rigg (Utech & Kawano 1975, 1976a) also from northeastern Asia. What remains are the 16 species of section *Disporum* (Hara 1988) of which several present species delimination problems (Liu and Ying 1978, Shinwari *et al.* 1994a, Tamura and Kawano 1995).

SYSTEMATIC TREATMENT

Prosartes D. Don

Proc. Linn. Soc. London **1**:48. 1839; Trans. Linn. Soc. London **18**: 531(–532). 1841; *Disporum* sectio *Prosartes* (D. Don) Q. Jones, Contr. Gray Herb. **173**: 11. 1951 –[Greek prosarthao, to append or hang from, in reference to the pendulous ovules or flowers].

Perennial herbs from slender, knotty, creeping rhizomes with fibrous roots, generally pubescent throughout. Stems single, erect, branched above, with two to several papery, brown, sheathing, lower stem bracts. Leaves alternate, sessile or subsessile, often clasping, broadly ovate to oblanceolate, veinlets forming loose reticulum. Inflorescence strictly terminal; flowers perfect, solitary to several in an umbellate cluster, nodding on slender pedicels. Perianth segments 6, distinct, in two similar series, 3 major veins. Stamens 6, hypogynous, basally adnate to perianth segments, falling with them; filaments filiform to basally dilated; anthers extrorse, linear–oblong, dehiscing laterally. Ovaries sessile, narrowly ellipsoidal to obovoid, 3–locular; ovules anatroposus, 2—6 per locule, pendulous or horizontal from axile placentae; styles filiform, included or exserted; stigmas subentire to weakly 3–cleft. Berries more or less fleshy, straw–colored to red; seeds ellipsoid to oblong, smooth, with stony endosperm.

Type species: *Prosartes lanuginosa* (Michaux) D. Don, (*Streptopus lanuginosus* Michaux), "in altis montibus Carolinae meridionalis", P.

Key to Species

1. Ovaries ellipsoidal, glabrous or with a pubescence of simple hairs; ovules pendulous.
2. Stems sparingly branched; leaf margins with short, forward pointed, sharp hairs; flowers turbinate, narrowing and slightly gibbous below; perianth segments 8–18 mm; fruit never more than 6–seeded.
3. Perianth segments lanceolate, long acuminate, greenish–yellow; ovaries glabrous, stigma usually 3–cleft; veins of lower leaf surface densely lanulose; eastern North America. ..... 1. *P. llanuginosa*
3. Perianth segments oblanceolate, short acuminate, creamy–white; ovary pubescent or glabrous, stigma rarely 3–cleft; lower leaf surface scabbidulous or puberulent, the hairs distributed throughout; western North America. .....2. *P. hookeri*
2. Stems freely branched; leaf margins glabrous or looselly ciliate; flowers cylindrical, truncate or slightly gibbous below; perianth segments 15—28 mm; fruit usually more than 6–seeded; coastal western North America. ..... 3. *P. smithii*
1. Ovaries broadly ovoid or obpyriform becoming 3–lobed, papillose or papillose with ascending, stellate glandular hairs; ovules horizontal; leaf margins with scattered, flattened hairs.
4. Leaf tips acute with 7—9 prominent veins; perianth segments lacking purple spots and basal claws, 10—15 mm long; ovary merely papillose; berries reddish orange to bright red; cordilleran and interior North America. .....4. *P. trachycarpa*
4. Leaf tips acuminate with (3)—5 prominent veins; perianth segments speckled with purple spots and narrowly clawed basally, 20—25 mm long; ovaries papillose with stellate glandular hairs; berries pale–straw–colored; eastern North America. .....5. *P. maculata*

1. ***Prosartes lanuginosa* (Michaux) D. Don**, Proc. Linn. Soc. London **1**:48 (1839); Trans. Linn. Soc. London **18**: 532 (1841).

Streptopus lanuginosus Michaux, Fl. Bor. Amer. **1**: 201 (1803); *Uvularia lanuginosa* (Michaux) Persoon, Syn. Pl. **1**: 360 (1805); *Disporum lanuginosum* (Michaux) Nicholson, Ill. Dict. Gard. **2**: 485 (1884).

Plants sparingly branched, 4—7.5 (9) dm, finely and densely pubescent. Leaves narrowly ovate to oblanceolate, narrowly acuminate, rounded basally, 5—12 (15) x 2—5 cm, upper surface glabrate or vein moderately pubescent, lower surface lanulose, veins densely so, marginal cilia short, uniform and forward pointing. Flowers 1—3; pedicels 20–30 mm; perianth segments spreading, linear–lanceolate to linear–elliptic, slightly gibbous below, greenish–white to greenish–yellow, 15—25 mm. Stamens included, 8—15 mm; filaments strap–shaped, narrowly dialated, 6—12 mm; anthers glabrous, 2—4 mm. Ovaries narrowly ellipsoidal, glabrous; ovules pendulous, 2 per locule; styles stout, glabrous, 8—12 mm; stigma weakly 3–cleft. Berries spherical, glabrous, 10—15 mm, bright red, 1—2 (4) seeded; seeds light yellow, 5—6 mm.

Flowering late spring (April) to early summer (June). Rich moist, deciduous woods, coves, 200–1550 m.

Synoptic Distribution (Maps): (Jones 1951, Johnson 1969, Wood, Jr. 1970, Argus & White 1982) **Canada**: Ontario (Argus & White 1982). **USA**: Alabama, Arkansas (Smith 1988), Georgia (Jones, Jr. & Coile 1988), Kentucky, Maryland, New York (New York Flora Association 1990), North Carolina (Radford *et al.* 1968), Ohio (Braun 1967), Pennsylvania (Wherry *et al.* 1979, Rhoades & Klein, Jr. 1993), South Carolina (Radford *et al.* 1965), Tennessee, Virgina (Harvill *et al.* 1977) and West Virgina. (Fig. 1).

Common Name: Yellow Mandarin, Hairy Mandarin.

Chromosome Number: $2n = 18$ (Tamura *et al.* 1992)

Comments: Since Jones' published range map (1951), the Appalachian distribution has become more completely known and extended to the other, ancient, eastern North American upland, the Ozark Mountains of Arkansas (Fig. 1). Only marginal northward expansion beyond the Pleistocene glacial maxima (Flint 1971), particularly into southern Ontario, is evident for this species.

REPRESENTATIVE SPECIMENS EXAMINED: **CANADA**: **ONTARIO**: **Elgin**: Aldborough Twp, 2.5 mi NE Clearville, 175–205 m, 12 JUN 1983, *Brownell & Catling 83–40* CAN. Bayham Twp, 1 km NE of Straffordville, 31 JUL 1986, *MacDonald 17, 748* OAC. 0.5 mi W of Lakeview, 23 MAY 1959, *Maycock 5643* MTMG. Malahide Twp, 6.75 km WNW of Port Burwell, 29 MAY 1987, *Oldham & Reznicek 7255* CAN. St Thomas, 8 mi SE, 14 AUG 1952, *James 1637* DAO OAC. Port Stanley, 27 JUN 1889, *Dearness 2337* DAO, 1.5 mi N, 28 JUN 1956, *Soper & Fleischmann 6365* TRT. E of Jaffa, 17 MAY 1964, *Stewart 1060* DAO. Dunwich Twp, 6 mi SSE of Dutton, Pearce Park, 12 JUN 1982, *Webber 14,304* CAN. 4 km N of Port Bruce, 16 JUN 1986, *Wormington 19* MICH. **Haldimand**: Port Dover, 2 JUL 1960, *Scoggan 14,162* TRT. **Halton**: Waterdown to Alderhost, 7 JUN 1955, *Soper* TRT. Hendrie Valley, 22 AUG 1956, *Tamsalu 1334* DAO. Burlington, N of Cedar Springs Rd, 10 JUN 1974, *Carleton & Carleton* TRT. **Kent**: Orford Twp, 1.5 mi NW of Clearville, 28 JUL 1948, *Soper & Dale* TRT. **Middlesex**: London, Cove, *s.d., Baker* OAC, 20 JUL 1884, *Burgess* MTMG, 25 MAY 1893, *Balkwill* MICH. **Norfolk**: Turkey Point, 3 SEP 1950, *Heimburger* TRT. St Williams, 22 MAY 1937, *Brown 5455* CAN TRT UBC. Simcoe, 31 MAY 1889, *Dearness* DAO, 4 mi SW, 26 SEP 1937, *Brown 5778* TRT UBC. Charlotteville Twp, Spooky Hollow, 26 MAY 1949, *Landon* OAC. South Walsingham Twp, 4 mi N of Port Rowan, 19 MAY 1958, *Maycock 4024* MTMG. Big Creek Valley, 3 km SSW of Walsingham, 13 AUG 1976, *Lindsay*

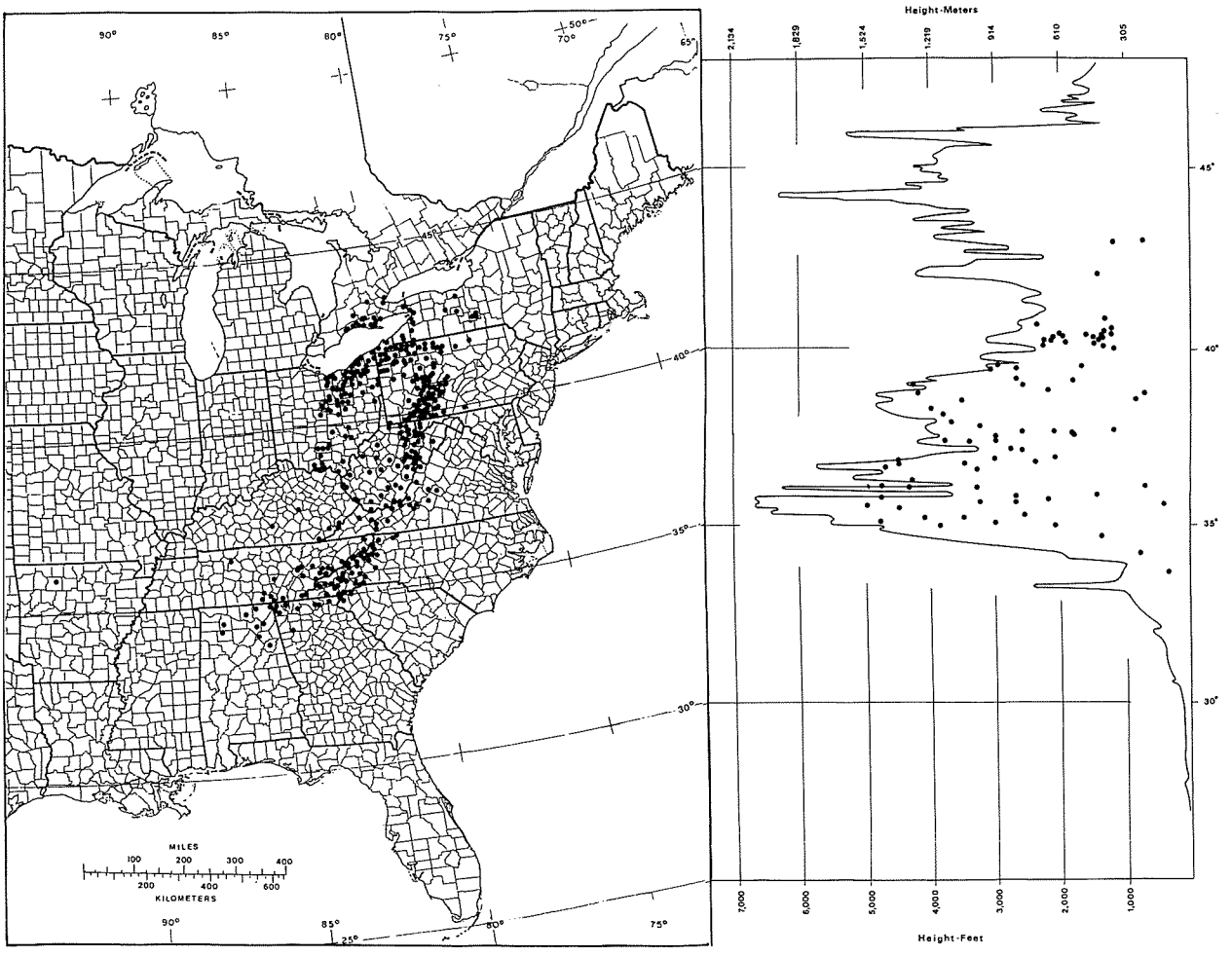


Figure 1. Specimen based distribution map of *Prosartes lanuginosa* (Michaux) D. Don.

1010 CAN. Port Rowan, 16 JUL 1892, *Macoun 27,561* CAN, 17 JUL 1892, *Macoun* NY. Port Dover Junction, 4 JUL 1882, *Macoun* GH, 5 JUL 1882, *Macoun 27,562* CAN. Townsend Twp, 0.5 mi W of Waterford, 20 MAY 1958, *Maycock & Maryniak 5557* MTMG. Woodhouse Twp, 2.5 mi E of Marburg, Miller's Woods along Lynn Valley Rd, 14 JUN 1968, *Dickinson & Cruise 274* CAN DAO GH MTMG QFA QUE TRT. Nanticoke Creek, 4 AUG 1972, *Cruise 11, 184* CAN DAO QFA TRT. Normandale, 22 MAY 1937, *Taylor* TRT. Marburg Station, 21 MAY 1933, *Brown 1287* DAO TRT. Tillsonburg, 25 JUN 1901, *Macoun 54,100* CAN NY. **Oxford**: Dereham Twp, 1 mi W of Tillsonburg, 26 JUN 1950, *Soper & Shields 4814* CAN TRT. **Waterloo**: Dryden tract, Alps Woods, 13 SEP 1975, *Campbell & Diebolt 75–84* CAN. **Welland**: St Davids, 1.5 mi off Queen Elizabeth Way, 23 MAY 1958, *Maycock & Maryniak 2707* MTMG. **Wentworth**: 1.0 mi N of Rock Garden, Wilsons Creek, 16 JUL 1937, *Brown 5662* QUE TRT. Dundas Ravine, 8 JUN 1901, *Herriott* OAC. Hamilton, Royal Botanic Gardens, 14 MAY 1955, *Montgomery 1620* OAC. Cootes' Paradise Sanctuary, 8 JUL 1955, *Tamsalu 1333* DAO. West Flamborough Twp, West Spencer Creek, 620–665 ft, 8 AUG 1979, *Varga* TRT. **UNITED STATES: ALABAMA: Calhoun**

Co.: 9 APR 1939, *Weishaupt* OS. **Dekalb Co.:** Buck's Pocket SP, 27 MAY 1974, *Whetstone & Atkinson 2862* NCU. **Etowah Co.:** 7 mi W Attalla, 13 APR 1969, *Kral 34,297* MO NCU. **Jackson Co.:** Pisgah, 15 SEP 1899, *Biltmore Herbarium 742–A* US. Bryant, Davis Swamp, 29 APR 1938, *Porter* GH. **Lawrence Co.:** Bee Branch Ravine, 9.5 mi SSW of Landersville, 9 MAY 1967, *Clark 12,778* NCU. **Madison Co.:** Monate Sano, 24 APR 1940, *Harper 3777* F GH MO NY PH US. Cave Stand, N of Garth, 16 AUG 1975, *Whetstone et al. 6516A* NCU. **Marshall Co.:** Guntersville, 16 JUN 1913, *Howell 812* US. Big Spring Creek, W of Nixon, 11 APR 1969, *Kral 34,193* NCU. **Winston Co.:** Bankhead NF, Sipsey River picnic area, 8 APR 1967, *Thomas 948* GH. **ARKANSAS: Newton Co.:** Upper Terrapin branch, 700 ft, T 26N R 23W S 26, 2 MAY 1971, *Redfearn, Jr. 27,381* NCU, **GEORGIA: Bartow Co.:** 0.75 mi from Etowah River, S side Allatoona Creek, 23 APR 1946, *Duncan 8104* GH MO US. S side of Etowah River, 1 mi W of Allatoona Dam, 780 ft, 14 AUG 1948, *Duncan 8689* MO. **Catoosa Co.:** S Chickamauga Creek bluffs opposite Graysville, 24 APR 1952, *Harper 4202* GH MO NCU NY. **Dade Co.:** Lookout Mt, Cloudland Canyon, 2 mi E of Trenton, 9 APR 1974, *Hill 1925* NY, 21 APR 1986, *Hill 16,528* GH NY. **Floyd Co.:** Cliffs of the Coosa, Rome, 24 APR 1901, *Biltmore Herbarium 742–C* US. **Murray** Co.: 3.2 km WNW of Gilmer Co line (Mulberry Gap) on USFS Rd 18, 9 MAY 1979, *Boufford & Wood 20,823* CM. **Rabun Co.:** Chattahoochee NF, Warwoman Dell, JUN 1976, *Mills* NY. Rabun Bald, 2400 ft, 4 MAY 1947, *Smith & Duncan 3098* DAO, NW of summit, 3850 ft, 18 MAY 1947, *Duncan 7556* GH MO NY, 2 km from summit, 6 MAY 1979, *Utech 79–035* CM. S of Highlands on NC 106, 11 MAY 1979, *Boufford & Wood 20,891* CM. **Union Co.:** Helton Creek, 1 mi N of Frogtown Gap, 2900 ft, 1 JUN 1934, *Leeds 1538* PH. Chattahoochee NF, Sosebee Cove Scenic Area, 950–1000 m, 10 MAY 1982, *Utech et al. 82–039* CM. **Walker Co.:** Grayton Gulf, 9.5 mi SW of Lafayette, 1400 ft, 4 JUL 1952, *Duncan et al. 13,854* MICH. Pigeon Mt, 1400 ft, 1 AUG 1900, *Harper 331* NY. **KENTUCKY: Adair Co.:** Canoe Creek, 12 mi N of Columbia, 29 APR 1959, *Gibson & Watson 279* F. **Bell Co.:** Middlesboro, 5.5 mi W of US 25E, 20 APR 1986, *Thomas et al. 95,506* NY. **Cumberland Co.:** Vaughn Creek, 17 APR 1940, *Braun 2870* NY US. **Fayette Co.:** Lexington, 1837, *Short* NY. **Harlan Co.:** Big Black Mt, AUG 1893, *Kearney, Jr. 243* F MTMG NY, 30 JUN 1933, *Braun 434* GH US. Pine Mt, AUG 1893, *Kearney, Jr. 113* CAN DAO F GH MO OS. 5.4 mi S of Harlan–Leslie Co line, US 421, 7 MAY 1961, *Browne & Browne, Jr. 4077* NCU. **Letcher Co.:** Black Mt, Collier's Creek, 8 JUL 1935, *Braun* GH. Lilley Cornett Woods, 13 JUL 1978, *Sole 328* NCU. **Lewis Co.:** Vanceburg, 450 ft, 10 MAY 1983, *Buddell, Jr. 1017* NCU NY. 2 mi SW of Petersville, 1 JUL 1940, *Wharton 545* MICH. **Madison Co.:** Berea, Dogfoot Springs, 8 AUG 1935, *Svenson 7207* GH. Berea College forest, Cowbell Hollow, 1200 ft, 30 APR 1959, *Pittillo 62* NY RM. 2.2 mi S of Big Hill to McKee, 25 APR 1975, *Thieret 48,417* OS. **Menifee Co.:** Red River Gorge, E of KY 715, 9 MAY 1969, *Higgins 1190* NCU. **Powell Co.:** Daniel Boone NF, Nada Tunnel, 1 SEP 1974, *Boufford et al. 15,534* NCU. **Taylor Co.:** Muldraugh's Hill, 28 APR 1957, *Wharton & Beckett 102* GH. **Wolfe Co.:** Sky Bridge, 24 APR 1938, *McFarland 4247* MO. Red River Gorge, 2 MAY 1969, *Higgins 1159* NCU. Rock Bridge along Swift Camp Creek, 1.5 mi S of Pine Ridge, 25 AUG 1961, *Henry* CM. **MARYLAND: Garrett Co.:** 3.5 mi S of Deer Park, 2950 ft, 24 MAY 1980, *Reveal et al. 5346* COLO. Castleman River, 1 mi S of Grantsville, 15 AUG 1911, *Stone 14,096* PH. Mountain Lake Park, 31 JUL 1906, *Braun* US, 27 SEP 1906, *Carter* PH. Wolfden Run, 0.5 mi W of Kitzmiller, 1700 ft, 6 MAY 1980, *Reveal & Brown 5151* COLO MICH. Savage River SF, New Germany along Big Run, 1500–1900 ft, 13 AUG 1991, *Utech 91–1171* CM. **NEW YORK: Alleghany Co.:** Alfred, MAY 1909, *Brown* DS. **Cattaraugus Co.:** Busti, SEP 1891, *Wilcox* OS. Upper Stoddard Brook, 5 AUG 1926, *Alexander & House 13,084* GH. New Albion, 7 SEP 1935, *Anderson* MO. **Cayuga Co.:** Auburn, *s.d., Carey* MO. **Chautaugua Co.:** Lake Chautauqua, Bemus Point, 2 AUG 1896, *Churchill* GH. **Chenango Co.:** Oxford, 5 SEP 1885, *Coville* US. **Erie Co.:** West Seneca, along Smocks Creek, 23 AUG 1889, *Shafer* CM MO. Hamburg, along Eighteen Mile Creek, 19 AUG 1918, *Johnson 1694* NY. **Niagara Co.:** DeVaux College Woods, 8 MAY 1896, *Townsend* WTU. **Ontario Co.:** Canadice, Hemlock

Lake, 21 MAY 1915, *Thomas 3733* GH. S of Bristol Springs, 1150 ft, 21 MAY 1938, *Clausen & Mandels 3433* NY. **Tompkins Co.:** Caroline Hills, 8 AUG 1881, *Dudley* DS. Ella Creek, 12 AUG 1916, *Eames 6196* GH. Ulysses, 16 JUN 1918, *Wiegand 9629* GH. 1 mi SE of Brookton, 24 JUL 1918, *Wiegand & Eames 9628* F MO. **Wayne Co.:** Lyons, 23 MAY 1871, *Hankenson* DS GH NY. **Yates Co.:** Penn Yan, *s.d., Sartwell* GH NY PH. **NORTH CAROLINA**: mountains, 1844, *Curtis* MO. Cherokee Reservation, Qualla, 1888, *Mooney* US. **Alleghany Co.:** Bullhead Mt, 26 JUL 1968, *Michael 1134* NCU. **Ashe Co.:** 0.7 mi S of Warrensville, 3 MAY 1958, *Radford 32,792* NCU. Bluff Mt, Perkins Rock, 4 JUN 1967, *Radford 45,387* NCU. **Avery Co.:** Frank, 11 MAY 1893, *Ashe* NCU. 3 km E of US 221, SE of Grandfather Mt, 1600 m, 15 MAY 1979, *Boufford & Wood 20,939* CM. 1 mi S of Senis on US 19E, 3 MAY 1958, *Radford 39,437* NCU. Linville, 4 JUL 1924, *Hunnewell 9173* GH. **Buncombe Co.:** Black Mt, 1854, *Forster* NY. Busbee Mt, 23 APR 1897, *Biltmore Herbarium 742–B* CM DAO F GH MICH MO NCU NY OS PH US. Pisgah NF, Waterfall Creek, 10 mi SE of Dillingham, 18 JUN 1974, *Boufford et al. 14,438* NCU. **Burke Co.:** Glenn Alpine Springs, 17 APR 1977, *Jacobs 51* MU. **Caldwell Co.:** 3 mi S of Globe, 12 MAY 1956, *Radford 11,123* NCU. **Clay Co.:** E of Perry Gap along Buck Creek, 11 JUN 1974, *Boufford et al. 14,162* NCU. **Graham Co.:** Tatham Gap, crest of Snowbird Mts, 3500 ft, 12 SEP 1973, *Leonard 6030* NCU. 5.1 mi N of junction Rds 1391 & 1399 on USFS Rd 423, 21 JUN 1974, *Boufford et al. 14,502* NCU. 0.2 mi W of Graham–Swain Co line, NE of Round Top Mt, 29 MAY 1956, *Radford 11, 771* GH. **Haywood Co.:** Richland Balsam Mts, 5000 ft, 21 MAY 1911, *House 4573* US. Lake Junaluska, 15 JUN 1933, *Blomquist* MU. 1.6 mi S of Sunburst on NC 215 along W Fork Pigeon River, 23 MAY 1974, *Boufford et al. 15,306* NCU. Blue Ridge Parkway, Wolf Ridge, NNE of Soco Gap, 4500 ft, 28 APR 1972, *Utech 72–018* CM. **Henderson Co.:** Hendersonville, JUL 1911, *Huger* MO. 3 mi NW of Saluda, 13 AUG 1959, *Freeman 59–105* NCU. **Jackson Co.:** Soco Falls, 19 JUN 1935, *Hendrix B–16* NY. 5.8 mi N of Glenville, 2550 ft, 14 APR 1949, *Smith et al. 5072* DAO. Blue Ridge Parkway, Thornbuckle Valley View, 1600 m, 19 MAY 1982, *Utech et al. 82–140* CM PH. **Macon Co.:** Coweeta Forest, trail to Ball Creek Rd, 2 AUG 1938, *Foust & Hechenbleikner* NCU. 3 mi N of Highlands Biological Station, 15 MAY 1969, *Cruise et al. 11,063* CAN MTMG NCU QFA QUE TRT. Nantahala NF, Wallace Gap to Albert Mt, 3738–4450 ft, 10 JUN 1975, *Weiss 145* NY. S of Highlands, NC 106 at GA line, 900 m, 10 MAY 1982, *Spongberg & Boufford 1768* A MO. **Madison Co.:** Hot Springs, 22 AUG 1924, *Wehmeyer 744* MICH. French Broad River, downstream from Sugartree branch, 22 JUL 1981, *Sather 1813* NCU. 6.3 mi SE of Marshall on US 25–70, 26 APR 1958, *Ahles & Duke 39, 907* NCU. **McDowell Co.:** 3.3 mi N of Linville Falls on US 221, 20 APR 1956, *Ahles & Bell 11,167* NCU. **Mitchell Co.:** Roan Mt, JUL 1841, *Gray & Carey* GH, 5000 ft, 1 JUL 1880, *Chickering, Jr.* US, 1891, *Carey* NY, JUL 1895, *Ashe* NCU. 1.5 mi N of Penland, 2 MAY 1958, *Ahles & Ashworth 39,245* CM. **Polk Co.:** Pearson Fall's Gorge, 24 AUG 1940, *Coker* NCU. Warrior Mt, 16 JUN 1942, *Walker 3352* NCU. **Rutherford Co.:** Bat Cave Preserve, 24 APR 1981, *McIver 1* NCU. **Surry Co.:** 3 mi NW of Low Gap, 23 JUN 1956, *Radford 13,142* NCU. **Swain Co.:** Alarka Creek, 1 mi NW of Alarka, 24 AUG 1956, *Radford 17,016* COLO. Nantahala Gorge, 26 MAY 1974, *Boufford et al. 13,731* NCU. **Transylvania Co.:** Rosman, W Fork French Broad River, 30 APR 1967, *Radford et al. 9121* NCU UBC. **Watauga Co.:** Blowing Rock Mt, Arctic Springs, 28 JUL 1891, *Small & Heller* F. Grandfather Mt, 6 AUG 1891, *Small & Heller 469* F PH. Rich Mt, 4 mi N of Boone, 9 JUL 1967, *Bozeman et al. 10,688* CM GH KE MICH NCU NY. Boone Lookout Tower, 1400–1560 m, 12 JUN 1975, *Boufford & Wood 16,339* NCU. **Wilkes Co.:** Brushy Mts, 3 MAY 1941, *Radford & Stewart 1895* NCU. **Yancey Co.:** 3.6 mi NNW of Swiss, 27 APR 1958, *Ahles & Duke 39,082* NCU WVA. Crabtree Meadows, 3 mi N of NC 80, 10 MAY 1976, *Solomon 1607* MO. **OHIO: Adams Co.:** E of Lynx, 24 APR 1977, *Carr* OS. Green Twp, head of Russell Forks, 29 APR 1953, *Braun* US. Jefferson Twp, Shawnee SF, Churn Creek Lake, 18 MAY 1975, *Cusick 14,124* KE. **Ashland Co.:** Hanover Twp, Mohican SF, Lyons Falls, 7 SEP 1966, *Cusick 3010* KE, Camp Wesley, 11 MAY 1979, *Emmitt 150* KE. Jackson Twp, 1.5 mi SE of Polk,

31 MAY 1971, *Haynes 3660* OS. Ruggles Twp, Ashland Crall Woods, 4 AUG 1975, *Pell 23* KE. **Ashtabula Co.:** Phelps Run, 30 MAY 1931, *Hicks* OS. Morgan Twp, 2 mi NW of Rock Creek, E side Grand River, 29 JUL 1960, *Herrick* KE. Pierpont Twp, 0.5 mi S Graham Rd, 17 MAY 1979, *Cusick 19, 223* OS. Windsor Twp, Wiswell Rd, 0.5 mi S US 322, 9 MAY 1973, *Tandy 1212* KE. **Columbiana Co.:** S of Salem, 18 JUN 1956, *Weishaupt* OS. **Coshocton Co.:** Bethlehem Twp, 0.5 mi N of Metham, Killbuck Creek, 13 MAY 1967, *Cusick 4126* KE. **Cuyahoga Co.:** Parma, MAY 1896, *Watson* F OS. Bedford Reservation, Tinkers Creek Gorge, 28 JUL 1975, *Fell 24* KE. Mayfield Twp, 0.25–0.5 mi E of Hwy 91, Eastgate, 28 MAY 1955, *Herrick* OS. **Delaware Co.:** Brown Twp, Twp Rd 77, 7 JUN 1962, *Herrick* OS. **Erie Co.:** Berlin Twp, 5 mi E of Milan, 3 MAY 1974, *Sharik 74–3594* CM. Florence Twp, E branch Vermilion River, 18 JUL 1961, *Herrick* OS. Kipton Creek, 7 SEP 1965, *Jones* KE. **Fairfield Co.:** Greenfield, 7 MAY 1935, *Goslin* OS. **Gallia Co.:** Rio Grande, 1892, *Davis* OS. **Geauga Co.:** Bainbridge Twp, E side Brewster Rd at Aurora branch Chagrin River, 10 JUN 1957, *Herrick* OS. Chardon Twp, 3 mi W of Chardon, 30 JUL 1959, *Hawver 30* KE. Parkman Twp, Grand River, 21 MAY 1968, *Cooperrider 10,705* KE. **Holmes Co.:** Knox Twp, 1.2 mi N of Hwy 520, 11 AUG 1960, *Herrick* OS. Mechanic Twp, Troyer's Hollow, 15 MAY 1971, *Wilson 1569* KE. Monroe Twp, Twp Hwy 286 near junction with 288, 9 SEP 1971, *Wilson 2623* KE. **Huron Co.:** 2.5 mi SW of W Clarksfield, 8 MAY 1966, *Jones* QFA. Wakeman Twp, Vermilion River, 2 mi N of Wakeman, 11 MAY 1965, *Jones* KE OS. **Jefferson Co.:** Salem Twp, Jefferson Lake SP, 24 JUL 1961, *Herrick* OS. Springfield Twp, 0.5 mi S of Bergholz, 15 MAY 1962, *Buchanan 520* OS. **Knox Co.:** Jefferson Twp, 2 mi N of Brinkhaven, 11 AUG 1960, *Herrick* OS. Liberty Twp, 1.5 mi N of Bangs, 8 MAY 1970, *Stuckey 8765* OS. Pike Twp, 0.25 mi E of junction Co Twp Hwys 15 & 416, 7 AUG 1974, *Pusey 588* KE. **Lake Co.:** Chapin SF, 1 mi NW of Kirtland, 30 JUN 1960, *Cooperrider 6122* NCU. Madison Twp, 1 mi W Madison, 15 MAY 1973, *Tandy 1283* KE OS, 8 MAY 1966, *Cusick 1977* KE. **Lawrence Co.:** Rock Hollow, 27 APR 1952, *Bartley* OS. Hamilton Twp, Long Bridge Hollow, 29 APR 1979, *Spooner 11* MU. **Licking Co.:** Fallsburg Twp, Waketomika Creek, 1.3 mi N of Fallsburg, 31 JUL 1963, *Herrick* OS. **Lorain Co.:** Plumb Creek, 3 JUL 1891, *Cowles* MICH, 4 JUL 1892, *Boque* OS. Brownhelm Twp, Mill Hollow, Bacon Woods Park, 6 AUG 1979, *Brandenburg 246* OS. Henrietta Twp, Firelands Reservation, 7 AUG 1971, *Peabody 332* KE. **Mahoning Co.:** Petersburg, 21 SEP 1884, *Shafer* CM. Poland Twp, 0.5 mi S of Lowellville, 30 JUN 1960, *Herrick* OS. **Medina Co.:** Hinkley Twp, Whipps Ledges, E branch of Rocky River, 28 JUL 1957, *Herrick* OS. Lafayette Twp, junction of Hwys 162 & 42, 24 JUL 1964, *Mutz* KE. **Morgan Co.:** Homer Twp, 17 JUN 1968, *Silberhorn 1754* KE. Malta Twp, AUG 1969, *Silberhorn 4525* NCU. York Twp, 0.1 mi S of Muskingum Co line, Hwy 555, 21 JUL 1963, *Herrick* OS. **Morrow Co.:** Chester Twp, 10 mi ESE of Mt Gilead, 12 MAY 1973, *Antibus et al. 34* KE. Lincoln Twp, 0.1 mi S of Fulton, 9 MAY 1963, *Cusick* OS. **Muskingum Co.:** Brush Creek Twp, Brush Creek, Hwy 555 near Morgan Co line, 21 JUL 1963, *Herrick* OS. **Perry Co.:** Corning, 1892, *DeLong* OS. **Pike Co.:** 3 mi S of Latham, 25 MAY 1963, *Bartley* OS. **Portage Co.:** Hiram Twp, Forty-foot Falls, 20 MAY 1978, *Andreas & Cusick 1799* KE. Nelson Twp, Nelson Ledges SP, 20 MAY 1966, *Cusick 2176* NCU. Eagle Creek Preserve, 1.5 mi NE Garrettsville, 21 MAY 1973, *Tandy 1299* KE. Suffield Twp, 3.25 mi S of Mogadore, 18 JUN 1955, *Ervin & Herrick* OS. **Richland Co.:** Mansfield, 17 MAY 1886, *Wilkinson 10,368* CM MO NY. Springfield Twp, 1 mi S of Ontario, 9 MAY 1970, *Stuckey 8782* OS. Troy Twp, 17 MAY 1961, *Weishaupt* OS. **Ross Co.:** Bowser Tract, 21 AUG 1937, *Crowl 189* OS. Colerain Twp, Tar Hollow, 10 AUG 1936, *Bartley & Pontius 21* NY. Harrison Twp, *s.d., Bartly* OS, 11 JUL 1937, *Crowl* NY. **Scioto Co.:** Shawnee SF, Camp Gordon CCC, Friendship, 21 JUN 1934, *Demaree 10,748* MO NY OS. 1 mi NE of Otway on OH 348 from OH 73, 13 MAY 1983, *Utech & Ohara 83–293* CM. Nile Twp, Wolf Den Reservoir, 7.5 mi miles NW of Friendship, 15 MAY 1978, *Bryant 762* MU. **Stark Co.:** Osnaburg Twp, 2 SEP 1937, *Brown* OS. **Summit Co.:** Bath Twp, Yellow Creek Valley, Revere Dr, 15 MAY 1973, *Black 78* KE. Boston Twp, 1 mi W of Riverview Rd & N of Boston Mills Rd, 1 SEP 1977,

Tomci 1196 KE. Copley Twp, 0.9 mi W of Hametown Rd, N-side of OH 162, 8 MAY 1979, *Andreas 3202* KE. Twinsburg Twp, 1.5 mi NW of Twinsburg, 28 MAY 1955, *Herrick* OS. **Trumbull Co.:** Farmington Twp, S side of B&O Railroad, 0.5 mi E of Co 227, 8 MAY 1960, *Herrick* OS. **Wayne Co.:** Meyer's Hollow, 5 SEP 1899, *Selby & Duvel 417* NY OS. Funk's Hollow, 17 OCT 1899, *Selby & Duvel 418* OS. Canaan, Killbuck Creek, 26 JUL 1966, *Cusick 2665* KE. Sugar Creek Twp, 0.2 mi N of Jericho Rd, 1 MAY 1977, *Andreas 669* KE. **PENNSYLVANIA: Armstrong Co.:** Mahoning Creek along PA 28, 12 MAY 1951, *Henry & Buker* CM. **Bedford Co.:** 0.13 mi NWW of Lovely, 1340 ft, 14 MAY 1939, *Berkheimer 628* CM PH. 2.75 mi NNW of Pavia, 2000 ft, 4 SEP 1960, *Berkheimer 20,156* PH. 2.75 mi N of Hyndman, 1480 ft, 16 MAY 1948, *Berkheimer 9688* PH. Bedford Springs, 17 MAY 1952, *Buker* CM, 28 SEP 1969, *Pearth* CM. 2 mi E of West Bend, 21 MAY 1970, *Duppstaddt & Duppstaddt 2612-A* CM COLO KE MICH NCU NY. **Blair Co.:** Canaan, 3 mi W of Duncansville, 5 JUN 1942, *Wood, Jr. 2015* PH. Juniata Gap, 1.2 mi NE of Buckhorn, 2360 ft, 25 MAY 1979, *Kunsman 3135* CM. Short Mt to Loop Mt, 1 mi ESE of Kladder Station, 1200 ft, 4 MAY 1985, *Kunsman 6813* CM. Sinking Valley-Brush Mt area, 10 mi NE of Altoona, 400 m, 6 SEP 1987, *Utech 87-865* CM. **Bradford Co.:** 2.75 mi NE of Columbia Cross-roads, 11 SEP 1947, *Moul 5092* PH. **Butler Co.:** Slippery Rock, 20 MAY 1939, *Russell* PH. **Cambria Co.:** Stony Creek, S of Johnstown, 16 JUN 1907, *Bartram* NY. Sang Hollow Station, 7 MAY 1887, *Seal* F PH. 4 mi NE of Belsano, 15 MAY 1949, *Mason* CM. 3.5 mi W of Ebensburg, 5 JUN 1942, *Pohl 3777* CM. 1 mi E of Salix along PA 160, 11 SEP 1954, *Henry & Buker* CM. **Centre Co.:** Bald Eagle Mt, 0.5 mi S of Julian, 11 MAY 1939, *Kelly* GH. Centennial to Port Matilda, 14 MAY 1974, *Buker* CM. **Clarion Co.:** Clarion River mouth, 6 SEP 1921, *Jennings* CM. **Clearfield Co.:** 2 mi E of Curwensville, 11 JUN 1935, *Lisi* PH. 2 mi S of Westover along PA 36, 24 SEP 1947, *Henry* CM. Susquehanna River, 1 mi S of Patchinville, 24 MAY 1947, *Henry* CM. 2 mi E of Bells Landing, 24 MAY 1947, *Henry* CM. **Crawford Co.:** Cambridge Springs, 7 JUL 1928, *Murray* CM. Spring Twp, 3 mi ENE of Springboro, MAY 1970, *Leberman* CM. 5.5 mi ENE of Guys Mill along PA 198, 1 MAY 1985, *Utech 85-027* CM. **Elk Co.:** Medix Run, 7 JUN 1932, *McClelland* CM. 4 mi NE of Ridgeway, 11 OCT 1940, *Jennings* CM. 4 mi E of Johnsonburg, 3 JUN 1947, *Westerfeld 2137* GH PH. **Erie Co.:** Union City, 1891, *Porter* PH. Cory, 2 JUN 1893, *Churchill* GH MO. Wintergreen Gulf, 27 AUG 1879, *Guttenberg* CM. Elk Creek, N of Fairview, 11 MAY 1930, *Jennings & Van Dersal* CM. Six-mile Creek mouth, 28 JUN 1950, *Henry & Buker* CM. 6 mi NE of Edinboro along PA 6, 11 NOV 1966, *Buker* CM. **Fayette Co.:** Fallingwater, 4 mi N of Ohiopyle, 18 JUN 1966, *Buker* CM. Tate's Hollow, tributary of Indian Creek, 26 MAY 1934, *Graham* CM. Indian Creek Reservoir, 1 mi SE of Normalville, 4 MAY 1938, *Henry* CM. Wymp's Gap, Lake of the Woods, 21 OCT 1947, *Buker* CM. Saltlick Twp, 1.5 mi W of White, 500 m, 24 MAY 1987, *Utech 87-181* CM. **Forest Co.:** S of West Hickory along Little Hickory Run, 8 JUN 1942, *Wood, Jr. 2276* PH. 0.5 mi N of East Hickory, 22 MAY 1948, *Henry* CM. **Franklin Co.:** Mt Alto, 16 MAY 1921, *Jennings* CM. **Greene Co.:** E of Deep Valley, 23 MAY 1970, *Buker* CM. **Huntingdon Co.:** Birmingham, 1866, *Lowrie* PH, ridges opposite Mountain Seminary, JUN 1867, *Davis* F NY. **Indiana Co.:** Dixon Run, 1 mi SW of Deckers Point, 17 SEP 1948, *Lewis* PH. Brady Run, 1 mi N of Glen Campbell, 7 JUN 1950, *Henry & Beer* CM. Sides Run, 1 mi E of Pine Flats, 22 MAY 1952, *Henry & Beer* CM. **Jefferson Co.:** McKee Run, 1.5 mi ENE of Desire, 24 JUN 1947, *Wahl 2884* PH. 5 mi S of Brookville, 23 MAY 1948, *Burkhouse* CM. 0.8 mi W of Allens Mills along PA 830, 27 MAY 1953, *Henry & Beer* CM. **McKean Co.:** Allegheny NF, Morrison, 1400 ft, 17 SEP 1935, *Park 417* RM. 2 mi SE of Port Allegany, 8 SEP 1949, *Wherry* PH, 5 mi N, 30 JUL 1956, *Henry* CM. 2.5 mi SE of Derrick City, 15 AUG 1950, *Fogg, Jr. et al. 19,939* PH. **Mercer Co.:** 3 mi NW of Sharpsville along PA 846, 14 MAY 1955, *Buker* CM. 3.5 mi NW of Mercer along PA 258, 8 SEP 1956, *Henry & Buker* CM. **Potter Co.:** Coudersport, 6 SEP 1920, *Jennings & Jennings* CM. Cross Fork Hollow, Windfall Run, 14 JUN 1925, *Graham 68* CM. 2 mi S of Sweden Valley, 13 JUN 1935, *True 219* PH. **Somerset Co.:** 5.5 mi S of Berlin, Hays Mills Fire Tower, 6 SEP 1952, *Henry & Buker*

PH. 4.7 km NNW of Thomas Mills, 473 m, 18 MAY 1956, *Shetler 341* NY. Klondike Ridge, S of Confluence near Casselman & Youghiogheny Rivers, 500 m, 15 MAY 1979, *Utech 79–141* CM ($2n = 18$). **Tioga Co.:** Wellsboro, 24 SEP 1931, *Gress* PH. **Venango Co.:** 8 mi N of Cooperstown along PA 427, 28 MAY 1958, *Henry & Beer* CM. Beatty Run, 3.5 mi NW of Cooperstown, 13 MAY 1963, *Henry* CM. **Warren Co.:** Hearts Content Forest, 1 mi W of Sheffield, 12 JUN 1935, *True 196* PH. 0.5 mi N of Spring Creek, 20 JUN 1951, *Fogg, Jr. et al. 20,777* PH. 1.25 mi WNW of Tidioute, 21 JUN 1951, *Fogg, Jr. et al. 20,818* PH. 2.6 mi SE of Scandia, 23 MAY 1959, *Henry & Buker* CM. **Westmoreland Co.:** St Vincent College, 10 MAY 1876, *Pierron* NY US. St Boniface Chapel, 2120 ft, 1 SEP 1936, *Duman 317* CM. Powdermill Nature Reserve, 4 MAY 1985, *Thompson & Loughlin 2300* CM PH. Loyalhanna Creek Gorge, Sleepy Hollow, 1100–1700 ft, 2 MAY 1992, *Utech 92–238* CM. 2 mi NE of Lycippus along PA 982, 1300–1800 ft, 9 MAY 1992, *Utech 92–389* CM. Furnace Run, 3 mi SE of Laughlintown, 1800–2100 ft, 31 JUL 1992, *Utech 92–1869* CM. **SOUTH CAROLINA: Greenville Co.:** Vaughan's Gap, 14 AUG 1921, *Peattie 1243* NCU. **Oconee Co.:** Tamasee Falls, 5 MAY 1906, *House 2084* MO. 4.5 mi NW of Tamasee along SC 107, 2 SEP 1956, *Radford 17,811* NCU. Poor Mt, 26 APR 1965, *Radford 44,711* NCU. **Pickens Co.:** 2.7 mi N from US 178 on Sassafras Mt Rd, 8 JUN 1956, *Ahles & Bell 14,332* NCU. **TENNESSEE:** Lookout Mt near GA line, 21 APR 1906, *Churchill* MO. Great Smokey Mountain (GSM) NP, Huskey Gap, 22 APR 1953, *Henry & Beer* CM. GSM NP, Rainbow Falls, 6 AUG 1957, *Comte 1136* MO. **Blount Co.:** Calderwood, 22 MAY 1955, *Sharp 18,865* NCU. GSM NP, Little River, 3.5 mi E on Hwy 73, 18 APR 1959, *Wood, Jr. et al. 8814* GH NCU. Bearwallow Mt along Reed Creek, 1 mi W of Sevier Co line, 26 APR 1980, *Thomas et al. 71,119* NY. **Claiborne Co.:** Cumberland Gap, 2 MAY 1903, *Biltmore Herbarium 742* US. **Cocke Co.:** 3 mi from Wolf Creek Station, 6 SEP 1897, *Kearney, Jr. 917* MO NY OS US. Wolf Creek, 20 APR 1898, *Allen* OS, MAY 1898, *Ruth 146* MO NY. 3.7 mi N of Carters Gap on TN 143, 1300 m, 10 MAY 1976, *Boufford et al. 18,204* MO. **Davidson Co.:** Joelton, 16 JUL 1922, *Svenson 94* GH. **Franklin Co.:** 0.4 mi S of entrance St Mary's School & 0.3 mi E of TN 56, 24 APR 1963, *Ramseur & Sasnett 59* NCU. **Grainger Co.:** Lea Lakes, Blaine, 25 APR 1934, *Jennison 335* MO. **Greene Co:** Paint Creek, 0.4 mi N of French Broad River, 28 APR 1974, *Boufford & Massey 12,961* CM. **Grundy Co.:** Cumberland Mt below Monteagle, 12 MAY 1939, *Svenson 9917* GH. Monteagle along I–24, 23 APR 1969, *Kral 34,331* MO NCU. Grundy SF, Tracy City, gorges near Stinking Creek & Firey Gizzard River, 2 MAY 1972, *Gonsoulin 1593* WVA. **Hamilton Co.:** Lookout Mt, 21 APR 1906, *Churchill* MO. along Tennessee River, MAY 1933, *McGilliard* GH. **Knox Co.:** Knoxville, bluffs along Tennessee River, 11 JUN 1893, *Ruth 56* PH. Knoxville, 5 JUN 1920, *Ruth 454* GH. **Marion Co.:** Fiery Gizzard Gorge, W of Anderson Point, 9 APR 1965, *Clark & Welch 1513* NCU. **Morgan Co.:** Emory River, 23 APR 1893, *Kearney, Jr.* 71 US. **Polk Co.:** 4 MAY 1928, *Leeds 1317* MO PH. Cherokee NF, Unicoi Mts, 7 mi NW of Turtletown, 20 APR 1968, *Mahler et al. 4741* NCU, 20 APR 1968, *Mahler et al. 4754* NCU. **Putnam Co.:** Monterey, 2 MAY 1942, *Sharp 1703* MO. **Roane Co.:** Harriman, APR 1893, *Kearney, Jr.* OS. Olivus Springs, MAY 1897, *Ruth 1168* NY. Clinch River Breeder Reactor Site, 14 APR 1974, *Hale & Clebsch 47,541* CM. **Sevier Co.:** Chilhowee Mts, Sugarloaf Mt, 1300–1600 ft, 23 APR 1966, *Thomas* NY, Bench Mt crest, 2200 ft, 23 APR 1966, *Thomas* NY. Greenbriar Cove, 8 mi NE of Gatlinburg, 1400 m, 4 MAY 1968, *D'Arcy 2437* MO. GSM NP, Chimneys above US 41, 2700 ft, 16 APR 1990, *Utech et al. 90–177* CM. **Sullivan Co.:** Holston Mt, 3300 ft, 19 MAY 1934, *Sharp & Jennison 888* PH, 16 MAY 1941, *Sharp 1469* PH. **Unicoi Co.:** Cherokee NF, Long Arm branch & Clark Creek junction, 16 JUN 1961, *Ahles & Smith 54,599* NCU. **Van Buren Co.:** 6–7 mi E of Spencer, 31 APR 1971, *Kral 2358* GH. **Washington Co.:** 1 mi S of Camp Albison on Horse Cove Rd, 1500 ft, 21 APR 1974, *Gonsoulin 3650* WVA. **VIRGINIA: Amherst Co.:** Blue Ridge Parkway, Lickley Springs Gap, 29 AUG 1962, *Freer 2641* GH US. **Augusta Co.:** North River, Staunton, 6 MAY 1934, *Rawlinson 185* US. **Bath Co.:** Hot Springs, 11 MAY 1916, *Hunnewell 4109* GH. Allegheny Mt, Paddy Knob, 4000 ft, 26 JUN 1971, *Stevens 3622* NCU. **Bedford Co.:** Montgomery,

26 MAY 1870, *Curtiss 8218* MO. **Buchanan Co.:** Big A Mt, Council, 2800 ft, 22 JUL 1973, *Stevens 7480* NCU. **Craig Co.:** Alleghany Station, 19 JUN 1895, *Glatfelter* MO, 545 m, 15 SEP 1903, *Steele & Steele 185* GH. **Giles Co.:** Bald Knob, 4100 ft, 26 AUG 1937, *Fogg, Jr. 13,517* PH. Butt Mt along Laurel Creek, 4 mi WNW of Mountain Lake, 8 AUG 1937, *Fogg, Jr. 13,047* PH. Salt Pond Mt, 30 MAY 1890, *Brown et al.* NY US. Jefferson NF, Peter's Mt Wilderness Area, 29 JUN 1980, *Castro 927* NY. Wolf Creek, 10 mi SW of Narrows, 13 AUG 1958, *Cooperrider 5294* KE. **Grayson Co.:** White Top Mt, 4700 ft, 22 MAY 1934, *Leeds 1537* PH. **Highland Co.:** W of McDowell, Crab Run, 23 AUG 1927, *Wherry & Pennell 13,383* MO PH. **Montgomery Co.:** 3 mi NE of Nutter's Hollow, 3 MAY 1960, *Kral 10,024* NCU. **Roanoke Co.:** Poor Mt, 5 mi SSW of Singer, 10 JUL 1942, *Wood, Jr. 3737* PH. Bent Mt, 1.5 mi WNW of Airpoint, 16 MAY 1941, *Wood, Jr.* PH.. Roanoke River, 1.25 mi SSW of Wabun, 22 AUG 1942, *Wood, Jr. 5246* GH. **Rockbridge Co.:** Blue Ridge Parkway (mile 49), Licklog Springs Gap, 18 MAY 1966, *Freer 3832* NCU. **Smyth Co.:** Stalie's Knob along Stalie's Creek, 2400 ft, 18–19 MAY 1892, *Small* F MO. White Top Mt, 4000–5000 ft, 28–29 MAY 1892, *Small* MU. Marion, 2100 ft, 23 MAY 1892, *Britton et al.* CM MU NY. Pond Mt, East Marion, 3000 ft, 25 MAY 1892, *Small* F PH US. Hungry Mother SP, 30 AUG 1949, *Mikula 3997* NCU. **Tazewell Co.:** Clinch Mt Wildlife Area, 6.3 km N of Smyth Co line on VA 91, 17 MAY 1979, *Boufford & Wood 21,014* CM. **Wise Co.:** Big Stone Gap, 5 MAY 1903, *Biltmore Herbarium 742–E* US. **Wythe Co.:** 7 JUN 1872, *Curtiss* F MO. Wytheville, Reed Creek, MAY 1874, *Shriver* MICH, OCT 1878, *Shriver* CM. **WEST VIRGINIA: Barbour Co.:** Tygart Junction, 24 SEP 1904, *Greenman 99* GH. 2 mi S of Phillippi, 14 JUL 1937, *Core 5953* WVA. **Braxton Co.:** Sutton, AUG 1931, *Ferry* WVA. **Cabell Co.:** Devil's Den Hollow, N of Milton, 15 MAY 1937, *Williams 578* CM F GH MICH MO NY PH TRT WVA. **Calhoun Co.:** Pink, MAY 1933, *Harris* WVA. **Clay Co.:** 1 mi N of Clay, 19 JUL 1938, *Core 511* WVA. **Fayette Co.:** Clifftop, 30 MAY 1937, *West 250* WVA. **Grant Co.:** NE of Mt Storm, 2700 ft, 5 JUN 1956, *Rossbach 970* WVA. Fairfax Stone, N branch Potomac River, 10 AUG 1967, *Downs 2126* NCU. **Greenbrier Co.:** White Sulphur Springs, 17–18 MAY 1909, *Eggleston 4343* GH MO NY PH US. Kate's Mt, summit, 21 MAY 1939, *Hermann 10,290* GH. Little Clear Creek, 16 MAY 1947, *Peck* WVA. Briery Knob, 3.5 mi from Anjean, 3700 ft, 2 SEP 1950, *McCutcheon* CM. Cole's Mt, 5 AUG 1959, *Clarkson 3199* RM. **Hardy Co:** Sugar Camp Hollow, 4.5 mi W of Old Fields, 13 MAY 1961, *Wratchford 1362* WVA. **Kanawha Co.:** East Banks, 15 June 1903, *Biltmore Herbarium 742–G* US. Clendenin, 800 ft, 26 MAY 1933, *Strickland 39* WVA. Queen Shoals, SEP 1935, *Randolph 230* WVA. **Logan Co.:** 1954, *Cutright* WVA. **Marion Co.:** Valley Falls, 2 OCT 1960, *Sweeney* WVA. **Marshall Co.:** Glendale, 1 MAY 1937, *Brooks & Margolin* WVA. **McDowell Co.:** Coalwood Mt, 28 APR 1968, Music WVA. **Mercer Co.:** Brush Creek, 16 JUL 1930, *McNeill* WVA. Athens Campus, APR 1931, *McNeill* WVA. **Mineral Co.:** Shaw, AUG 1950, *Brown* WVA. **Mingo Co.:** Varney School, 8 JUL 1930, *Berkeley* WVA. Little Huff Creek mouth, 10 JUL 1930, *Berkeley* GH. Williamson, Sycamore Hollow, 18 APR 1937, *Williams* PH WVA. **Monongalia Co.:** Clay Furnace near Cheat Haven, 27 AUG 1911, *MacElwee* PH. Rockley, 18 MAY 1923, *Davis 134* CM. Cheat View, 1121 ft, 24 AUG 1946, *Mozingo* CM, 24 AUG 1946, *Buker* CM. 1 mi NW of Cascade, Maiden Springs Run & Deckers Creek junction, 9 MAY 1965, *Cusick 228* KE. Richard, E of Morgantown, 8 MAY 1979, *Rader 2157–A* WVA. **Monroe Co.:** Gap Mt, 850 m, 2 SEP 1903, *Steele & Steele 185* NY. Peters Mt, 3000 ft, 4 JUL 1933, *Griscom & Hunnewell 18,681* GH. **Pendleton Co:** Monogahela NF, 3.6 mi S Spruce Knob, 4200 ft, 18 AUG 1957, *Clarkson 1746* WVA. **Pocahontas Co.:** Elk Mt, 3500 ft, 26 MAY 1933, *Weatherby & Weatherby 6417* GH. Clay Hollow near Cass, 11 MAY 1951, *Clarkson 284* RM. Monogahela NF, 2 mi N of Durbin along US 250, 6 SEP 1959, *Clarkson 3968* WVA. Kenniston Mt, W of Mill Point along WV 39, 28 JUL 1971, *Ahles 70,084* CM. **Preston Co.:** Masontown, 9 MAY 1903, *Wright 927* WVA. Lake Terra Alta, 26 MAY 1937, *Ammons & Pattison* WVA. 2 mi E of Erwin, 24 MAY 1940, *Pohl 1859* PH. 4 mi S of Silver Lake along US 219, 31 AUG 1946, *Henry* CM. 0.5 mi S of Ranger Cabin on Chestnut Ridge Rd, 14 MAY 1964, *Stewart*

WVA. **Putnam Co:** Bills Creek Rd, 24 APR 1973, *Denison* WVA. **Raleigh Co.:** Piney River at Batoff, 10 MAY 1940, *Tosh 114* WVA. **Randolph Co.:** Monongahela NF, along Gandy Creek at Sinks' exit, 19 AUG 1959, *Clarkson 3663* NCU. 1.5 mi S of Laurel Creek & Hwy 33, E of Middle Fork River, 2550 ft, 21 MAY 1962, *Rossbach & Lamb 3994* WVA. SE of Alexander, S of Left Fork of Buckhannon River, 2200 ft, 30 APR 1977, *Rossbach 9369* WVA. **Ritchie Co.:** Myers Run Rd, S of US 50, 8 AUG 1976, *Bartholomew & Wilson* WVA. **Summers Co.:** Hinton, 26 APR 1933, *Brown* WVA. Hinton Mt, Horseshoe Bend Hollow, 4 MAY 1939, *Tosh* CAS WVA. **Taylor Co.:** 9 JUL 1948, *McCauley & Chamberland* WVA. **Tucker Co.:** 2.5 mi SW of US 219 near Parson along Old Elkins Rd, 1800 ft, 10 MAY 1981, *Rader & White 2294* WVA. **Wayne Co.:** Hammond Hollow, 15 MAY 1932, *Lycan 18* WVA. Buffalo Creek, 14 APR 1938, *Plymale 271* WVA. **Webster Co.:** AUG 1957, *Hinkle* WVA. **Wetzel Co.:** between Hundred & Earnshaw, 21 JUN 1931, *Haught 479* WVA. Burton, 22 JUN 1878, *Mertz* NY. **Wyoming Co.:** Cabin Creek, *s.d.*, *Evans* WVA.

2. *Prosartes hookeri* Torrey, Pacif. Railr. Rep. **4**: 144 (1857).

Prosartes lanuginosa (Michaux) D. Don var. *hookeri* (Torrey) Baker, Journ. Linn. Soc., Bot. **14**: 587 (1875); *Disporum hookeri* (Torrey) Nicholson, Ill. Dict. Gard. **2**: 484 (1884); *Prosartes oregana* S. Watson, Proc. Amer. Acad. **14**: 271 (1879); *Disporum oreganum* (S. Watson) Miller, Bailey Cycl. Amer. Hort. 496 (1900); *Disporum hookeri* var. *oreganum* (S. Watson) Q. Jones, Contr. Gray Herb. **173**: 32 (1951); *Lethea oregana* (S. Watson) Farwell, Papers Mich. Acad. Sci. **2**: 20 (1923); *Prosartes trachyandra* Torrey, Pacif. Railr. Rep. **4**: 144 (1857); *P. lanuginosa* var. *trachyandra* (Torrey) Baker, Journ. Linn. Soc., Bot. **14**: 587 (1875); *Disporum trachyandrum* (Torrey) Britton, Bull. Torrey Bot. Club **15**: 188 (1888); *D. hookeri* var. *trachyandrum* (Torrey) Q. Jones, Contr. Gray Herb. **173**: 36 (1951); *Prosartes hookeri* var. *oblongifolia* S. Watson, Geol. Surv. Calif. Bot. **2**: 179 (1880); *Disporum hookeri* var. *oblongifolia* (S. Watson) Britton, Bull. Torrey Bot. Club **15**: 188 (1888); *Prosartes parvifolia* S. Watson, Bot. Cal. **2**: 179 (1880); *Disporum parvifolium* (S. Watson) Britton, Bull. Torrey Bot. Club **15**: 188 (1888).

Plants sparingly branched, 3—8 (10) dm, roughly pubsescent. Leaves variable, ovate to lanceolate, long acuminate to acute, rounded to obliquely subcordate basally, 3—9 (14) x 1.5—5 cm, lower surface scabridulous or puberulent especially on veins, upper surface glabrate or sparsely so, marginal cilia minute to scabrous, pointed sharply forward. Flowers (1) 2—3 (4); pedicles 20—30 mm; perianth segments spreading, oblanceolate, dull or creamy-white to greenish-white, (8) 10—18 (20) mm. Stamens included or exserted, 8—15 mm; filaments filiform; anthers oblong, glabrous or minutely sharp-bristly, (2) 3—5 mm. Ovaries ellipsoidal, glabrous or more or less hairy, ovules pendulous, 2 per locule; style filiform, glabrous or basal half pubescent; stigma entire to weakly 3-lobed. Berries ovoid to obovoid, narrowing apically into short hairy beak, bright red, 8—16 mm, commonly 4 (6) seeded; seeds browish yellow, 5—6 mm.

Flowering early spring (March) to mid summer (June). Damp, shady forests and thickets, 100–2000 m.

Synoptic Distribution (Maps): (Jones 1951, Wood, Jr. 1970 Mladenoff 1990) **Canada**: Alberta, British Columbia. **USA**: California, Idaho, Michigan (Voss 1972; Mladenoff 1990), Montana, Oregon and Washington. (Fig. 2).

Common Name: Fairy Bells

Chromosome Number: $2n = 18$ (Tamura *et al.* 1992)

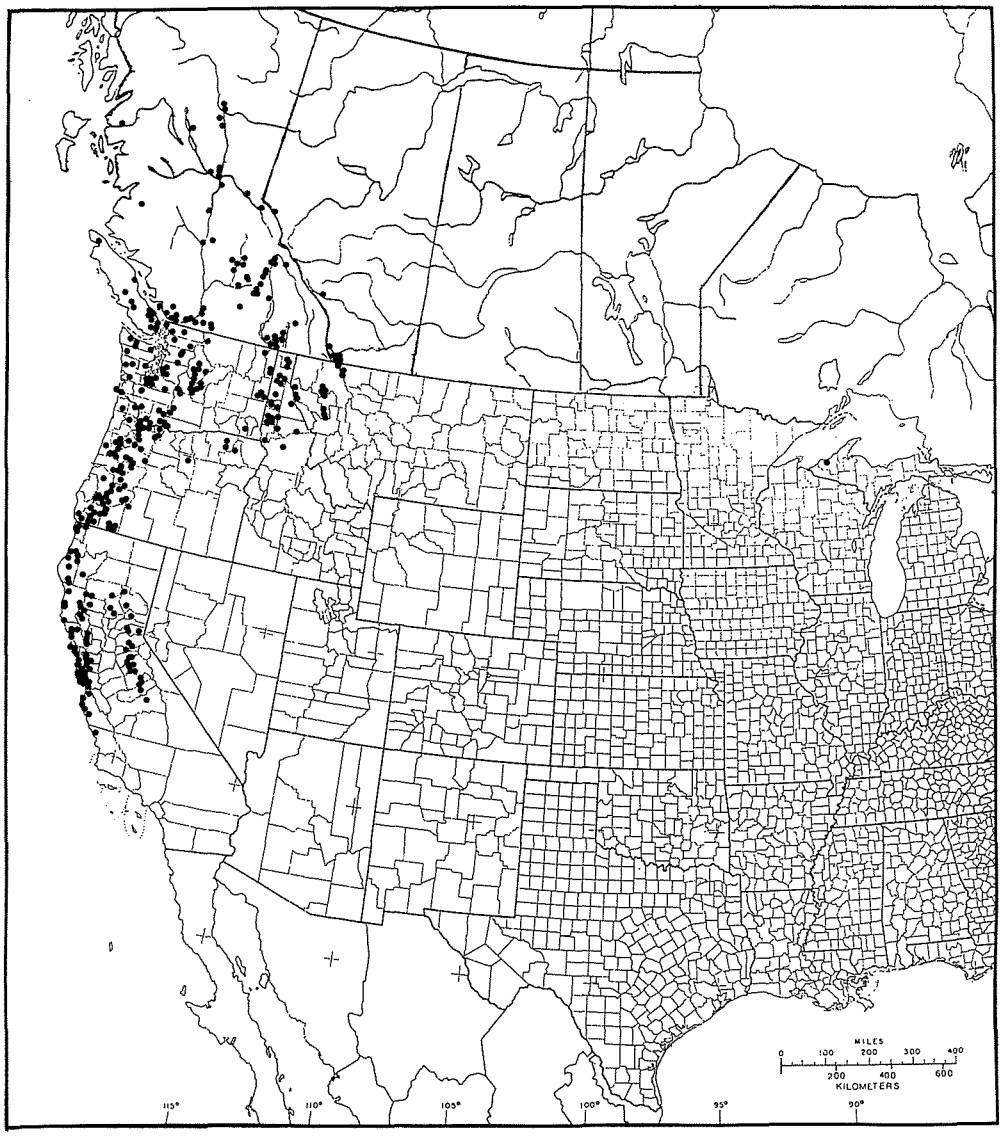


Figure 2. Specimen based distribution map of *Prosartes hookeri* Torrey

Comments: The three geographical races recognized as varieties by Jones (1951), i.e., var. *hookeri* (coastal California northwards), var. *oreganum* (northern California north and northwestwards) and var. *trachyandrum* (Sierra Nevada Mountains northwest to Oregon), are highly variable and intergrade with respect to their diagnostic floral pubescences on the anthers, ovary and style and the degree of stamen exertion. This is especially true in their overlapping areas in northern California and southern Oregon. Where extremes may be distinctive, collectively the varieties so intergrade that they are not here recognized.

It is also from this area where the Coastal, Sierra and Cascade Mountain Ranges met, that the purported, sterile hybrid *Prosartes parvifolia* S. Watson (*P. hookeri* x *smithii*) was

first reported (Watson 1880). These three, mountain ranges have each had their own geologic history and associated ecological and floristic consequences (Barbour and Major 1977, Hickman 1968, 1993). The few older collections labeled *P. parvifolia* and recent, dwarf ones of *P. hookeri* from this area are similar, especially those from serpentine substrata (Brooks 1987). The know variation for *P. hookeri* unquestionably encompasses that described for *P. parvifolia*.

REPRESENTATIVE SPECIMENS EXAMINED: CANADA: ALBERTA: Waterton Lakes NP, between boarding & superintendent houses, 4200–4300 ft, 8 JUN 1925, *Malte & Watson 139* COLO RM, Bertha Lake Trail, 4000–4600 ft, 12 JUN 1925, *Malte & Watson 283* GH, 19 JUL 1935, *Moss 3168* UBC, 1 SEP 1938, *Nelson & Nelson 3110* GH MO RM, W shore Waterton Lake, 4250 ft, 8 AUG 1953, *Ownbey 17,322* F, Obed, 8 JUN 1959, *Montgomery 2063* OAC, Lower Bertha Falls, 4700 ft, 26 MAY 1969, *Nagy & Blais 468* UBC. Kananaskis, Jumping Pond Rd, 15 JUN 1959, *Ogilvie* UBC. S Fork of Lost Creek, 3.7 mi W of Fork, 24 JUL 1961, *Ogilvie* UBC. **BRITISH COLOUMBIA:** Lower Frazer River, [Oregon Boundary Commission], 1859, *Lyall* GH. Chilliwack Valley, [International Boundary Commission], 49°/49°10'N, 121°25'/122°W, 15 JUN 1901, *Macoun 54,084* GH. Emerald Lake, 26 AUG 1903, *Farr* PH, 4300 ft, 25 JUN 1904, *Shaw 27* GH MO NY PH RM. Selkirk Mts, Bear Creek, 20 AUG 1904, *Farr* PH, 25 MAY 1905, *Farr* UBC, Gold River mouth, 2400 ft, 9 JUN 1911, *Butters & Holway* GH. Revelstoke, 18 MAY 1890, *Macoun* MO, 1600 ft, 6 JUL 1905, *Shaw 825* CM COLO GH MO, 50°N 118°W, AUG 1950, *Scott* UBC. Beavermouth, Columbia River, 2400 ft, 18 AUG 1905, *Shaw 1158* CM COLO GH MO NY PH. Illecillewaet Valley Loop Trail, 3500–4000 ft, 22 JUN 1906, *Brown 262* GH MO PH. Savary Island, 24 MAY 1912, *Davidson* UBC. Crescent, 4 MAY 1913, *Taylor* UBC. Upper Skookum Valley, 13 JUN 1914, *Davidson* UBC. Lynn Creek flats, 14 MAY 1916, *Taylor* UBC. Point Grey Indian Reserve, 23 APR 1925, *Malkin* UBC. Grizzly Peak, 8 mi W of Clearwater, 10 JUN 1935, *McCabe 2285–C* UC. Nelson, Venus Mine, 5000 ft, 18 JUL 1937, *Eastham* UBC. Athabasca Mill, 4000 ft, 19 JUN 1938, *Eastham* UBC. 2.5 mi N of Yale, Frazer River, 2 MAY 1938, *McCabe 5778* UC. Alexandra Bridge, Frazer River Canyon, 18 APR 1934, *McCabe 729* UC WTU. Bella Coola, Skeena, 11 MAY 1933, *McCabe 51* UC. Huntingdon, Frazer Valley, 26 APR 1936, *McCabe 3315* UC. 8 mi N of Trail, Columbia River, 10 MAY 1938, *McCabe 6851* UC WTU. Balfour, Kootenay, 15 MAY 1938, *McCabe 6900* UC. 13 mi W of Kaslo, 6 JUN 1938, *McCabe 6561* UC. Hollyburn Mt, JUN 1940, *Buckland* UBC. Prince George, 17 JUN 1940, *Kermode* UBC, 28 JUN 1944, *Eastham* UBC, 2260 ft, 8 JUN 1951, *Burch 7* UBC. McBride, Forestry Lookout Trail, 12 JUL 1946, *Eastham* UBC. Kinbasket, Big Bend Hwy, 2 AUG 1947, *Eastham* UBC. Cheam Lake, 20 m, 8 AUG 1949, *Krajina 588* UBC. Bridal Falls, 30 AUG 1950, *Krajina* UBC. Saltspring Island, Beaver Point, 10 MAY 1950, *Ahles 68* UBC. Silver Creek, Chilliwack to Hope, 23 JUN 1951, *Barr 22* UBC. Hamilton Creek Trail, 10 mi E of Revelstoke, 29 MAY 1966, *Alex 2218* OAC. 36 mi E of Revelstoke, 29 MAY 1966, *Alex 2213–A* OAC. Kaslo, 2100 ft, 15 JUL 1960, *Bell* UBC. Retallack, Kaslo River, 3500 ft, 19 JUL 1972, *Harris* UBC. Arrow Park, JUL 1958, *Bell* UBC. Salmo, 2325 ft, 28 AUG 1959, *Bell* NCU UBC. Hope, 3 MAY 1950, *Brayshaw 50–155* UBC. Hope to Princeton, 5000–6500 ft, 1938–45, *Fodor* UBC. Yale Tunnel, N of Hope, 21 MAY 1975, *Luitjens & Campbell 21* UBC. Glacier, 4700 ft, 14 AUG 1913, *Butters & Holway 8733* GH. North Thompson River, 6 mi N of Clearwater Station, 2650 ft, 14 JUN 1956, *Calder et al. 17,431* GH. 5 mi N of Little Fort, 3 JUN 1953, *Calder & Savile 8643* COLO. 3 mi S of Beaver Lake, 158 Mile House to Likely, 2600 ft, 3 JUN 1956, *Calder et al. 16,962* NY. Manning PP, Skagit River, 2700 ft, 29 JUL 1958, *Ireland 3500* ORE, West Gate, 640 m, 27 AUG 1973, *Chuang 1515* UBC. Lumby, 2800 ft, 22 MAY 1950, *Dickens 11* UBC. 53 mi SE of Nelson, 4900 ft, 1966, *Roche* UBC. Pinchi Lake, 700 m, 12 JUN 1953, *Florian 20* UBC. Sorrento, Shuswap Lake, 25 AUG 1976, *Fodor 984* UBC. Maple Ridge PP, enroute to Golden Ears Park, 20 MAY 1963, *Krause* UBC. Columbia River Valley, near Blueberry River & Golden, 2575 ft, 21 JUN 1965, *Krajina* UBC. Harrison Hot Springs, 29 APR 1951, *Krajina* UBC.

Wigwam, 18 mi S of Revelstoke, 1530 ft, 29 JUN 1952, *Krajina* GH UBC. Mt Revelstoke NP, 2040 ft, 22 JUN 1965, *Krajina 32* UBC. Columbia River Valley, 35 mi behind Revelstoke, 27 JUN 1953, *Krajina* UBC. Boat Encampment, 2200 ft, 6 JUL 1952, *Krajina* UBC. Mabel Lake, 23 AUG 1950, *Krajina* GH UBC. Mt Robson PP, Hargreaves Ranch, 2900 ft, 19–28 AUG 1943, *Scamman 3244* GH, 3350 ft, 20 AUG 1970, *Krajina* UBC. Larch Hills, Shuswap Lake, 1600 ft, 22 JUN 1965, *Krajina 43* UBC. Tseax River, 2 mi W of Aiyash, 8 JUL 1973, *Krajina & Krajina* UBC. 25 mi NW of Prince George, Fraser River, 2000 ft, 30 JUL 1974, *Krajina & Pojar* UBC. Summit Lake, 25 mi N of Prince George, 13 JUN 1963, *Auclair 233* MTMG. 20 mi SE of Prince George, 2500 ft, 1966, *Roche* UBC. Fraser River, near Emory Creek, 14 MAY 1976, *Luitjens & Luitjens 12* UBC. 15 mi N of Mackenzie, 2400 ft, 9 AUG 1974, *Krajina & Pojar* UBC. Slim Creek, 30 mi SE Purden Lake, 2500 ft, 2 AUG 1974, *Krajina et al.* UBC. Dry Williams Lake, 2500 ft, 6 JUL 1974, *Krajina et al.* UBC. Aleza Lake, 600 m, 19 JUN 1952, *Taylor & Lewis 320* UBC, 2100 ft, 7 AUG 1974, *Krajina et al.* UBC. Quesnel, JUN 1949, *Stace–Smith* UBC. N of Sisters River, 27 JUL 1941, *Marr 743* COLO. Seymour Creek, 14 MAY 1959, *Orloci* UBC. Crawford Bay, 25 MAY 1919, *Murray* UBC. McLeod Lake, 2000–2500 ft, 6 JUN 1967, *Revel* UBC, 14 mi S, 2000–2500 ft, 14 AUG 1967, *Revel* UBC. Whiskers Campsite, 2000–2500 ft, 23 JUN 1967, *Revel* UBC. Tacheeda Lake, 2100–2500 ft, 18 AUG 1968, *Revel* UBC. 1 mi N of Parsnip River along Hart Hwy, 2000–2500 ft, 22 AUG 1967, *Revel* UBC. Raft River, 40 mi NW of Clearwater, 50°00'N 120°00'W, 19 JUN 1974, *Schwartz 8* UBC. Prince Rupert, Skeena River, 19 AUG 1983, *Stansell* OSC. Haney, 3 MAY 1947, *Taylor 1019* UBC. Mt Waddington, 3000 ft, JUL 1937, *Taylor* UBC. Castelgar, 4000 ft, 23 JUN 1962, *Taylor 6344* UBC. Cheakamus River, 5 mi N of Brackendale, 300 ft, 17 AUG 1962, *Thomas 9955* DS. Eye Lake, NW of Elliot Lake, 23 JUN 1982, *Kruckeberg 271* UBC. Patsuk Creek Valley, N of Mackenzie, 2500 ft, 9 AUG 1974, *Pojar* UBC. Beaver Valley, 3800 ft, 18 AUG 1904, *Shaw 527* MO. **Queen Charlotte Islands:** JUN 1878, *Dawson* GH. **Vancouver Island:** Victoria, 10 MAY 1874, *Richardson* MTMG, APR 1887, *Anderson* MTMG. Goldstream, MAY 1887, *Macoun* MTMG. Burrard Inlet, Capilano Creek, 9 JUN 1900, *Laverock 95* UBC. Alberni, MAY 1915, *Carter 155* GH. New Westminster, 3 MAY 1915, *Henry 9124* RM. Spanish Banks, 8 AUG 1937, *Eastham* UBC, 3 MAY 1950, *Eastham 16,378* UC. Comox, Quinsam Lake, 20 MAY 1951, *Bendell 151* UBC; Point Holmes, 8 JUN 1955, *Molyneux 102* UBC. Bowser, Nile Creek, 15 MAY 1954, *Ogilvie* UBC. Kennedy River area, 620 ft, 28 MAY 1963, *Young & Hubbard 118* WTU. pass between Sproat & Kennedy Lakes, 500 ft, 3 JUN 1972, *Pojar 327* UBC. Chemainus River, Duncan to Ladysmith, 11 MAY 1961, *Calder & MacKay 28,958* UC UBC. WC part of Island, 410 m, 7 JUL 1980, *Gagnon et al. 80–27* UBC, 570 m, 23 JUL 1980, *Gagnon & Palmer 80–36* UBC. Langford, 8 MAY 1968, *Kojima* UBC. Strathcona PP, Drum Lakes, 330 m, 5 AUG 1968, *Kojima* UBC. Skutz Falls along Bear Creek, 130 m, 27 MAY 1950, *Krajina & Spilsbury 4073* UBC. MacMillan PP, 187 m, 29 MAY 1950, *Krajina & Spilsbury 4876* GH UBC, 185 m, 8 AUG 1950, *Krajina et al. 5328* GH UBC. Cameron Lake, 650 ft, 8 JUL 1969, *Soper et al. 12,407* DS. Salmon River Valley, 15 mi S of Sayward, 65 m, 3 JUN 1950, *Krajina & Spilsbury 4305* UBC. Caridan Lake, 220 m, 28 MAY 1950, *Krajina & Spilsbury 4130* UBC. Middle Nanaimo River Valley, 700 ft, 10 JUN 1956, *Mueller–Dombois 63–2* UBC, 710 ft, 20 JUN 1956, *Mueller–Dombois 83–8* UBC. Western Nanaimo River Valley, 1000 ft, 30 MAY 1955, *Mueller–Dombois 12–7* UBC. below Fourth Nanaimo Lake, 300 m, 3 JUL 1950, *Krajina et al. 4728* UBC, *Krajina et al. 4743* GH. First Nanaimo Lake, 215 m, 18 JUN 1950, *Krajina et al. 4447* GH UBC, 210 m, 24 JUN 1950, *Krajina et al. 4581* MTMG UBC. Second to Fourth Nanaimo Lakes, 290 m, 6 AUG 1950, *Krajina et al. 5295* GH UBC. Second to Third Nanaimo Lakes, 7 JUL 1950, *Krajina et al. 4774* UBC. Mable Inlet at Rupert Inlet, Quatsino Sound, 46 m, 19 MAY 1979, *McComb–Watson 79–40* UBC, 22 JUL 1979, *McComb–Watson 79–26* UBC. Marble River, 3 mi from Forestry camp, 51 m, 6 MAY 1978, *McComb–Watson 13* UBC. Brentwood, 28 MAY 1951, *Raymer* UBC. **UNITED STATES: CALIFORNIA:** Sierra Nevada, Duffields Ranch, [Whipple Exploration], 10 MAY 1854, *Bigelow*

GH. **Alameda Co.:** San Antonio Creek, 18 APR 1868, *Kellogg & Harford 993* PH. Inverness Canyon, 21 MAR 1943, *Rodin 95* UC. Strawberry Canyon, 17 MAR 1965, *Hutt* JEPS [$n = 9$]. San Leandro Canyon, 6 APR 1930, *Quick & Pylman* RM. Chabot Regional Park, Columbine Trail, 24 MAR 1982, *Stratford* JEPS. **Amador Co.:** Panther Creek, 5000 ft, MAY 1895, *Hansen 1081* MO. 4500 ft, T 8N R 15E, 4 JUN 1936, *Allen 764* UC. **Butte Co:** Brush Creek, 1907, *Conger* PH. Paradise, 18 MAY 1935, *Whitetaker* OSC. **Calaveras Co.:** Calaveras Big Trees, 5794 ft, 13 JUN 1915, *Grant* GH, *Jepson* JEPS, 31 MAY 1926, *Mason 3352* UC. **Contra Costa Co.:** S of Mt Diablo, [Geol. Survey of California, 1860–62], 16 MAY 1862, *Brewer 1099* GH MO UC US. Alamo Canyon, E fork, 22 MAR 1931, *Bowerman 606* UC. Wild Cat Canyon, 10 MAR 1934, *Ewan 8626* COLO MO. 0.5 mi E of Oakland Tunnel, 700 ft, 8 MAR 1948, *Rattenbury 96* NCU [$2n = 18$], 26 MAR 1948, *Rattenbury 104* UC [$2n = 18$]. Los Trampas Canyon, 850 ft, 3 MAR 1968, *Sharsmith 5184* UC. **Del Norte Co:** Adams Station, Waldo to Crescent City Rd, 22 APR 1907, *Eastwood* CAS. 3 mi S of Siskiyou Mt summit along US 199, 24 JUN 1952, *Ownbey & Preece, Jr. 3330* NY. Jedediah Smith Redwoods, Mill Creek, 45 m, 25 MAY 1988, *Utech 88–329* CM. Young's Peak, 6000 ft, 1 JUL 1978, *Utech 78–265* CM. Loretta Falls, Little Grayback, 26 MAY 1986, *Utech 86–473* CM. **El Dorado Co.:** Pyramid Peak, 0.25 mi NW of Riverton, 3400 ft, 7 JUN 1934, *Johannsen & Gifford 259* UC. 2–3 mi S of Kyburz, Silver Fork American River, 4 JUN 1943, *Robbins 1114* UC. **Fresno Co.:** Snow Creek above Cascada, 7000 ft, 6 JUL 1917, *Grant 1057* JEPS MO. Cedar Brook near Pinehurst, 26 MAY 1921, *Newton 167* JEPS. **Glenn Co.:** Snow Basin Creek, 17 JUL 1944, *Howell 19,835* CAS. **Humboldt Co.:** Kneeland Prairie, 2500 ft, 9 JUN 1908, *Tracy 2663* UC WTU. Brannon Mt, Willow Creek, 2500–4500 ft, 15 JUN 1918, *Abrams 7107* DS. Richardson Redwood Grove, 27 MAY 1934, *Armstrong* UC. Horse Mt, 4000 ft, 12 JUN 1927, *Tracy 8152* NCU, 4700 ft, 13 JUN 1938, *Tracy 15,898* UC. Weott Station, S Fork Eel River, 12 JUL 1929, *Benson 1788* PH, 100–200 ft, 16 JUL 1929, *Benson 1840* WTU. Blue Lake, Arcata to Redding Rd, 27 MAY 1933, *Henderson 15,452* ORE. Trinity Summit, head Little Horse–Linto Creek, 4500 ft, 2 JUL 1937, *Tracy 15,409* UC. Grizzly Creek, Van Duzen River, 300 ft, 11 MAY 1924, *Tracy 6670* UC. **Lake Co.:** Mt Sanhedrin, SW of old Frazier Mill, 4200 ft, 16 JUL 1913, *Hall 9486* UC. Bartlett Mt, Pinnacle Rock, 20 JUN 1945, *Howell 21,118* CAS. Snow Mt, Middle Fork Stony Creek, 4650 ft, 23 JUN 1981, *Heckard & Hickman 5653* JEPS. **Madera Co.:** Ellis Meadows, *s.d., Brandegee* UC. **Marin Co.:** near San Fransisco, 1865, *Torrey 515* GH NY. Mt Tamalpais, 1875, *Vasey* US, 17 APR 1887, *Sonne* UC. San Rafael, 1885, *Gray* GH. Tocaloma, MAY 1893, *Michener & Bioletti* CM F MICH MO NY UC. Lagunitas Creek, AUG 1894, *Eastwood* GH. Sausalito, 31 MAR 1869, *Kellogg & Harford 993* GH NY. W shore Tomales Bay, Teachers Beach, 5 AUG 1932, *Schreiber 748* UC. Big Rock Ridge, 8 mi W of Hamilton Field Air Base, 300 ft, 14 APR 1944, *Robbins 1519* UC. Ben Johnson to Bootjack Trail, 200 ft, 26 JUN 1977, *Utech 77–002* CM. **Mariposa Co.:** Fistman Mt, 13 MAY 1894, *Congdon* UC. Yosemite NP, Bridal Vail Meadows, 3900 ft, 4 JUN 1911, *Hall 8851* UC, W boundary, 4600 ft, 29 MAY 1937, *Foster 306* GH MO. Wawona, 4000 ft, 12 MAY 1924, *Howell 310* CAS. Wawona Rd to Big Trees, 8 JUN 1924, *Howell 388* CAS. **Mendocino Co.:** Rattlesnake Creek, below Cummings & Leggett Valley, 9 SEP 1921, *Jepson 9452* JEPS. S Fork Eel River at Elder Creek, 23–24 JUN 1961, *Sharsmith 4872* UC. Fish Rock Rd, 2 mi E of Iverson Rd, 500 ft, 19 JUL 1978, *Wheeler 531–A* CAS. Red Mt North, School Section Creek headwaters, 1000 ft, 7 JUL 1981, *Smith et al. 6954* CAS. 6 mi E of Ft Bragg & CA 1 on Ft Bragg–Shernwood Rd, 1150 m, 22 MAY 1988, *Utech 88–253* CM. **Monterey Co.:** Santa Lucia Mts, JUL 1880, *Vasey 644* US. Anderson Canyon, 23 FEB 1935, *Ewan 9094* COLO. Limekiln Creek, 4 MAR 1959, *Hardham 4052* NCU. Point Sur, JUL 1888, *Brandegee* F. Cruikshank Creek, 11 AUG 1910, *Condit* UC. Carmel, San Jose Canyon, 24 JUN 1906, *Smith 1201* MICH. Pajaro River, 5 APR 1915, *Eastwood 4176* CAS. **Napa Co.:** Franz Valley, Calistoga, 1 MAY 1893, *Jepson* JEPS. Napa, 1893, *Smyth* GH, 26 JUL 1913, *Suksdorf 682* GH. Mt St Helena, 3000 ft, 30 APR 1949, *Wiggins 12,088* UC WTU. 2 mi W of Aetna Springs, 9 MAY 1964, *Raven 19,046* DS. **Nevada Co.:**

Emigrant Gap, JUN 1882, *Jones* NY PH. **Placer Co.:** Truckee, 21 JUL 1901, *Williamson* PH. Dutch Flat, APR 1921, *Patterson* DS. Baxter's Camp above Alta, 13 MAY 1924, *Austin* DS. **Plumas Co.:** Mill Creek, SEP 1896, *Austin 858* MO. Spanish Peak, 6000 ft, 29 JUN 1912, *Hall 9294* UC. Bidwell Bar, 0.5 mi NW of Edmanton, 4900 ft, 20 JUL 1954, *Nerdstrom 242* UC. **San Francisco Co.:** S of Golden Gate Park, 29 MAR 1891, *Cannon* CAS. **San Luis Obispo Co.:** Santa Rita, Juhl Corral, 1956, *Hardham 341* CAS. Santa Rita Creek, W of Templeton, 23 APR 1958, *Hoover 8465* NY OSC UC. **San Mateo Co.:** Crystal Springs Lake, 6 APR 1902, *Baker 650* GH MICH MO NY UBC UC US. Butano Creek, 11 MAR 1928, *Roush* JEPS. Los Trancos, 9 APR 1932, *Demaree 8971* CM. San Mateo Canyon, 150 ft, 5 MAY 1939, *Rose 39,095* GH MICH MO NY UC. 1 mi N of La Honda, 8 APR 1950, *Ward 949* GH NY UC WTU [$2n = 18$]. Jasper Ridge Biological area, 5 mi SW of Palo Alto, 19 APR 1964, *Thomas 10,328* US. **Santa Clara Co.:** Stevens Creek Canyon, 16 FEB 1900, *Wight 70* US. Santa Cruz Mts, Palo Alto, Los Trancos Creek, 600–1800 ft, 27 MAR 1975, *Martineau 433* DS. Loma Prieta, 3500 ft, 20 APR 1940, *Nelson 83* UC. Mt Hamilton, Santa Isabella Creek, 2000 ft, 27 MAY 1934, *Sharsmith 1209* UC. Monte Bellow Ridge, 5 mi S of Los Altas, 1800 ft, 2 MAY 1956, *Thomas 5675* UC US. **Santa Cruz Co.:** 10 mi E of Watsonville, 1866, *Wood 537* GH NY. Santa Cruz, 1872, *Gray* GH. Santa Cruz Mts, Deer Creek, 1500 ft, 11 APR 1906, *Pendleton* 309 UC. Swanton, 6 MAR 1912, *Rich* WTU. 2.5 mi NE of Felton, 9 APR 1950, *Thomas 1506* DS WVA. **Shasta Co.:** Goose Valley, 29 JUN–11 JUL 1912, *Eastwood 947* US. **Sierra Co.:** 1874, *Lemmon* GH. **Siskiyou Co.:** Russian Creek, Marble Mt, 6000 ft, JUN 1901, *Chandler 1553* UC. Eldridge's Corral, 4000 ft, 24 MAY 1908, *Butler 93* DS JEPS. Humbug Mt, 30 MAY 1909, *Butler 787* UC. Jaynes Canyon, 3700 ft, 10 AUG 1934, *Wheeler 3104* GH. French Creek Rd, W of Callahan, 3500–4000 ft, 12–16 JUN 1948, *Ferris & Lorraine 11,750* ORE UC WTU. Salmon–Trinity Mts, Rush Creek to Big Bend Creek, 3100–3200 ft, 22 JUL 1954, *Thomas & Thomas 4450* US. English Lake, Wiregrass Meadow, 5600 ft, 1 AUG 1969, *Oettinger 1123* MICH UC. Indian Creek, 4.5 km N of Happy Camp, 30 APR 1988, *Straley 4683* UBC. **Sonoma Co.:** Forestville to Guerneville Rd, 2 APR 1898, *Baker* UC. Mt Hood, 27 MAR 1902, *Heller & Brown 5164* F GH MO NY PH US. Sonoma Creek Canyon, 20 JUN 1904, *Baker* UC. Sebastopol, 1 mi W of Camp Meeker, 600 ft, 26 MAR 1934, *Armstrong 902* UC. Geysers, 14 mi ESE of Preston & US 101 on Geysers Rd, 330 m, 15 MAY 1986, *Utech et al. 86–168* CM. **Tehama Co.:** Deer Creek Trail, 24 JUN 1912, *Wilder* UC. **Trinity Co.:** Morris Meadow, S Fork Trinity River, 4200 ft, 22 AUG 1948, *Alexander & Kellogg 5535A* UC. Canyon Creek Meadow, 4600 ft, 1 JUL 1949, *Balls 13,734* WTU. Coffee Creek Ranch, 2400 ft, 29 MAY 1950, *Wiggins 12,406* DS ORE UC. E Fork New River, 2000 ft, 8 MAY 1970, *Sawyer 2616* OSC. **Tulare Co.:** Kaweah River Valley, 24 JUL 1896, *Dudley 1388* DS. Sierra Nevada Mts, JUL 1902, *Grant 290* F MICH. Giant Forest, 5 OCT 1905, *Hopping* UC. Balch Park, 6300 ft, 30 MAY 1936, *Peirson 11,824* JEPS. **Tuolumne Co.:** Hetch Hetchy, 4000 ft, 16 JUN 1917, *Grant 987* JEPS MO. Mather, Middle Fork Tuolumne River, JUL 1924, *Mason 1100* UC. Long Barn, 25 JUN 1937, *Hoover 2517* NY UC. 3 mi from Carl Inn to Big Trees, 18 AUG 1944, *Howell 20,710* CAS WTU. Sonora Pass Rd, 6500 ft, 27 JUN 1954, *Straw 731* WTU. Stanislaus NF, Twain Harte, Italian Bar at Stanislaus River, 1130 m, 13 MAY 1986, *Utech et al. 86–220* CM. **IDAHO:** Clearwater Plateau, [NW Territories, 10th Census of U.S. Forestry], 28 AUG 1880, *Watson 422* GH. **Adams Co.:** Weiser NF, Mann Creek Station, 4000 ft, 15 MAY 1923, *Helm 8* RM, Ditch Creek, 4000 ft, JUL 1928, *McDowell 1377* RM. Pony Creek, 5700 ft, 1 JUN 1986, *Wellner 3634* NY. **Benewah Co.:** 10 mi NE of Emida, Soldier Creek mouth, 26 MAY 1949, *Ownbey & Jones 3191* GH WTU. NW of Lake Chatcolet, 10 mi NE of Plummer, 2200 ft, 16 JUL 1949, *Cronquist & Jones 5952* CM COLO GH MICH WTU. **Bonner Co.:** S end of Lake Pend Oreille, JUN 1889, *Leiberg* ORE. Priest River Station, 2300–2500 ft, JUL 1923, *Epling 5732* MO OSC. 1 mi W of Sand Point, 14 MAY 1936, *Hitchcock 2882* ORE OSC WTU. 2 km E of Priest River (city) along Priest River, 25 JUL 1980, *Utech 80–460* CM. Trestle Creek from ID 200, 775–850 m, 29 JUN 1992, *Utech 92–1364* CM. **Boundary Co.:** Copeland,

3000–4000 ft, 22 AUG 1922, *Ehlers & Erlanson 203* MICH. Meadow Creek camp along Moyie River & NF 34, 800–850 m, 29 JUN 1992, *Utech 92–1392* CM. **Clearwater Co.:** Musselshell Station, 3000 ft, 4 JUN 1914, *Beatty 13* RM. Orogrande Creek, 4000 ft, 12 JUL 1926, *Epling 9328* MO. Jacknife Creek mouth, 2500 ft, 20 MAY 1966, *Jenni 63* RM. Castle Butte area, 15 mi NE of Lochsa Station on US 12, 925 m, 16 JUN 1986, *Utech 86–731* CM. Ahsahka, N Fork Clearwater River, 8 MAY 1949, *Ownbey 3174* GH WTU. **Idaho Co.:** Nez Perces NF, 2250 ft, 10 MAY 1913, *Crossby 20* RM, above Selway Falls, Meadow Creek, 31 MAY 1936, *Constance & Rollins 1653* WTU. Lowell–Kooskia Rd, 3 mi W of Lowell, 16 JUN 1950, *Jones 47* GH. **Kootenai Co.:** 610 m, JUL 1891, *Leiberg* ORE. **Latah Co.:** Moscow Mts, MAY 1900, *Abrams 847* DS. Mica Mts, 22 AUG 1911, *Beattie 4520* RM. Cedar Mt, 2 JUL 1935, *Tucker 95* NY. Robinson Lake, 10 MAY 1941, *Weber 2161* COLO. 1 mi S of Troy, 27 MAY 1944, *Hitchcock & Muhlick 8403* WTU. 1 mi E of Harvard, 28 MAY 1949, *Ownbey & Jones 3188* COLO GH WTU. **Nez Perces Co.:** Lake Waha, 2000–3500 ft, 3–4 JUN 1896, *Heller & Heller 3183* MO. **Shoshone Co.:** Fishhook Creek, 19 MAY 1940, *Ownbey 2047* CM GH MO WTU WVA. Little Baldy Lookout, 4 JUL 1946, *Witt 1037* WTU. St Joe Mts, 2 mi S of Wallace, 950–1000 m, 26 JUN 1992, *Utech 92–1202* CM. 3 mi SW of Kings Pass on NF 605, 950 m, 12 JUL 1992, *Utech 92–1674* CM. **MICHIGAN: Ontonagon Co.:** Porcupine Mt SP, 0.25 km NW of S Boundary Rd & Little Carp River Rd, 3 JUL 1988, *Maldenoff 1688* MICH, 1.5 km NNW of S Boundary Rd & Little Carp River Rd, 9 SEP 1988, *Maldenoff 4788* MICH. **MONTANA: Flathead Co:** Swan Lake, 25 AUG 1908, *Clemens* MO. Yellow Bay, 16 MAY 1941, *Chesbro 14* GH MO RM UC, 1 mi S, E shore, 27 JUN 1948, *Hitchcock 17,718* WTU, 2900 ft, 29 JUN 1968, *Thomas 14,598* DS. **Glacier Co.:** Glacier NP, Olsen Creek Valley, 1280–1525 m, 25 JUL 1950, *Harvey & Marshall 4301* NCU. Blackfoot Valley, 6000 ft, 11 MAY 1963, *Cantou* CAS. **Lake Co.:** Mission Mts, St Mary's Lake, 3500 ft, 21 AUG 1921, *Kirkwood 1066* GH MO. Mollman Pass, 7 JUL 1948, *Reynolds 108* NCU. Mission Cirque, 35 mi S of Flathead Lake, 24 JUN 1950, *Blanchard* MICH. Goat Creek, 12 JUN 1968, *Mooar 8021* NY. **Ravalli Co.:** Bitterroot NF, Kootenai Canyon, 5000 ft, 5 JUL 1957, *McDonald 1464* RM, T 9N R 21W S 8, 24 JUN 1959, *McDonald 1539* RM. **Sanders Co.:** Heron, 630 m, 31 AUG 1895, *Leiberg 1630* ORE. Cube Iron Mt, NE of Thompson Falls, 800–850 m, 13 JUL 1992, *Utech 92–1697* CM. 0.5 mi SW of Graves Creek Falls Overlook, 800 m, 13 JUL 1992, *Utech 92–1711* CM. **OREGON:** Sanvie's Island, MAY 1887, *Howell* MO OSC. **Benton Co.:** Corvallis, S of Crystal Lake Cemetery, 1 MAY 1916, *Gilbert 356* OSC. Mary's Peak, 29 APR 1922, *Epling & Shorett 5043* MO. Philomath, 25 APR 1938, *Cooke 10,643* OSC. McDonald SF, Oak Creek, 18 APR 1965, *Dennis 2670* NCU OSC WTU. Starr Creek, Bellfountain Rd, 25 APR 1955, *Oglesby* GH. Mary's River, W of Avery Park, 200 ft, 4 MAY 1959, *Stiles 25* OSC. **Clackamas Co.:** Swim, Summit Station, 21 JUN 1927, *Evinger 35* OSC. Horse Thief Meadows, 28 JUN 1927, *Goodding & Evinger 34* OSC. Lake Oswego, 6 MAY 1928, *Thompson 4141* GH MO. Nanitch Campground to Timberline Lodge, 5000 ft, 8 JUL 1978, *Utech 78–282* CM. **Clatsop Co.:** Saddle Mt SP, Saddle Mt, 2600 ft, 3 JUN 1951, *Detling 6883* ORE, 6 mi N of Necanicum & US 26, 1500 ft, 9 AUG 1972, *Utech 72–020* CM, 2600 ft, 3 JUN 1973, *Chambers 3735* OSC. **Columbia Co.:** Clatskanie, along Clatskanie Creek, 15 MAY 1927, *Thompson 2433* WTU. **Coos Co.:** Iron Mt, 15 JUN 1948, *Baker 5469* OSC. 3 km E of Bridge, 335 m, 6 MAY 1980, *Sundberg 936* ORE. Myrtle Point, 12 MAY 1893, *Holzinger 33* US. **Curry Co.:** Bear Camp, 5 JUN 1928, *Leach 1734* ORE. Snow Camp to Lookout, 24 JUN 1929, *Leach & Leach 2398* ORE. 2 mi beyond Carpenterville, 17 MAY 1929, *Henderson 10,135* NY ORE. Chetco River, Mt Emily summit, 13 JUL 1929, *Henderson 11,674* ORE. Granite Creek, 13 JUN 1930, *Leach 2948* ORE OSC. **Douglas Co.:** Cow Creek, APR 1887, *Watson 660* ORE. Nine Mile Mt, summit, 20 JUN 1917, *Nelson 1399* GH. Myrtle Creek, 9 APR 1934, *Thompson 10,177* WTU. Red Mt, 4100 ft, 18 JUN 1942, *Detling 5309* ORE. 5 mi S of Canyonville, 20 MAY 1948, *Peck 24,782* WILLU. 4.5 mi NE of Steamboat Bridge, 19 JUN 1955, *Earle 4855* PH. Crater Lake NP, Hamaker Campground, 3 JUL 1971, *Henry* CM. E Fork Abbot Creek, 20 mi W of Crater Lake, 5200 ft, 18 JUN 1972,

Mitchell 62 OSC. Upper Elk Meadow, 32 km SSE of Cottage Grove, 1280 m, 5 JUN 1979, *Christy 2473* ORE. 8 km W of Elkton, 245 m, 29 MAY 1980, *Sundberg 991* OSC. **Hood River Co.:** Hood River, 23 JUN 1911, *Peck 1409* WILLU. Sonny, 14 APR 1921, *Suksdorf 2143* WTU. Mt Hood NF, Gordon Creek Trail, 22 MAY 1952, *Ireland 3147* ORE. Lost Lake, 26 JUN 1921, *Peck 9892* WILLU. **Jackson Co.:** Sykes Creek, 28 JUN 1892, *Hammond 392* MO. Sampson Creek, 5000 ft, 1 JUN 1895, *Applegate 732–A* UC. Wimer, 4 APR 1889, *Hammond 392–A* GH MO. Woodville, Rouge River, 27 JUN 1909, *Peck 4068* WILLU. Rabbit Ears, Hershberger–Brown's Cabin Trail, 5000 ft, 13 JUL 1929, *Applegate 6005* DS. Ashland Peak, 5700–5900 ft, 5 JUL 1958, *Dennis 1066* OSC. Mill Creek Meadow, 2 JUL 1928, *Sipe* OSC. Wagner Creek Canyon, 23 MAY 1948, *Peck 24,875* WILLU. 2 mi E of Green Spring Summit, Klamath Junction & Klamath Falls Hwy, 2 JUN 1951, *Hitchcock 19,412* WTU. **Jefferson Co.:** Cabot Lake Rd, 4000 ft, 12 JUN 1960, *Swedberg 322* OSC. **Josephine Co.:** Alta, 14 MAY 1887, *Henderson 1409* GH. Waldo, 25 APR 1887, *Howell 660* GH, *Howell 1283* MO OSC PH. Mt Greyback, 16 JUN 1904, *Piper 6093* GH. Grants Pass, JUL 1909, *Peck 1411* WILLU. Galice, MAY 1916, *Eschen 6646* WILLU. Kerby Peak, 23 MAY 1923, *Sweetser 7210* ORE, 5000 ft, 25 MAY 1923, *Savage* ORE. Upper Thompson Creek, 10 MAY 1924, *Abrams & Benson 10,390* RM. Selma, 1 APR 1926, *Henderson 5782* MO ORE RM. Rogue River, opposite Alameda Mine, 18 APR 1926, *Henderson 7208* ORE. Oregon Caves NM, 28 MAY 1928, *Leach & Leach 1733* ORE, 26 JUN 1936, *Thompson 12,943* CAS MO OSC, slope above Cave opening, 18 JUN 1950, *Baker & Ruhle 749* NY WTU. Siskiyou NF, Store Gulch Creek Station, 7 mi W of Selma, 1 JUL 1977, *Utech 77–391* CM, 9 mi W of Selma, 1 JUL 1977, *Utech 77–394* CM, 10.75 mi W of Selma, 450 m, 23 APR 1984, *Utech 84–285A* CM. Siskiyou NF, 25 mi E of Cave Junction, 5120 ft, 23 JUN 1973, *Denton 2579* NY WTU. 1 mi N of Cave Junction, George Creek bridge, 24 APR 1987, *Chambers 5315* ORE OSC. Waldo–Happy Camp Rd, T 41S R 7W S 8, 5 JUN 1950, *Jones 10* WTU [$2n = 18$]. Greyback Forest Camp, E of Cave Junction, 12 MAY 1984, *Straley* 2976 UBC. **Klamath Co.:** Crater Lake NP, Annie Creek, 22 AUG 1936, *Applegate 10,904* DS. Rogue NF, JUL 1964, *Mastrogiuseppe* WVA. **Lane Co.:** Calapooya Mt Range, Adams Mt Trail, 5000 ft, 9 AUG 1927, *Henderson & Patterson* ORE, Fairview Mt, 4 JUL 1948, *Baker 5546* OSC WTU, Bohemia Mt, 4900 ft, 4 JUL 1948, *Baker 5569* OSC, Culp Creek, 1300 ft, 1 MAY 1926, *Patterson* ORE. Springfield, 700 ft, 5 MAY 1938, *Detling 2589* ORE. Marten Ridge, 1200 ft, 22 APR 1939, *Detling 3543* ORE. Big Fall Creek, 23 MAY 1938, *Henderson 18,604* ORE. **Lincoln Co.:** Siuslaw NF, Pacific slope, 650 ft, 21 AUG 1969, *Denham 3043* COLO. **Linn Co.:** Mt Jefferson, Hunt's Cove, AUG 1933, *Leach 4489* ORE. Douglas, 3 SEP 1933, *Gilkey* OSC. Calapooya River, 25 mi from Corvallis, 2 MAY 1936, *Schuster* OSC. S of Crawfordville, 23 JUL 1936, *Henderson 18,134* ORE. Frissell Point Trail, E of Blue River, 1129 m, 22 MAY 1951, *Detling 6840* ORE. 21 mi E of junction with Hwy 22, 8 JUN 1983, *McNeal 2865* NY. **Marion Co.:** Silver Creek, [Plantae Oregonenses], 1871, *Hall 520* F MO NY PH. [Pacific Coast Plants], MAY 1880, *Howell 12,582* MO. Salem, 23 APR 1910, *Peck 1305* WILLU, MAY 1911, *Peck 1924* WILLU, 2 MAY 1917, *Nelson 1089* GH. Detroit, Santiam River, 18 AUG 1910, *Peck 1671* WILLU. Mansfield Mt Trail, 1068 m, 21 JUN 1946, *Detling 5713* ORE. **Multnomah Co.:** Portland, MAY 1887, *Howell 575* CM, 3 MAY 1887, *Henderson 989* OSC, Lake Albina, 8 JUN 1903, *Sheldon 12,078* ORE, King's Heights, 30 MAY 1918, *Collins* GH. Multnomah Falls, 21 APR 1903, *Sheldon 11,915* ORE, 25 JUN 1911, *Peck 2051* WILLU, 8 APR 1914, *Peck 4075* WILLU, 8 APR 1917, *Peck 4076* WILLU. Mt Hood NF, Bonneville Dam exit on I–84, Columbia River bluffs, 100–150 m, 25 APR 1984, *Utech 84–237* CM. **Polk Co.:** Monmouth, JUN 1893, *Spillman* WTU. Independence, 21 APR 1894, *Spillman* WTU. Falls City, 12 MAY 1911, *Peck 1885* WILLU. Helmick Park, N of Corvallis, 28 APR 1956, *Murphy 34* OSC. **Umatilla Co.:** Weston, 1897, *Baker* UC. 5 mi W of Meacham, 25 JUL 1915, *Peck 4717* WILLU. Bingham Springs, 13 MAY 1930, *Leach & Leach 2746* ORE. **Union Co.:** 6 mi W of Summerville, 1 JUN 1933, *Sprague* OSC. **Wallowa Co.:** 3900 ft, T 3N R 41E S 8, 21 JUN 1956, *Ferguson 111* OSC. 4600 ft, T 5S R 47E S 23, 16 MAY 1959, *Ferguson 385* OSC. **Wasco Co.:** 1.5

mi E of junction of Hwy 26 along Hwy 216, 4 JUN 1980, *McNeal 2359* NY OSC. **Washington Co.:** Forest Grove, 1 JUN 1893, *Lloyd* NY, 22 APR 1894, *Lloyd* CM, 18 APR 1926, *Thompson 624* MO WTU. **WASHINGTON**: Yakima region, [WA Territory, Plantae Americae Septentrionalis], 1882, *Brandegee 45* MO. woodlands, [WA Territory, Northern Transcontinental Survey], AUG 1883, *Brandegee 1110* GH. **Chelan Co.:** Lake Wenatchee, 610 m, 1 AUG 1893, *Sandberg & Leiberg 644* GH ORE. Lookout Mt, Leavenworth, 4000 ft, 23 MAY 1931, *Thompson 6511* GH MO OSC WTU. Entiat Valley, 2500 ft, 12 AUG 1933, *Morrill 287* WTU. Boundary Butte, 3000 ft, 4 JUN 1948, *Currie 57* WTU. Stehekin River, Cottonwood Camp, 3000 ft, 31 AUG 1956, *Raven 10,298* CAS. Wenatchee NF, Tumwater Camp, 12 mi W of Leavenworth, 11 MAY 1968, *Maze et al. 351* MTMG NCU. Wenatchee NF, along Eight-mile Creek & NF 7601, 900–1000 m, 1 JUL 1992, *Utech 92–1405* CM, Chatter Creek at Icicle Creek, along NF 7600, 800 m, 1 JUL 1992, *Utech 92–1435* CM, Rock Island Camp along Icicle Creek & NF 7609, 840–860 m, 1 JUL 1992, *Utech 92–1442* CM, Napeequa Crossing Camp along White River & NF 6400, 550–580 m, 2 JUL 1992, *Utech 92–1483* CM, Mountain Home Rd (NF 7300) to Bleutt Pass, 575–625 m, 3 JUL 1992, *Utech 92–1513* CM. **Clallam Co.:** Dungenese Canyon, 26 MAY 1905, *Grant 138* GH. Olympic Mts, JUL 1910, *Elmer 2497* MO. Olympic NF, Soleduck River, 2300 ft, 23 AUG 1935, *Jones 8378* WTU. Olympic Hot Springs, 1 JUL 1933, *Jones 3983* WTU. Hurricane Ridge, Elwha River Range, 2 JUL 1933, *Jones 4021* WTU. **Columbia Co.:** Tucanon River, T9N R 41E, 20 JUN 1913, *Darlington* WTU. **Clark Co.:** W of Camas, 15 APR 1932, *Thompson 8122* MO WTU. Gifford Pinchot NF, Gumboot Mt, Jacks Mt Rd, 2800 ft, 11 JUN 1964, *Franklin 348* OSC RM. **Cowlitz Co.:** 2 mi W of Kalama, 14 MAY 1938, *Thompson 14,267* GH MICH MO WTU. **Grays Harbor Co.:** Montesano, MAY 1918, *Grant* CM. Olympic Mts, Mt Colonel Bob Lookout, 12 JUL 1933, *Thompson 9411* WTU, 4000 ft, 23 AUG 1933, *Thompson 9974* WTU. Olympic NF, Quinault Lake, 13 AUG 1969, *Henry* CM. **Jefferson Co.:** Hoh River, 17 APR 1934, *Murie 1151* MO. **King Co.:** Seattle, Seacowa Beach, 21 MAY 1910, *Grainger* WTU. Renton, 16 APR 1918, *Lovitt* WTU. Scenic, 27 JUL 1934, *Jones 5720* GH WTU. Snoqualmie River, North Bend, 10 MAY 1935, *Edwards* MO. 0.5 mi E of Issaquah, 3 JUN 1949, *Jones 3* WTU [$2n = 18$]. **Kittitas Co.:** Cle Elum, 12 MAY 1897, *Whited* WTU. Easton, 31 JUL 1915, *Jennings & Jennings 9391* CM. Wenatchee NF, Redtop Mt, 4500 ft, 4 JUL 1933, *Thompson 9298A* WTU. Goat Mt, Tucquala Meadows along Cle River, 1000–1200 m, 3 JUL 1992, *Utech 92–1558* CM. Stafford Creek, 20 mi N of Teanaway, 2400 ft, 27 MAY 1939, *Hitchcock & Martin 4693* WTU. **Klickitat Co.:** Falcon Valley, 11 MAY 1886, *Suksdorf 901* F MO PH UC WTU. White Salmon River, 11 APR 1892, *Suksdorf* WTU. Bingen Mt, 10 MAY 1895, *Suksdorf* WTU. 3–4 mi N of Bingen, 19 MAY 1919, *Suksdorf 10,197* WTU. **Lewis Co.:** Centralia, 6 MAY 1927, *Owen* WTU. **Mason Co.:** Lake Cushman, AUG 1895, *Piper* GH. **Okanogan Co.:** Okanogan NF, 2 mi SE of Harts Pass along NF 5400, 1600–1700 m, 11 JUL 1992, *Utech 92–1628* CM. **Pacific** Co.: North Head, 24 AUG 1948, *Mine* CM. **Pend Oreille Co.:** Carlton, Davis Ranch, 25 JUL 1902, *Kreager 304* WTU. 8 mi W of Locke, 17 MAY 1923, *Spiegelberg 86* WTU. **Pierce Co.:** Tacoma, MAY 1911, *Furry* WTU, 20 MAY 1911, *Bardell* MO, 19 JUN 1920, *Eastwood* CAS, MAY 1965, *Shumway* F WTU. Clover Creek, E side of Steilacoom Lake, 12 MAY 1940, *(no name)* ORE. **Skagit Co.:** Pack Demonstration Forest, Brushy Valley, 29 MAY 1933, *Nelson & Nelson 681* MO RM. Mt Baker–Snoqualmie NF, Marble Creek camp at Marble Creek & Cascade River, 350 m, 10 JUL 1992, *Utech 92–1588* CM. **Skamania Co.:** Butterfly Lake, 10 JUL 1891, *Suksdorf* WTU. Cape Horn, 29 APR 1920, *Suksdorf 10,401* WTU. Gifford Pinchot NF, Steamboat Mt, 17–18 JUL 1973, *Franklin & Dyrness 102* RM. **Snohomish Co.:** Index, JUL 1898, *Savage et al.* MO, MAY 1928, *Grant* RM. Darrington, 31 JUL 1933, *Thompson 9638* MO UC WTU. Snoqualmie NF, 8 AUG 1938, *Purer 7713* MO. Big Four Inn, 2000 ft, 18 MAY 1940, *Thompson 14,538* COLO GH MICH MO UBC WTU. **Spokane Co.:** Hangman Creek, 2 AUG 1889, *Suksdorf* WTU. Ft Wright, Spokane River, 22 JUN 1915, *Jennings & Jennings 8706* CM. Liberty Lake, 18 MAY 1932, *Milburge 350* WTU. **Stevens Co.:** Columbia River Valley, 6 mi NE of Northport, 2500 ft, 7 JUL

1932, *Hedgcock* NY WTU. **Thurston Co.:** Olympia, 1892, *Henderson* WTU. Upper Nisqually Valley, 27 MAY 1895, *Allen 148* GH MO RM. Tumwater, 26 MAY 1904, *Townsend* UC WTU. Olympia to Nisqually, 9 MAY 1931, *Thompson 6268* GH MO OSC WTU. **Whatcom Co.:** McLeod Lake, 20 JUL 1890, *Suksdorf* WTU. Point Roberts, S of Tsawwassen (BC), 27 APR 1968, *Kojima* UBC. Mt Baker NF, Mt Baker, 1000–1300 m, 17 JUN 1991, *Utech 91–559* CM. **Yakima Co.:** Ft Stampede Pass, 4 OCT 1892, *Henderson* WTU. Breitenberg, S of Mt Adams, 15 MAY 1897, *Suksdorf* WTU. Wenatchee NF, Bumping River, Mt Rainier via Chinook Pass, 900 m, 31 MAY 1986, *Utech 86–564* CM.

3. *Prosartes smithii* (Hooker) F.H. Utech, Z.K. Shinwari et S. Kawano, in Z.K. Shinwari, R. Terauchi, F.H. Utech et S. Kawano, Taxon **43**: 364 (1994)

Uvularia smithii Hooker, Fl. Bor. Amer. **2**: 174, pl. 189 (1838); *Disporum smithii* (Hooker) Piper, Contr. U.S. Nat. Herb. **11**: 201 (1906); *Prosartes menziesii* D. Don, Proc. Linn. Soc. London 1: 48 (1839); *Disporum menziesii* (D. Don) Britton, Bull. Torrey Bot. Club **15**: 188 (1888).

Plants freely branched, 3—10 dm, crisp pubescent or glabrate. Leaves mostly ovate to oblong–lanceolate, acute to abruptly acuminate, rounded to obliquely subcordate basally, (4) 6—15 x 2—5 cm, glabrous above, lower surface and margins sparsely pubescent with long, twisted hairs. Flowers (1) 2—5 (7), cylindrical, truncate below, flarring slightly at tips; pedicels pubescent; perianth segments oblong lanceolate, slightly gibbous at base, sordid to creamy white, 15—28 mm. Stamens included, equaling or slightly shorter than the style, 10—23 mm; filaments filiform or slightly dilated near the base; anthers 4—5 mm. Ovaries triangular in cross section, elliptical in longitudinal section, glabrous, ovules pendulous, 2—4 per locule; style filiform, pubescent full length, 10—23 mm; stigma 3–cleft, lobes 0.5—1.0 mm. Berries oblong to ovoid, beaked with persistent style base, smooth, yellowish–orange to dark red, 12—16 mm, 3—6 seeded; seeds 4 mm.

Flowering late spring (March) to early summer (June). Moist shady, coastal mountain forests, 10–200 m.

Synoptic Distribution (Maps): (Jones 1951, Wood, Jr. 1970) **Canada**: British Columbia. **USA**: California, Oregon, Washington. (Fig. 3).

Common Name: Large–flowered Fairy Bells, Fairy Lantern.

Chromosome Number: $2n = 16$ (Tamura *et al.* 1992)

SPECIMENS EXAMINED: CANADA: BRITISH COLUMBIA: Vancouver Island: Renfrew District, Nanaimo, Gordon River valley, AUG 1902, *Rosendahl 837* COLO MO NY RM. Port Renfrew, 4 MAY 1961, *Beamish 61–0108* UBC. Bear Creek, Port Renfrew to Shawnigan Lake, 21 MAY 1961, *Calder & MacKay 29,402* GH OSC UBC UC WTU. Nitinat, 2 mi W of Cowichan Lake, 28 MAY 1961, *Calder & MacKay 26,691* NY COLO. W of Cayuse enroute to Nitinat, S side Cowichan Lake, 28 MAY 1961, *Calder & MacKay 29,729* RM. WC part of Island, 410 m, 15 AUG 1980, *Gagnon & Palmer 80–59* UBC, 125 m, 16 JUN 1981, *Gagnon et al. 81–36* UBC. **UNITED STATES: CALIFORNIA: Del Norte Co.:** Patrick Creek Lodge, *s.d., Stephenson* US. Crescent City, APR 1892, *Greene* NY, 19 SEP 1912, *Eastwood 2293* CAS. Gasquet Flat, 10 APR 1934, *Brown 23* GH. Adams Station, 4 MAY 1936, *Bright 13,474* CM. Smith River, 450 ft, 10 APR 1938, *Parks & Parks 24,124* GH MICH MO NY UC US. Little Mile Creek, MAY 1937, *Parks & Parks 24,055* GH NY UC WTU. Patrick Creek Forest Camp, 450 ft, 27 APR 1947, *Detling 5944*

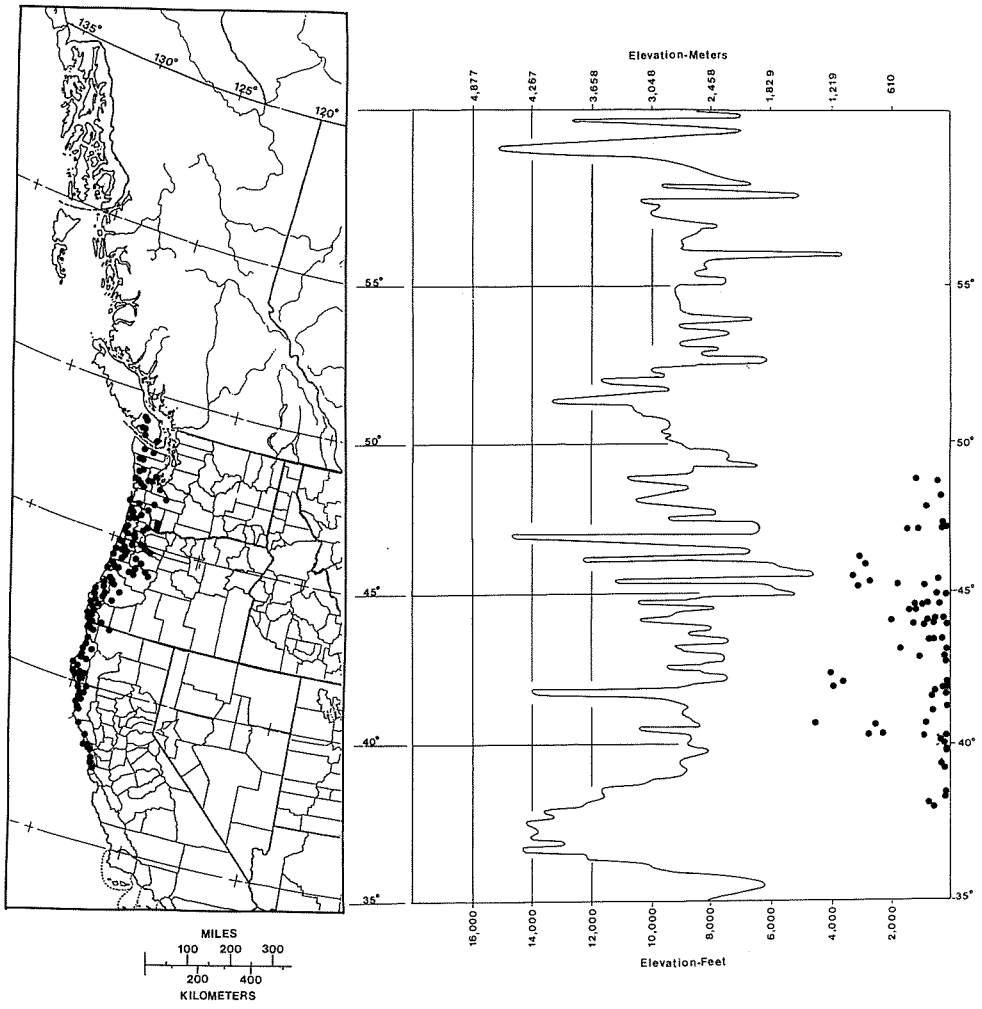


Figure 3. Specimen based distribution map of *Prosartes smithii* (Hooker) Shinwari, Utech and Kawano.

ORE. 1 mi S of Ft Dick, 25 ft, SEP 1937, *Parks & Parks 24,077* GH. 2.4 mi ESE of Klamath, Klamath River, 75 ft, 21 APR 1984, *Utech et al. 84–183* CM. Florence Keller Park, 1.5 mi NNW of Crescent City, 15 m, 25 MAY 1988, *Utech 88–314* CM. **Humboldt Co.:** Kneeland Prairie, 2500 ft, 9 JUN 1908, *Tracy 2662* UC. Buck Mt, Van Duzen River valley, 1000 ft, 27–30 JUN 1908, *Tracy 2867* UC WTU. Bull Creek, 27 JUL 1932, *Jepson 16,477* JEPS, 31 MAY 1934, *Constance 753* JEPS US. McClellan Mt, 2200 ft, 21 MAY 1933, *Tracy 12,209* GH UC. Scotia, 3 MAY 1936, *Bright 13,353* CM. Orick, 11 mi E, 17 MAY 1936, *Cantelow* CM. Snow Camp, 4600 ft, 14 JUN 1951, *Tracy 19,418* UC WTU. Trinidad, Spruce Cove, 200 ft, MAY 1952, *Parks & Parks 24,452* NY UC US. Klamath River, 5.4 mi NE of Weitchpec, 28 JUN 1961, *Roderick* JEPS [n = 8]. Humboldt Redwoods SP, Nelson Grove, Eel River, 250 ft, 24 FEB 1963, *Rice 53* NCU, Jensen Grove, 50 m, 7 MAY 1990, *Utech et al. 90–288* CM. 3 mi NE of Weitchpec, Cavanaugh Creek, 500 ft, 9 APR 1977, *Detzer 14* MO. 4 mi S of Arcata, Jacoby Creek, 1 MAY 1965, *Rogers & Anderson 513* WVA. 3.5

mi N of Phillipsville, 85 m, 4 MAR 1988, *Utech 88–021* CM. Van Duzen CP, 14 mi W of Bridgeville to Carlotta, 50 m, 23 MAY 1988, *Utech 88–271* CM. Bridgeville to Dinsmore, CA 36 (mile 42.0), 800 m, 23 MAY 1988, *Utech 88–284* CM. **Marin Co.:** Camp Taylor, APR 1888, *Sonne* NY. Lagunitas, 14 JUL 1893, *Blasdale* RM, 28 MAR 1910, *Eastwood 3971* CAS, 20 APR 1932, *Rose 32,179* CM RM. Stinson Beach, 500 ft, 9 APR 1939, *Rose 39,057* GH MO NY UC WTU WVA. Muir Woods, 8 MAR 1941, *Rose 41,016* MO. Mt Tamalpais, 18 MAY 1941, *Howell 16,185* CAS NY UC. W side of Bolinas Ridge, E of Bolinas Lagoon, 750 ft, 23 FEB 1963, *Sharsmith 5172* UC. Arroyo Hondo, 3 mi NW of Bolinas, 200 ft, 1 APR 1970, *Rose 70,002* MICH. **Mendocino Co.:** Long Valley, 1866, *Bolander 4724* GH. Westport, 31 JUL 1897, *Jepson 14,765* JEPS. Ft Bragg, 25 MAY 1903, *Henderson 15,434* ORE, 3 MAY 1914, *Newell* GH NY. Pudding Creek, 0.25 NE of High School, 50 ft, 5 MAR 1941, *Wolf 10,004* NY. Noyo, 8–16 AUG 1912, *Eastwood 1626* CAS GH MO NY UC US. 3 mi N of Rockport enroute to Redwood Hwy, 200 ft, 30 JUN 1934, *Wolf 5828* GH. N Fork Navarro River, 3–4 mi E of Dimmick Park, 22 JUL 1936, *Jepson 17,679* JEPS. 5 mi N of S Kibesillah Gulch Angling area, 16 APR 1971, *Maze et al. 1071* NY UBC. MacKerricher SP, 25 m, 28 JUN 1977, *Utech 77–003* CM. 4.7 mi E of CA 1 on Navarro Ridge Rd, 175 ft, 14 APR 1984, *Utech et al. 84–066* CM. **San Francisco Co.:** San Francisco, Coast Range, 1865, *Bolander 370* F MO. **San Mateo Co.:** Pilarcitos, 21 APR 1895, *Davy 1057* UC. Pescadero, MAY 1903, *Elmer 4697* CAS MO NY ORE OSC UC US. Kings Mt, MAY 1907, *McGregor* MO, 28 MAR 1908, *Randall* CM WTU, APR 1917, *Mason* DS. Purisma Canyon bottom, 9 MAR 1906, *Dudley* WTU. Kings Mt Rd, Woodside, APR 1925, *Wiggins 1677* DS. Skyline Boulevard, N of La Honda, 30 APR 1937, *Foster 248* GH. Butano Creek, 11 MAR 1928, *Roush* JEPS. **Santa Clara Co.:** 6 JUN 1877, *Edwards* NY. **Siskiyou Co.:** Klamath NF, Jaynes Canyon, 3700 ft, 10 AUG 1934, *Wheeler 3104* RM. **Sonoma Co.:** Stewart's Point, 20 JUL 1925, *Parks* CAS. 5 mi SE of Monte Rio, 6 APR 1949, *Miller 23* WTU. **OREGON:** Willamette Valley, MAY 1878, *Cusick* GH. Western Pacific Coast, MAY 1880, *Howell* MO NY ORE. Western Oregon, 1881, *Howell 134* ORE. Coast Mts, 9 JUL 1884, *Henderson 988* US. **Benton Co.:** Alsea Bay, 17 APR 1905, *Sweetser* MO. Alsea Mt, 18 MAY 1933, *Nelson & Nelson 602* MO RM, 22 APR 1946, *Fleischman* CM GH. Mary's Peak, 16 MAY 1914, *Gilbert 355* OSC, 1000 ft, 5 MAY 1922, *Epling & Pubols 5047* MO, SE–slope, 6 JUN 1946, *Baker 5409* OSC, 7 MAY 1947, *Merkle 47–84* OSC. 5 mi SW of Corvallis on Airport Rd, 300 ft, 10 APR 1957, *Noller 11* GH. Philomath, 25 APR 1936, *Powell* UC WTU. McDonald SF, Oak Creek, 18 JUN 1965, *Dennis 2671* OSC. 5 mi SW of Philomath, Beaver Creek Rd, 3500 ft, 30 MAR 1968, *Holmgren 3033* NY. Sweet Home Creek, 1200 ft, 30 APR 1983, *Taylor 8178* CAS. **Clatsop Co.:** Astoria, 11 JUN 1933, *Morrill* 11 WTU. Saddle Mt SP, Saddle Mt, 11 JUN 1936, *Ifft & Wildman 29* OSC, 1775 ft, 25 MAY 1950, *Detling 6563* ORE UC, 2600 ft, 3 JUN 1951, *Detling 6882* ORE UBC, 850–1000 m, 8 JUN 1988, *Utech 88–548* CM. Onion Peak, 3064 ft, 13 JUN 1972, *Chambers 3436* OSC. 0.4 mi E of Elsie along OR 26, 25 MAY 1975, *Watkins & Dunn 332* NY. E of Gearhart & Seaside, 250–290 m, 30 MAY 1987, *Boufford & Wood 23,735* A. **Columbia Co.:** Nehaalem Range, upper Clatskanie Valley, 15 MAY 1927, *Thompson 2444* WTU. **Coos Co.:** S Fork Coos River, 30 MAR 1911, *Smith 3589* F NY. South Slough, 10 JUL 1911, *Haydon 90* F. Coos Bay, Marshfield, 20 AUG 1911, *House 4703* US. Millicoma SF, 4 JUN 1954, *Krajina* UBC. Cape Arago, 15 SEP 1912, *House 5030* NY. Charleston, 16 JUN 1926, *Scaffer* UC. Bandon to Coquille, 14 APR 1927, *Thompson 2326* WTU. Roseburg to Myrtle Point along OR 42, 23 APR 1931, *Leach 3359* ORE. Myrtle Point, APR/MAY 1938, *Schaad* OSC. Isthmus Slough, Coos City, 25 ft, 21 APR 1940, *Detling* 4097 ORE UC WTU. Iron Mt, 26 APR 1947, *Baker 3724* OSC. E Fork Millicoma River, 4 mi upstream from Allegany, 20 APR 1953, *Cronquist* 6867 GH NY UBC UC. 3 km E of Dora, Bay Wagon Rd at China Creek Rd, 75 m, 22 MAR 1979, *Sundberg & Chrisstensen 372* ORE. SE of Elliott SF, 18 mi NE of Coos Bay, 100 m, 28 MAY 1986, *Utech 86–531* CM. 5 mi N of Sitkum, Brummet Creek Rd, 400–600 m, 29 MAY 1988, *Utech 88–423* CM. **Curry Co.:** Port Orford, 4 JUL 1919, *Peck 8652* GH. Gold Beach, MAR 1916, *Hoyt* NY. Brookings, JUN 1916, *Thompson 136*

DS, 14 MAR 1926, *Henderson 7209* ORE. Siskiyou NF, head Six River, 750 ft, 13 MAY 1927, *Gabrielson & Ingram 2118* RM. Watermans, Winchuck River, 7 MAY 1929, *Henderson* ORE. Snow Camp, 4000 ft, 25 JUN 1929, *Leach 2397* NCU ORE OSC. Chetco River, Tollmans, 10 JUN 1932, *Leach* ORE. 4 mi N of Agness, Cherry Flat, Rogue River, 23 MAR 1947, *Baker 3489* OSC WTU. Oak Flat, Illinois River, 24 MAR 1947, *Baker 3498* OSC. Bald Mt Creek, McGribble Station, 75 ft, 24 APR 1947, *Detling 5904* ORE. Winchuck River, Winchuck Camp, 150 ft, 17 JUN 1948, *Detling 6285* ORE. 9.7 mi S of Carpenterville, 5 MAY 1951, *Balls 16,436* NY RM WTU. W Fork Indigo Creek enroute to Agnes, 1100 m, 27 MAY 1986, *Utech 86–501* CM. Chetco River, 8.5 mi NE of Brookings, 40 m, 24 MAY 1988, *Utech 88–297* CM. **Douglas Co.:** Umpqua Valley, MAY 1987, *Howell 574* CM UC. Elkton, 4 APR 1903, *Sheldon 11,801* ORE. Cow Creek Canyon, 9 MAY 1922, *Gorman 5628* NY ORE UC. Umpqua River, 500 ft, 5 APR 1940, *Detling 3931* ORE OSC WTU. Mill Creek, W of Scottsburg, 20 APR 1980, *Straley 2086* UBC. Loon Lake, 200 m, 2 JUN 1988, *Utech 88–430* CM. **Josephine Co.:** Almeda, Rogue River, 18 APR 1926, *Savage* ORE. 3 mi above Takilma, E Illinois River, 26 APR 1926, *Henderson 5991* CM RM. **Lane Co.:** Noti, 20 APR 1924, *Constance* UC. McKenzie Bridge along McKenzie River, 28 AUG 1928, *Henderson* ORE. Winberry Creek above Ranger Station, 20 APR 1933, *Henderson 15,166* ORE. Canary, 75 ft, 24 APR 1938, *Detling 2543* ORE. Springfield, 700 ft, 2 MAY 1938, *Detling 2590* ORE. Big Fall Creek, 14 MAY 1938, *Henderson 18,471* ORE. McLeod Creek, Minerva, 300 ft, 23 APR 1938, *Detling 2531* ORE. Marten Ridge, 1200 ft, 22 APR 1939, *Detling 3544* ORE. 0.5 mi from coast along Ten Mile Creek, 18 MAY 1952, *Smith* OSC. Willamette NF, Andrews Forest, 1900 ft, 18 MAY 1967, *Dyrness 11* RM. Wendling, 600 ft, 2 MAY 1971, *Mason 8521* ORE. Mabel CP, 3–4 mi N of Marcola, 22 MAY 1974, *Mason 9706* ORE. 3 mi E of Penn, 27 MAY 1975, *Mason 10,099* ORE UC. Whittaker Creek, 130 m, 3 JUN 1988, *Utech 88–458* CM. 0.6 mi SW of Marcola Rd along Shotgun Creek Rd, 260 m, 4 JUN 1988, *Utech 88–469* CM. **Lincoln Co.:** Newport, 16 MAY 1925, *Mason 2307* UC. Devils Lake, 13 APR 1926, *Gorman 7557* NY ORE. Siletz River mouth, 13 APR 1926, *Henderson* ORE, 4 AUG 1928, *Henderson* ORE. Walport, Black Canyon, 14 APR 1928, *Overlander* OSC. Seal Rocks SP, 18 MAY 1947, *Evenden, Jr.* OSC, 9 JUN 1953, *Krajina* UBC. 8 mi E of Eddyville along US 20, 14 MAY 1954, *Dress 4186* UC UBC. **Linn Co.:** Cascadia, S Santiam River, 12 JUN 1901, *Henderson 13,707* ORE. Cascadia SP, 11 mi E of Sweet Home, 25 MAY 1956, *Chisaki & Tavares 751* UC. 7 mi E of Foster, 5 MAY 1973, *Barkworth 706* WTU. McDowell Creek Falls CP, McDowell Creek, 270 m, 5 JUN 1988, *Utech 88–492* CM, 8 MAY 1990, *Utech et al. 90–321* CM. **Marion Co.:** Silver Creek, 1871, *Hall 520* F GH ORE US. Silverton, 15 APR 1928, *Thompson 4099* MO PH. Mehama, Santiam River, 9 MAY 1928, *Thompson 4171* MO. 15 mi SE of Silverton, N Fork Silver Creek, 450 m, 7 JUN 1988, *Utech 88–516* CM. **Multnomah Co.:** Willamette Slough, MAY 1879, *Howell & Howell* NY ORE. Portland, 5 MAY 1888, *Henderson* ORE, 10 MAY 1905, *Palmer 1459* MO NY US. Balch Creek, 3–6 MAY 1907, *Suksdorf 1222* GH MO NY PH UC WTU. **Polk Co.:** 10 mi SW of Falls City, 18 MAY 1918, *Nelson 2147* GH. Glen Creek, 3 mi W of Salem, 7 APR 1946, *Clinette* OSC. **Tillamook Co.:** Coast Mts, 9 JUL 1882, *Howell & Henderson* ORE. Wilson River, 4 MAY 1894, *Lloyd* NY, 15 mi above Tillamook, 21 APR 1928, *Thompson 4106* MO PH US. Sand Lake, 1 MAY 1926, *Thompson 701–A* MO. S of Tillamook, 1 MAY 1926, *Thompson 701* WTU. Triangulation Point, 3294 ft, 23 JUN 1980, *Joyal & Carpenter 209* OSC. Munson Creek Falls CP, 100 m, 8 JUN 1988, *Utech 88–534* CM. **Washington Co.:** Patton's Valley, 20 MAY 1896, *Lloyd* NY. **Yamhill Co.:** Coast Mts, 9 JUL 1882, *Henderson* MICH. Walker Flat, 11.5 mi W of Carlton, 552 m, 16 MAY 1986, *Halse 3279* ORE OSC. **WASHINGTON:** Turtle Head, 13 AUG 1907, *McGregor* DS. Cartte Rock, 20 mi E, 12 JUN 1954, *Brayshaw 54–089* UBC. **Clallam Co.:** 10 mi E of Sappho, 29 MAY 1938, *Hitchcock & Martin 3542* RM WTU. 5 mi W of Port Angeles, 11 MAY 1940, *Beach* UC. 12 mi W of Lake Crescent, 23 JUN 1940, *Wiggins* 9442 CAS GH NY RM. **Clark Co.:** Big & Little Washougal Rivers junction, 1 MAY 1926, *Biddle* NY ORE. Gifford Pinchot NF, Gumboot Mt, Jacks Mt Rd, 2800 ft, 11 JUN 1964,

Franklin 349 OSC RM. **Cowlitz Co.:** 5 mi W of Kelso, 24 APR 1938, *Hitchcock 3279* RM WTU. **Grays Harbor Co.:** Hoquiam, 13 MAY 1897, *Lamb 1039* CAS MO, 28 MAY 1912, *Bardell* MO. Montesano, 200 ft, 7 JUN 1898, *Heller & Heller* 3895 MO NY US, MAY 1917, *Grant* NY PH UC. 1 mi W of Quiniault, 21 JUN 1902, *Conard 129* US. Copalis, 30 MAY 1912, *Bardell* MO. Olympic NF, Lake Quinault, Ewell Creek Trail, 9 MAY 1931, *Thompson 6255* MO PH WTU, 2 mi up Mt Baldy Trail, 1000 ft, 5 JUN 1949, *Jones 6* WTU, Fall Creek Trail, 75 m, 10 JUN 1988, *Utech 88–603* CM. Humptulips River, 8 APR 1934, *Jones 4575* WTU, 11 MAY 1935, *Jones 6464* PH. 5 mi N of Copalis Crossing, 4 JUN 1949, *Jones 4* WTU [$2n = 16$]. N of Aberdeen & Hoquiam along US 101, 50 m, 31 MAY 1987, *Boufford & Wood 23,758* A. Lake Sylvia SP, 2.5 mi N of Montesano, 100 m, 9 JUN 1988, *Utech 88–587* CM. **Jefferson Co.:** Olympic NF, Hoh River, 100 ft, 24 APR 1925, *Otis 1419* WTU, Olympus Station, 800 ft, 13 MAY 1934, *Cliff 76* RM, Snider Creek, 550 ft, 26 MAY 1936, *Schwartz 40* RM WTU. **Lewis Co.:** Toledo, 12 MAY 1940, *Gould 1178* UC. Snoqualmie NF, Alder Lake, 11 mi N of Morton, 440 m, 30 MAY 1986, *Utech 86–539* CM. **Mason Co.:** Kamilche to Elma, 19 MAY 1929, *Benson 1425* WTU. Schafer SP, 10 mi N of Satsop, Satsop River, 100 m, 9 JUN 1988, *Utech 87–576* CM. **Pacific Co.:** North Head, 24 AUG 1918, *Mine* RM. **Pierce Co.:** Upper Nisqually Valley, 25 JUN 1893, *Allen 117* GH. **Wahkiakum Co.:** Elokomin River, 23 JUN 1927, *St. John 8671* WTU.

4. ***Prosartes trachycarpa*** **S. Watson**, U.S. Geol. Expl. 40th Parallel (Bot. King Expl.) **5**: 344 (1871).

Disporum trachycarpum (S. Watson) Bentham & Hooker, Gen. Pl. **3**: 832 (1883); *D. trachycarpum* var. *subglabrum* E.H. Kelso, Rhodora **39**: 150 (1937); *Lethea trachycarpa* (S. Watson) Farwell, Papers Mich. Acad. Sci. **2**: 20 (1923); *Uvularia lanuginosa* (Michaux) Persoon var. *major* Hooker, Fl. Bor. Amer. **2**: 174 (1839); *Disporum majus* (Hooker) Britton, Bull. Torrey Bot. Club **15**: 188 (1888).

Plants sparingly branched, 3—6 (8) dm, crisp pubescent, glabrate or glabrous with age. Leaves ovate to oblong–lanceolate, acute to short acuminate, subcordate to oblique basally, 4—10 (12) x 2—5 cm, lower surface and margins moderately pubescent with scattered, flattened hairs. Flowers 1—2 (3), narrowly campanulate; pedicels stout, pubescent; perianth segments narrowly oblanceolate, creamy to greenish–white, (8) 10—15 mm. Stamens mostly exserted; filaments filiform, 10—15 mm; anthers 3—4 (5) mm. Ovaries broadly ovoid to obovate, becoming 3–lobed and obpyriform after anthesis, finely papillose; ovules horizontal, 2—6 per locule; styles filiform, glabrous or pubescent, 0.9—1.2 cm; stigma 3–cleft to subentire. Berries depressed–globose, strongly papillose, reddish orange to bright red, 6—12 (18) seeded; seeds 4—5 mm.

Flowering late spring (April) to summer (July). Rich shady deciduous forests, aspen groves to open coniferous–deciduous woods, 350–2800 m.

Synoptic Distribution (Maps): (Jones 1951, Wood, Jr. 1970, Argus & White, 1982) **Canada**: Alberta, British Columbia, Manitoba, Ontario (Argus & White, 1982), Saskatchewan. **USA**: Arizona, Colorado, Idaho, Montana, Nebraska, New Mexico (Martin & Hutchins 1980), North Dakota, Oregon, South Dakota, Utah (Albee *et al.* 1988), Washington, Wyoming. (Fig. 4).

Common Name: Rough–fruited Fairy Bells, Rough–fruited Mandarin.

Chromosome Number: $2n = 22$ [Jones 1951]

SPECIMENS EXAMINED: CANADA: ALBERTA: Glenbow, 1892, *Moodie 354* MTMG.

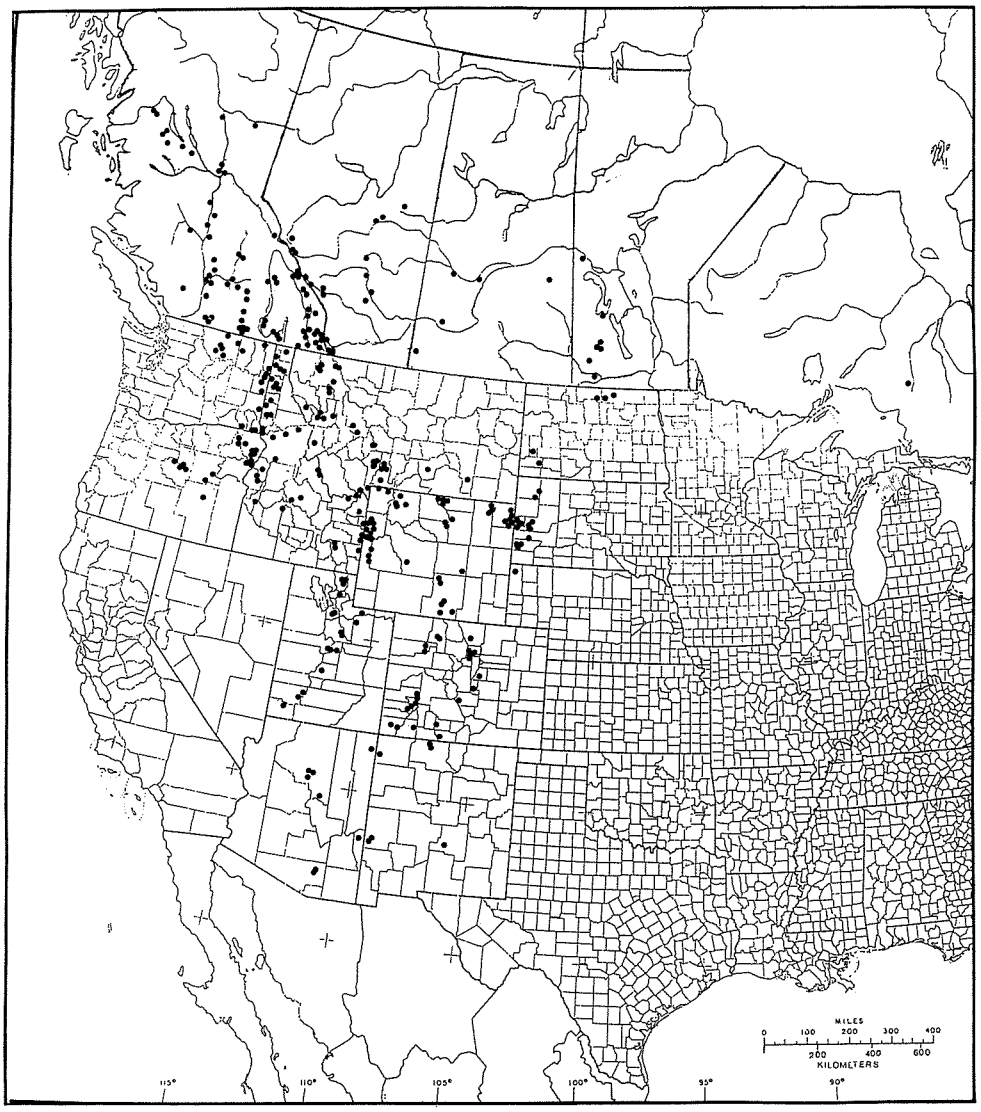


Figure 4. Specimen based distribution map of *Prosartes trachycarpa* S. Watson.

Calgary, 7 JUN 1897, *Macoun* NY, Shaganappi, 30 MAY 1913, *Moodie 184* MTMG US, below Municipal Golf Course, 4 JUN 1943, *McCalla 7409* UBC. Crow Nest Pass, AUG 1897, *Macoun 25,055* NY, Twin Bridges, 12 JUL 1960, *Ogilvie* UBC. Tunnel Mt, 4900 ft, 23 JUN 1899, *McCalla 2215* OAC WTU. Sulphur Mt, 6000–8000 ft, 14 JUN 1906, *Brown 153* GH MO NY. 5.0 mi W of Battle River, Grand Trunk Pacific Railroad, 17 AUG 1906, *Macoun & Herriot 78,373* F. Yellowhead Lake, Saskatchewan & Athabasca Rivers headwaters, 20 AUG 1908, *Schaffer 1598* WTU. Henry House, 9 SEP 1911, *Hollister 81* US. Rosedale, 30 MAY 1914, *Moodie 45* F. Rosedale Trail, 2200–2500 ft, 13 MAY 1915, *Moodie 868a* F GH MO OSC RM UC, 31 JUL 1915, *Moodie 868* F GH. Castle River Station, 2 JUN 1928, *Brinkman* GH MICH. Waterways, 8 JUN

1928, *Raup 2022* GH, 2 JUN 1939, *Raup & Soper 9062* GH. Firebag River, 3 JUN 1935, *Raup 6044* GH. Ft Saskatchewan, 13 AUG 1935, *Turner 70* GH, 14 MAY 1939, *Turner 1192* GH, 16 MAY 1947, *Turner 5438* UBC, 2 JUL 1947, *Turner 5734* UBC, 16 AUG 1950, *Turner 7368* MTMG. Ft McMurray, junction Athabaska & Clearwater Rivers, 11 SEP 1935, *Raup 7110* GH. Athabasca, Ft McMurray, 9 AUG 1903, *Preble & Cary 106* US, 28 AUG 1903, *Preble & Cary 168* US. Edmonton, 18 MAY 1937, *Moss 4191* UBC, Elk Island Park, 1 SEP 1947, *Brown 6994* UBC. Brule, 10 AUG 1937, *Knowlton* GH. Waterton Lakes NP, 4500 ft, 13 JUL 1938, *Hunnewell 15,578* GH, Crypt Lake, 5000 ft, 31 JUL 1953, *Breitung 16,987* F, 2 mi W of Blakiston Station, 5000 ft, 7 AUG 1953, *Breitung 17,242* NY, Interpretive Building, 4300 ft, 20 MAY 1969, *Blais & Nagy 4300* UBC. 5.0 mi W of Pincher Creek, 29 JUL 1939, *Moss 142* GH, 19 MAY 1941, *Moss 1196* GH. Jasper NP, Cabin Creek, 3472 ft, 3–16 AUG 1943, *Scamman 3024* GH. Banff NP, Mt Norquay, Bow River Valley, 6400 ft, 23 JUN 1945, *Porsild & Breitung 12,201* UBC. Kananaskis Forest Station, 28 JUN 1946, *Porsild & Breitung 16,377* RM. Stoney Indian Reserve, Morley, Lake Chiniki, 7 AUG 1949, *McCalla 10,531* UBC. Lac la Biche, 19 JUN 1953, *Cody & Gutteridge 6786* GH. 8 mi S of Delburne, 6 JUN 1956, *Diem 24* NY. 7 mi S Delia, 7 JUL 1958, *Boivin & Perron 12,421* GH. Donevan, JUN 1959, *Buchanan* UBC. Banff, 20 JUL 1962, *Bahr* MTMG. Lake Ste–Anne, 8 AUG 1976, *Muhlenbach* MO. **BRITISH COLUMBIA:** Quesnel, 29 MAY 1875, *Macoun* MTMG, 20 JUL 1944, *Eastham* UBC, 1 AUG 1946, *Eastham* UBC, 20 AUG 1963, *Auclair 502* MTMG. Mt Revelstoke NP, 19 MAY 1890, *Macoun* GH, 25 JUL 1965, *Montgomery 2725* OAC, S of Canyon Creek, 15 JUL 1953, *Krajina* UBC. Kootenay, Roselands, 1895, *Hislop* UBC, Wardner, 2 JUL 1915, *Murray* UBC, 16 mi N of Natal along Elk River Rd, 8 SEP 1937, *McCabe 4929* UC. Vernon, 20 APR 1898, *Homes* UBC. Glacier, 31 JUL 1901, *Williamson* PH, 4093 ft, 14 JUN 1904, *Schaffer* PH. Okanagan, Armstrong, 22 APR 1904, *Wilson 18* UBC, 20 JUL 1913, *Davidson* UBC, Kelowna, 22 APR 1915, *Holman* UBC. Field, 8 JUN 1904, *Farr* PH. Emerald Lake, 4300 ft, 25 JUN 1904, *Macoun 27* CM. Beaver Valley, 3800 ft, 18 AUG 1904, *Macoun 527* CM. Field, 4500 ft, 14 JUN 1906, *Butters & Rosendahl 1432* GH. Clinton, Horse Fly mine, 22 JUL 1906, *Wilson 747* UBC. Ashcroft, 29 JUN 1907, *Cowles 267* F. Crawford Bay, 25 MAY 1920, *Murray* UBC. Hudson to Hope, N–slopes of Peace River, 2100 ft, 16 JUN 1932, *Raup & Abbe 3601* GH. Clearwater River Rd, 13.2 mi from North Thompson River Rd, 11 MAY 1934, *McCabe 1059* UC. 6.5 mi N of Clearwater, 5 MAY 1935, *McCabe 1871* UC. Clearwater, ridge E of Raft River, 16 MAY 1935, *McCabe 2083* UC. Ainsworth, 27 JUL 1937, *Eastham* UBC. Fairview Pass, Oliver to Keremeos, 6 MAY 1938, *McCabe 5913* UC. 2.0 mi E of Wasa, 1000 ft, 18 MAY 1938, *McCabe 6111* UC. 2.0 mi E of Radium Springs, Sinclair Creek Gorge, 21 MAY 1938, *McCabe 6174* UC WTU. Crows Nest Pass, 1 JUN 1938, *McCabe 6468* UC. Kamloops, 9 JUN 1938, *Tisdale* UBC, 3500 ft, 12 MAY 1949, *Coltle 122* UBC. Pinantan, 14 MAY 1935, *McCabe 2069* UC. 1 mi N of Paul Lake PP, 11 MAY 1949, *Hatter 202* WTU. Green Mt, 7000 ft, 28 JUL 1938, *Thompson & Thompson 649a* WTU. 5.0 mi N of Prince George, Summit Lake, 19 MAY 1939, *McCabe 6954* UC. New Hazelton, 23 MAY 1939, *McCabe 7004* UC WTU, 10 AUG 1940, *McCabe 8246* UC. 2 mi S of New Hazelton, 24 MAY 1939, *McCabe 7020* UC WTU. Peace, along Wicked River, 2000 ft, 14 JUL 1932, *Raup & Abbe 3818–A* GH, 18 JUL 1932, *Raup & Abbe 3873* GH NY. Penticton, Mt Apex, 10 MAY 1940, *Eastham* UBC. Allenby, Similkameen River, 8 AUG 1940, *McCallum 13* UBC UC. Skeena, Ball Ranch, 12 mi W of Telegraph Creek, 12 AUG 1941, *McCabe 8763* UC. Mt Robson PP, Hargreaves Ranch, 2900 ft, 19–28 AUG 1943, *Scamman 3243* GH, 3350 ft, 20 AUG 1970, *Krajina* UBC. Nelson, E of Nelson Ferry, 1 MAY 1944, *McCalla 8106* UBC. Ft Fraser, 4 JUL 1944, *Eastham* UBC. Kimberley, Cherry Creek, 9 JUL 1944, *Fodor 150* UBC. Hanceville, 7 AUG 1944, *Lee* UBC. Smithers, enroute to Duthie Mine, 27 JUL 1946, *Eastham* UBC. Lytton–Stein River Valley, 250–800 m, 19 AUG 1949, *Krajina 1478* UBC. Botanie Valley, 22 AUG 1949, *Krajina* UBC. Lightening Lake, Hope to Princeton Rd, 26 AUG 1949, *Cowan* UBC. Botanie Mt, 29 AUG 1950, *Krajina* GH UBC WTU. 8 mi W of Princeton, 3500 ft, 23 MAY 1952, *Brayshaw 3* UBC. Pavilion

Lake, 900 m, 12 JUN 1952, *Taylor &* Lewis *165* UBC UC. 8 mi SW of Okanagan Falls, Orofino Mt, 3800 ft, 1 JUL 1953, *Calder & Savile 9929* UC. Kinbasket Mt, 2700 ft, 18 JUL 1953, *Krajina* UBC. W Kettle River Valley, Beaverdell, 2600 ft, 29 AUG 1953, *Krajina* UBC. Giscome, 20 mi NE of Prince George, 9 JUL 1954, *Calder et al. 12,712* UBC. 3 mi NW of Lac la Hache village, 2750 ft, 23 MAY 1956, *Calder et al. 16,606* WTU. 3.5 mi S of Mamit Lake, 28 MAY 1956, *Calder et al. 16,788* COLO PH. 9 mi SE of Clinton, 2200 ft, 11 JUL 1956, *Calder et al. 18,653* NY. Flathead Rd (mile 15), 4800 ft, 18 JUL 1957, *Bell & Davidson 308* UBC. Sage Creek Lodge, 5000 ft, 1 AUG 1957, *Bell & Davidson 735* UBC. Fish Lake, Summerland–Fish Lake Rd, 3000 ft, 10 MAY 1958, *Beamish 8112* UBC. Nakusp, 14 JUL 1958, *Bell* UBC. 3.7 mi N of Roosville Customs on BC/MT border, 16 MAY 1958, *Taylor & Ferguson 525* COLO GH NY OSC RM WTU. 3.5 mi ENE of Ft Steel along Maus Creek, 3100 ft, 19 MAY 1958, *Taylor & Ferguson 609* UBC. New Denver, 5 AUG 1959, *Roller* UBC. Oliver Pass on Causton Rd, 3000 ft, 3 MAY 1960, *Beamish & Vrugtman 60–064 GH* UBC WTU. 6 mi S of Merritt, 3400 ft, 17 MAY 1961, *Beamish et al. 61–124* UBC. 10 mi N of Princeton, Merrit Rd, 2550 ft, 2 MAY 1960, *Beamish & Vrugtman 60–037* GH UBC WTU. 3 mi S of Balfour, 1950 ft, 6 MAY 1960, *Beamish & Vrugtman 60–147* GH UBC WTU. Kootenay River Rd, 3000 ft, 12 MAY 1960, *Beamish & Vrugtman 60–251* GH UBC WTU. Greenwood–Phoenix Rd, 3050 ft, 16 MAY 1960, *Beamish & Vrugtman 60–383* GH UBC WTU. 0.25 mi S of Dry Lake, 2800 ft, 18 MAY 1961, *Beamish et al. 61–147* UBC. Pilot Mt, 15 mi NE of Prince George, 12 JUL 1963, *Auclair 330* MTMG. Salmon Arm along Hwy 1, 23 JUN 1964, *Montgomery 2360* OAC. Quesnel to Williams Lake, 1540 ft, 19 JUN 1965, *Krajina* UBC. Kootenay NP, 26 JUL 1965, *Montgomery 2734* OAC. Soda Creek above Blue Lake, 17 JUL 1967, *Bell* UBC. Old Cawston Rd to Oliver, 2800 ft, 30 APR 1968, *Beamish et al. 68–022* UBC. 3 mi S of Lytton, Fraser River Canyon Hwy, 23 APR 1969, *Maze & Muhlenbacher 490* NCU UBC. Glenora, 25 MAY 1974, *Sampson* UBC. Kishinena Valley, 4000–5000 ft, 22 JUL 1970, *Beamish et al. 762* UBC. 1.1 mi E of junction of Hwy 5 & Louis Creek Rd, 19 JUL 1971, *Taylor & Tarrant 5313* UBC. 25 mi N of Mackenzie, Patsuk Creek Valley, 2350 ft, 9 AUG 1974, *Pojar* UBC. Hat Creek, 3650 ft, 11 JUN 1976, *Beirne 2,048* UBC. Vernon, 24 APR 1977, *Wright* UBC, 9 mi SW, 2000 ft, 23 JUL 1952, *Brayshaw 58* UBC, 4 mi E, 2600 ft, 28 JUL 1952, *Brayshaw 61* UBC. Fraser Lake, 2500 ft, 6 JUL 1974, *Krajina et al.* UBC. 4 mi SE of Telkwa, Bulkley River, 1500 ft, 7 JUL 1974, *Krajina et al.* UBC. 2 mi E of Tyhee Lake, 2600 ft, 12 JUL 1974, *Krajina et al.* UBC. 26 mi S of Houston, Okusyelda Hill, 3400 ft, 28 JUL 1974, *Krajina et al.* UBC. 35 mi E of Quesnel, 4 mi ESE along Swift River, 2950 ft, 12 AUG 1974, *Krajina et al.* UBC. Poison Lake, 2 mi N of Carpenter Lake, 3500 ft, 10 MAY 1978, *Gornall 236* UBC. 5 mi E of Golden, 27 JUL 1980, *Soreng & Spellenberg 979* NY. McGillivray, Anderson Lake, N of D'Arcy, 300 m, 6 MAY 1990, *Newton* UBC. **MANITOBA:** Oak River at Lothair, along Grand Trunk Pacific Railroad, 21 JUN 1906, *Macoun & Herriiot 78,375* F GH. Riding Mt NP, Clear Lake, 2016 ft, 29 AUG 1941, *Scamman 2862* GH. N of Wasagaming, 10 JUL 1979, *Cody 24,385* UBC. Wasagaming, E Lookout at Whirlpool Lake, 15 JUN 1967, *Baldwin 10,990* MTMG. Cedar Lake to Lake Winnipegois, East Mossy Portage, 17 AUG 1948, *Scoggan 4648* GH. Churchill District, 2 mi E of The Pas, Saskatchewan River, 30 AUG 1959, *Krivda 2166* GH UBC. Carberry, SW of Treesbank along Oak Creek, 26 MAY 1967, *Baldwin 10,850* MTMG. Gilbert Plains, 30 MAY 1981, *Parker 110* MTMG, 23 JUL 1981, *Parker 487* MTMG. **ONTARIO: Cochrane District:** Gill Township, Hearst, 28 mi W at Rabbit Lake, moraine below fire tower, 4 AUG 1952, *Baldwin & Breitung 3759* GH, 4 JUN 1954, *Baldwin 5642* MTMG WTU. Rabbit Lake tower, 21 JUN 1966, *Soper & Haber 736* MICH. **SASKATCHEWAN:** [Palliser's British N. Amer. Explor. Expedition], 1857–58, *Bourgeau* GH. 2 mi S of Porcupine, 30 MAY 1941, *Breitung 984* GH. Saskatoon, 4 JUN 1950, *Brayshaw 50–258* UBC, 7 AUG 1958, *Boivin & Perron 12,809* GH RM UBC. Battleford, 23 MAY 1958, *Macins* OAC. Cypress Hills PP, 18 mi S of Maple Creek, 24 AUG 1959, *Swink 3073* F CM, *Swink 3095* F. Matador Field Station, 35 km SE of Kyle, 21 MAY 1969, *Skoglund 38* GH. **UNITED STATES: ARIZONA: Apache Co.:** Luka–Chukai Mts, 2727 m, 30 JUN 1936, *Goodman*

& Payson 2837 GH MO NY WTU, 2520 m, 9 AUG 1939, *Goodman & Payson 3192* GH MO NY UC WTU. **Coconino Co.:** Bill Williams Mt, 9 JUN 1883, *Rusby 843* MICH NY PH US, AUG 1884, *Lemmon 4176* GH UC, 4 JUN 1904, *Dudley* DS, 7400–9264 ft, 17 JUL 1938, *Kearney & Peebles 14,026* NY. Weits Canyon, 2 MAY 1891, *McDougal 64* US **[Type:** var. *subglabrum* K.E. Kelso**]**. Mt Mogollon, Mormon Dairy, 30 MAY 1887, *Mearns 41* NY. Flagstaff, JUN 1891, *McDougal* DS US. Coconino NF, San Francisco Peaks, 2200 m, 1 JUL 1901, *Leiberg 5613* ORE, 7 JUN 1911, *Read & Hill* RM. Elden Mts, 2.1 mi E of NF Rd 420 on NF Rd 557, 7780 ft, 14 JUN 1985, *Ricketson 2592* MO. **Greenlee Co.:** Apache NF, Hannagan Meadow, 2300–2900 m, 11 JUN 1973, *Moir & Campbell 33* RM. **Pima Co.:** Coronado NF, Santa Catalina Mts, Soldier's Camp, 1 AUG 1916, *Harris 16,436* US, 7500 ft, 27 AUG 1927, *Graham* CM. 20 mi NE of Tucson, 2400–2900 m, 8 JUL 1964, *Baad 448* MICH. **COLORADO:** [Colorado Territory], AUG 1871, *Canby* NY PH, 1875, *Henry 63* PH. Cheyenne Canyon, 1 SEP 1904, *Huestis* COLO. **Boulder Co.:** Osborn Lake, 1864, *Parry* GH MO NY. Boulder, 1896, *Moseley 304* RM, 28 MAY 1896, *Crandall 2453* RM, 10 JUN 1901, *Wheeler 326* COLO RM. Green Mt, 6500 ft, 16 JUL 1906, *Daniels 455* MO. Boulder Creek, 2200 m, 28 MAY 1921, *Clokey & Clokey 4062* UC. Bluebell Canyon, opposite Third Flatiron, 21 MAY 1939, *Fullerton* OS. Ward, 4 mi E of Caribou, 23 AUG 1961, *Dahl* COLO NCU. **Conejos Co.:** Sheep Creek, 2 mi W Aspen Glade camp & 2.5 mi SSE of Spruce Hole, 8700 ft, 8 JUN 1986, *Douglas 946* RM. **Douglas Co.:** 7.3 mi SW of Sedalia, 6500 ft, 24 MAY 1952, *Weber 7435* COLO RM WTU. **Fremont Co.:** Sangre de Cristo Mts, AUG 1874, *Brandegee 935* UC, SEP 1874, *Brandegee 955* MO [Plantae Americae Septentrionalis]. **Gilpin Co.:** Central City, 1869, *Scovell* MICH. Eldora to Baltimore, 8500–9500 ft, 20 JUN 1903, *Tweedy 5513* NY RM. **La Plata Co.:** San Juan NF, Weminuche Wilderness Area, 12 mi NNE of Durango, 21 JUN 1990, *Utech 90–931* CM. **Larimer Co.:** Estes Park area, Fern River, 15 AUG 1895, *Osterhout 839* RM. 6000 ft, 9 MAY 1896, *Cown* RM. **Mineral Co.:** Pagosa Peak, 9000 ft, AUG 1899, *Baker 253* CM F GH MO NY RM US. **Montezuma Co.:** Dolores River, Escalante Sector, 2000–2200 m, 1978, *Bye et al.* CM COLO. La Plata Canyon, 8200 ft, 16 SEP 1983, *Kass & Preston 1459* NY. **Montrose Co.:** Black Canyon of the Gunnison, Curecanti Dam, 29 JUN 1983, *Weber et al. 16,833* COLO, Gunnison Point to River, 2 AUG 1983, *Beck & Kennedy 17,051* COLO. **Ouray Co.:** Ouray, 8400 ft, 22 JUN 1892, *Crandall* NY, 24 JUL 1897, *Shear 4117* NY, 2300–2600 ft, 7 SEP 1901, *Underwood & Selby 89* NY, 21 JUL 1915, *Osterhout 5279* RM. Umcompahgre NF, 2.5 mi W of Owl Creek Pass on NF 858, 2600–2900 m, 23 JUN 1990, *Utech 90–1000* CM. **Rio Blanco Co.:** White River NF, Fourmile Creek, 8500 ft, 14 JUN 1962, *Gierisch 2532* RM. Timber Gulch, 2 mi E of Joe Bush Gulch, 2285 m, 30 JUN 1982, *Popp & Naumann 82–303* COLO. **Routt Co.:** Elk Mt, 10 mi W of Steamboat Springs, 28 JUL 1951, *Weber & Maslin 7082* COLO WTU. Hot Springs, 4 mi S of Steamboat Springs, 24 JUN 1965, *Weber & Salamun 12,499* COLO WVA. **San Miguel Co.:** Telluride, 11 AUG 1896, *Biltmore Herbarium 2159A* US. Iron Springs Mesa, 11 JUN 1912, *Payson 50* COLO RM. San Miquel Canyon, Placerville, junction Park Creek & San Miquel River, 24–29 MAY 1964, *Becker* MICH. **Teller Co.:** Palmer Lake, 28 MAY 1903, *Ferril* COLO. **IDAHO:** Minidoka NF, North Cedar, 7500 ft, 4 JUN 1923, *Deming & Smith 177* RM, S Fork of Kolsaw Canyon, 6600 ft, 27 MAY 1924, *Deming 4* RM. Cache NF, Two Mile Creek, 6000 ft, 17 MAY 1923, *Standing 41* RM. Boise NF, Boise River above Twin Springs, 4000 ft, 1 JUN 1913, *Grandjean 68* RM. **Adams Co.:** Weiser NF, Stacy Creek, 4000 ft, 27 MAY 1917, *Mann 213* RM, 4600 ft, T 20N R 1W S 34, 22 MAY 1930, *Clabby 69* RM. Starkey, Evergreen Camp, 12 MAY 1939, *Davis* WVA. **Bannock Co.:** Pocatello, 1926, *Donaghe 41* CAS. City Creek, MAY 1934, *Davis* RM. **Benewah Co.:** Plummer Butte, SE of Plummer, 17 MAY 1961, *Baker 16,096* WTU. **Bonner Co.:** Hope, 11 MAY 1891, *Talcott* MICH, 22 APR 1914, *Bunkle 374* RM. Priest Lake to East Fork, 660 m, 27 JUL 1900, *MacDougal 222* NY RM. 5 mi N of Priest River, 31 JUL 1955, *Baker 13,691* WTU. Kaniksu NF, Benton Creek, 12 mi WNW of Sandpoint, 2600 ft, 24 AUG 1966, *Stickney 1364* RM. **Bonneville Co.:** Targhee NF, Palisade Creek, 4 mi E of Irwin, 6 AUG 1952, *Baker 9668* WTU. Caribou NF, 6300 ft, 7 SEP 1913, *Anderson 203* RM, Snake

River, 5500 ft, 20 AUG 1915, *(no name) 347* RM. **Boundary Co.:** Pend Oreille NF, Copeland, 3000–4000 ft, 23 AUG 1922, *Ehler & Erlanson 236* MICH. **Caribou Co.:** Caribou NF, Portneuf Range, Big Springs area, Peeble Station, 6 JUN 1984, *Atwood & Vedder 9927* NY. **Clark Co.:** Little Dry Creek, Spenser, 16 JUN 1916, *Rust 56* UC. **Custer Co.:** Sawtooth Wilderness Area, Baron Creek, 2000–2400 m, 11–12 AUG 1955, *Morton 8356* US. Chellis NF, Challis, 19 JUN 1958, *Krujina* GH UBC. **Elmore Co.:** Boise NF, Spring Mt, Atlanta, 5 JUL 1941, *McFadden 15,767* UC. **Fremont Co.:** 3 mi N of Chester, 5100 ft, 21 MAY 1963, *Looney & Darrington* MICH. **Idaho Co.:** Clearwater NF, Camp George, 4500 ft, 9 SEP 1921, *Lumsden 108* RM, Badger Creek, 3900 ft, 29 MAY 1963, *Stickney 787* RM, 24 JUL 1983, *Stickney 844* RM, W of Powell Station, Lochsa River, 6 JUN 1963, *Baker 16,324* WTU, Major Fenn picnic area, 1650 m, 4 MAY 1974, *Wellner 88* RM. Snake River Canyon, Granite Creek, 1750 ft, 5 APR 1938, *Packard 373* UC. French Creek, 2 mi S of Salmon River, 20 mi E of Riggins, 21 APR 1950, *Cronquist 6185* WTU. 3 mi E of Joseph, Joseph–Whitebird Rd, 3 JUL 1950, *Jones 172* GH NY WTU. **Kootenai Co.:** JUL 1886, *Leiberg* F, JUN 1892, *Sandberg* MO. Spirit Lake, *s.d.*, *Teape 3124* NY, MAY 1931, *Milburge* WTU. Lake Pend d'Oreille, Lakeview, 1–10 AUG 1892, *Heller 198* GH MO PH. Coeur d'Alene, 10 MAY 1909, *Johnson 61* RM, JUN 1912, *Rust 56* WTU, Fernan Lake, 18 MAY 1958, *Baker 15,130* WTU. Hayden Lake, 3 MAY 1931, *Christ 998* NY. Wolf Creek, 7 MAY 1950, *Tibbitts* OSC. 1.5 km NE of Garwood, 720 m, 21 AUG 1979, *Stephenson* COLO. Coeur d'Alene NF, Skitwish Creek, 4000 ft, 12 JUN 1959, *Mueggler 59* RM. **Latah Co.:** Strychnine Creek, 15 MAY 1949, *Chichester* WTU. Moscow Mts, E of East Twin, 17 JUL 1949, *Ownbey 3208* UC WTU. Bald Mt, 12 JUN 1956, *Richards 38* WTU. **Lemhi Co.:** Salmon, 2250 m, 1895, *Henderson 3950* F ORE. Bohannan Creek above mines, 7500 ft, 28 AUG 1895, *Henderson 3950–A* US. **Nez Perce Co.:** Craig Mts, Lake Waha, 20 MAY 1892, *Sanberg et al. 198* F GH US, *Sanberg et al. 1038* F GH NY US, JUN 1892, *Sandberg* MO. **Teton Co.:** SE of Victor, 6200 ft, 24 JUL 1920, *Payson & Payson 2123* GH MO RM. **Washington Co.:** Middle Fork Weiser River, 3 AUG 1899, *Jones* PH. Starkey Hot Springs, 4500 ft, 7 AUG 1911, *Clark 202* F GH MO RM UC. **MONTANA:** Judith Mts, AUG 1882, *Canby* NY. Jack Creek Canyon, 14 JUL 1897, *Rydberg & Bessey 3880* NY UC. Sioux NF, Long Pines Division, 3800 ft, 23 MAY 1917, *Flint 61* RM. Beartooth NF, Sage Creek Station, 5700 ft, 9 JUL 1921, *Lay & Dewald 697* RM. MacLeod, 15 AUG 1923, *Pope* NY. Lenerich Canyon, 24 AUG 1933, *Swingle* RM WTU. **Beaverhead Co.:** Red Rock Lake, 30 JUN 1899, *Nelson & Nelson 5473* GH MO NY. **Broadwater Co.:** 20 mi E Townsend, 30 MAY 1956, *Booth 56–334* GH RM WTU. **Cascade Co.:** Little Belt Mts, 9 mi from Barker, 7000 ft, 17 AUG 1896, *Flodman* NY. **Fergus Co.:** Big Snowy Mts, 4 mi up Half Moon Canyon, 5 JUL 1945, *Hitchcock & Muhlick 11,982* NY WTU. **Flathead Co.:** Columbia Falls, 9 OCT 1899, *Blankenship* MICH. Flathead Lake, Big Fork, 18 JUL 1908, *Butler 896* NY, 3000 ft, 20 JUL 1908, *Jones* US, 24 JUL 1908, *Jones 9187* MO. Flathead NF, Belton Station, 3300 ft, 2 SEP 1917, *Flint 53* RM. Echo Lake, 3500 ft, 26 JUN 1928, *Kauffman & Cummins 69* MICH. 1.5 mi up Rescue Creek, 4000 ft, 3 AUG 1930, *Liebig 326* RM. **Gallatin Co.:** Bozeman, 2 JUN 1883, *Scribner 286* GH NY PH, 24 MAY 1901, *Jones* RM UC, 8 MAY 1906, *Blankinship* RM UC, 5 mi NE, 26 MAY 1947, *Booth 1531* WTU. Mt Bridger, 7000 ft, 18 JUN 1897, *Rydberg & Bessey 3881* CM F NY, 7000–8000 ft, 11 JUL 1903, *Blankenship* MICH. Bridger Canyon, 20 JUL 1898, *Reese* RM, 27 MAY 1899, *Blankenship* MICH, 3 MAY 1900, *Blankinship* RM, 7 MAY 1905, *Blankinship 478* PH. Gallatin NF, 5900 ft, T 3S R 5E S 23, 20 MAY 1928, *Nee 674* RM, Squaw Creek Station, 5500 ft, 28 MAY 1929, *Gray 22* RM. Spring Hill, 27 AUG 1905, *Blankinship 478–A* US. **Glacier Co.:** Glacier NP, 7 JUL 1900, *Blankenship* MICH, AUG 1917, *Kelley* CAS, 1140–1530 m, 18 AUG 1919, *Standley 17,827* US, Going-to-the-Sun, 7 AUG 1934, *McLaughlin 3203* F, 3200 ft, 1 JUN 1935, *Morehouse 18* UC, 14 MAY 1945, *Beatty 2746* RM, Howe Creek, 31 AUG 1954, *Chase 14,089* F. **Lake Co.:** Yellow Bay, 7 AUG 1908, *Butler 953* NY, 16 MAY 1941, *Chesbro 14* F PH. Flathead Lake Biological Station, 15 MAY 1938, *Smith & Warg 41* CM F GH MO NY. **Lewis & Clark Co.:** Helena, 29 APR 1886, *Williams* 21 *MO*, 1887, *Kelsey 121*

MO, 8 MAY 1888, *Kelsey 57* PH, MAY 1893, *Starz* MO, JUN 1921, *Wooton* US. Lewis & Clark NF, Hannan Gulch, 4500 ft, 21 MAY 1923, *Hendron 105* RM. **Madison Co.:** Red Rock Lake, 30 JUN 1899, *Nelson & Nelson 5473* CM GH MO RM. **Mineral Co.:** Superior, Fish Creek, 5500 ft, 26 MAY 1944, *Moldenke 17,040* RM. **Missoula Co.:** O'Keefe Canyon, 1000 m, 14 JUN 1901, *MacDougal 208* NY. Missoula, 3300 ft, 29 APR 1921, *Steward* RM, 10 mi N, 17 MAY 1940, *Shaffner 9* GH UC US. Mt Sentinel, 20 APR 1938, *Burett 4* PH WTU. Marshal Gulch, 16 MAY 1938, *Leithead 32* OSC. Rattlesnake Creek, 11 mi NE of Missoula, 11 MAY 1939, *Mart & Kibler 6* NY UC. Pattee Canyon, 7 APR 1940, *Lindberg 8* MO PH. Mission Primitive Area, Cold Lake, 8 JUL 1970, *Mooar 12,537* GH. **Park Co.:** Electric Peak, 6500 ft, 18 AUG 1897, *Rydberg & Bessey 3882* GH NY PH RM. Livingston, 10 MAY 1901, *Scheuber* NY. Absaroka NF, 6300 ft, T 6N R 10E S 26, 10 JUN 1915, *Hurst 250* RM, 6500 ft, *Crane 131* RM, Pine Creek, 8 JUL 1939, *Killeen 35* NY. Maker Creek, 9 mi NW of Wilsall, 28 AUG 1916, *Suksdorf 151* GH. **Ravalli Co.:** Bitterroot Mts, St Regis Canyon, 9 SEP 1880, *Watson 423* GH. **Rosebud Co.:** Northern Cheyenne Indian Reservation, Ft Union Basin, 22 MAY 1975, *Lackschewitz 5968* NCU. **Yellowstone Co.:** Billings, 1922, *Patten* F. **NEBRASKA: Sioux Co.:** War Bonnet Canyon, 23 JUN 1890, *Williams 76* NY. **NEW MEXICO: Catron Co.:** Gila NF, Mogollon Mts, 10 mi E of Mogollon, 8700 ft, 15 JUL 1928, *Wolf 2706* GH, 9 mi E of Mogollon, 3000 m, 2 JUN 1984, *Baad 56* MICH WTU. **Lincoln Co.:** Carrizo Mts, MAY–JUN 1892, *Matthews* US. **Rio Arriba Co.:** Chama, 10 JUL 1911, *Standley 6764* US. Brazos Canyon, 20 AUG 1914, *Standley & Bollman 10,642* US. **San Juan Co.:** Tunicha Mts, Navajo Indian Reservation, 8 AUG 1911, *Standley 7722* US. **NORTH DAKOTA: Billings Co.:** Popple Springs, 12 mi S Medora, 24 MAY 1970, *Stephens 38,398* GH NCU. **Bottineau Co.:** Turtle Mts, Lake Metigoshe, 29 JUL 1912, *Bergman* RM, 1 AUG 1942, *Stevens* UC. **Rollette Co.:** Turtle Mts, St John, Upsilon Lake, 16 JUN 1910, *Lunell* RM, 25 MAY 1912, *Lunell* MO, 22 AUG 1912, *Lunell* PH, 8 SEP 1917, *Mabbott 477* US. Dunseth, 18 AUG 1907, *Lunell* RM. **Slope Co.:** Shalky Buttes, N end, 26 MAY 1961, *Eastisene 2371* UNC UC. **OREGON:** Blue Mts, 21 MAY 1885, *Howell* GH WTU. Eastern Oregon Plants, 4000 ft, 20 JUN 1899, *Cusick 2208* CM F GH. **Baker Co.:** Pine Creek, 5 mi NW of Halfway, 19 MAY 1950, *Peck 25,995* WILLU, 7 mi above Halfway, 21 MAY 1950, *Peck 26,011* WILLU. East Eagle Creek Drainage, Hudson Creek, 5200 ft, 20 JUN 1961, *Mason 1198A* ORE, 2 JUN 1963, *Mason 5911–C* ORE, 4 SEP 1957, *Head 1589* GH. **Crook Co.:** Ochoco NF, Cabin Station, 3680 ft, 24 APR 1916, *Ingram 319* RM, White Trail, 5000 ft, 8 JUN 1916, *Ingram 446* RM, head of Miners Gulch, 4500 ft, 16 SEP 1916, *Ingram 649* RM. Strawberry Mts, Mitchel to Prineville, 3600 ft, 22 JUL 1926, *Mason 3564* UC. Achore Station, 27 JUN 1932, *Peck 17,146* WILLU. **Grant Co.:** Burnes–Harney Valley, 1200 ft, 26 SEP 1896, *Brown 95* F MO US. 18 mi SE of John Day, Canyon Creek, 4500 ft, 4 JUN 1953, *Cronquist 7082* MICH RM UBC UC WTU. Whitman NF, 4700 ft, 19 MAY 1936, *Kauffman 42* RM. **Harney Co.:** Harney Valley, Burns, 28 SEP 1896, *Brown 95* MO. Saw Tooth Creek, 18 JUN 1927, *Henderson 8833* ORE. **Union Co.:** Catherine Creek, 16 JUN 1928, *Thompson 4851–A* WTU. 5.0 mi NW of Elgin, 20 MAY 1975, *Watkins & Dunn 109* MO. **Wallowa Co.:** Griffith's Creek head, 5050 ft, 28 JUL 1897, *Sheldon 8656* GH MO UC US. Wallowa Mts, W fork of Wallowa River, 24 SEP 1981, *Nicholson 436* A. Wallowa River, 4 mi SE of Minam, 2700 ft, 2 JUN 1961, *Mason 1148* ORE. Wallowa Lake SP, Wallowa River, 4450 ft, 9 MAY 1961, *Mason 869* ORE, 6.5 mi S of Joseph on OR 62, 1300 m, 18 MAY 1990, *Utech et al. 90–512* CM. S of Lostine, E side Lostine River, 30 MAY 1970, *Mason 8326* ORE. Eagle Creek Drive, 3–4 mi E of Medical Springs, 3500 ft, 29 APR 1961, *Mason 835* ORE. Lostine River Rd, 4000 ft, 14 MAY 1961, *Mason 1044* ORE. Wallowa–Whitman NF, Lostine Creek area, 2.1 mi S of Williamson, 1450 m, 19 MAY 1990, *Utech et al. 90–528* CM, 1.1 mi S of Williamson, 1550 m, 19 MAY 1990, *Utech et al. 90–529* CM. **SOUTH DAKOTA:** Savoy Plantation, 5300 ft, 23 JUN 1910, *Murdoch, Jr. 4141* F. **Custer Co.:** Sylvan Lake, 7000 ft, 8 JUN 1892, *Rydberg 1049* GH US, 11 AUG 1934, *Braun* US. Elk Mt, 5000 ft, 12 JUL 1906, *Cary 54* US. Jewel Cave NM, Hell Canyon, 5250 ft, 14 MAY 1985, *Marriott 9467* RM. **Harding Co.:** Eagle Mt,

Cove Hill, 27 JUL 1910, *Visher 100* RM, 20 JUL 1920, *Over* US. Slim Buttes, 3700 ft, 19 AUG 1910, *Visher 100–A* F. **Lawrence Co.:** Black Hills NF, Crook Mt Station, 4000 ft, 27 MAY 1909, *Murdoch, Jr. 3519* F GH. Deadwood, 14 JUL 1913, *Carr 85* F GH MO NY RM US, 18 JUN 1927, *Hayward 1120* RM WTU. Pine–rest Camp, 1927, *Murdoch, Jr. 1114* F, *1120* F. Boulder Creek, 10 JUN 1929, *Palmer 37,113* GH MO. Canyon W of Whitewood, 1927, *Murdoch, Jr. 1216* F. Spearfish Canyon, 7 mi above fish hatchery, 1927, *Murdoch, Jr. 1329* F, 4 mi above Cheyenne Crossing, 1927, *Murdoch, Jr. 1456* F. Terry Peak, Trojan, 4 JUL 1927, *Hayward 1873* F RM. Spearfish, 4300 ft, 4 MAY 1938, *Bennett 259* MO, 11 AUG 1941, *Goodman 3336 GH MO* NY UC WTU, 5 mi S, 3500 ft, 16 SEP 1969, *Voss 13,078* MICH. Mt Moriah, 7 AUG 1942, *Degener & Peiler 16,673* F MO NY RM. Black Hills NF, Little Elk Creek, 4500 ft, 13 JUN 1957, *Pase 830* RM. 2 mi SW of Cheyenne Crossing along Spear Creek, 21 JUL 1966, *Stephens 7521* NCU, 2.5 mi S of Cheyenne Crossing on US 85, 18 AUG 1971, *Magrath 6997* NCU. W edge of Central City, 9 AUG 1969, *Stephens & Brooks 35,723* NCU. 1 mi S & 3 mi W of Lead, 22 JUN 1970, *Stephens & Brooks 40,505* NCU. Strawberry Hill, S of Deadwood–Lead junction, 11 JUN 1975, *Churchill 5700* MO. 2 mi W of Deadwood on US 14A, 4800 ft, 5 JUN 1985, *Harner 3094* COLO. **Meade Co.:** Black Hills NF, Gilford, 3800 ft, 12 MAY 1909, *Murdoch, Jr. 3509* F. Gilford, Elk Creek, 16 MAY 1924, *McIntosh 49* RM. Boulder Canyon, Bear Butte, 14 JUN 1927, *Hayward 1104* F RM. **Pennington Co.:** Rockerville, 16 JUN 1909, *White* MO, 15 AUG 1913, *Over 1066* ORE. **UTAH:** [U.S. Geol. & Geograph. Survey Territories; J.W. Powell], 1875, *Ward* F. Willow Creek Canyon, 8000 ft, 17 JUL 1962, *Jeffrey* WTU. **Box Elder Co.:** Raft River Mts, Clear Creek Ridge above Bull Canyon, 2593 m, 20 JUL 1985, *Thorne & Chandler 4052* RM. **Cache Co.:** Providence Canyon, 5000 ft, 15 MAY 1932, *Maguire 3270* MO. Logan Canyon, 5400 ft, 18 MAY 1932, *Maquire 3268* GH RM UC, 4800 ft, 28 MAY 1933, *Muenscher & Maquire 2282* RM MO UC, 30 JUN 1936, *Maguire 13,860* GH NY WTU, 4700 ft, 6 MAY 1951, *Thieret 237* F. NE of China Row, Hwy 89, 12 MAY 1978, *Shultz & Shultz 2439* COLO MO UC. **Carbon Co.:** 8 mi SE of Columbia, 7000 ft, 21 JUN 1977, *Welsh & Taylor 15,062* NY. Range Creek, 6.5 mi S of junction of Nine Mile & Gate Canyons, 7000 ft, 22 JUN 1977, *Welsh & Taylor 15,093* NY. **Duchesne Co.:** Duchesne River headwaters, 0.5 mi below Mirrow Lake, 12 JUL 1947, *Holmgren 7026* RM UC WTU. **Iron Co.:** Dixie NF, 8500 ft, 10 JUL 1936, *Crew* NY. Deer Creek Canyon, 7000 ft, 8 MAY 1938, *Harrison 8309* UC. Camp Creek, 6000 ft, 7 JUN 1988, *Higgins 17,714* RM. **Juab Co.:** Little Salt Creek, San Pitch Mt, 6.5 mi S of Levan, 12 MAY 1989, *Atwood & Thompson 13,592* NY. **Salt Lake Co.:** City Creek Canyon, 1875, *Parry* MO, 16 MAY 1908, *Clemens* F GH MO PH, 25 APR 1928, *Fisk* MO, 5 MAY 1943, *Garrett 8549* UC. Ft Douglas, 17 JUL 1880, *Jones* MICH RM WTU. Salt Lake City, 7300 ft, 16 JUL 1880, *Jones 1866* CM F MICH NY. Wasatch Range, Red Butte Canyon, 8 MAY 1909, *Clemens* GH, 5640 ft, 5 MAY 1968, *Arnow 1151* COLO MO US WTU. **San Juan Co.:** Dalton Springs camp, 4.5 mi W of Monticello, 6 AUG 1980, *Taylor & Taylor 29,664* NY. **Sanpete Co.:** San Pitch Mts, Big Springs, Fountain Green, 2 AUG 1927, *Harris 27–469* PH, 31 JUL 1928, *Harris 28–490* CM, 2 AUG 1929, *Harris 29–074* UC. 10 mi W of Moroni, 14 JUN 1940, *Maguire 18,693* NY. **Sevier Co.:** Canyon S of Glenwood, 7000 ft, 12 JUN 1875, *Ward 203* MO PH. **Summit Co.:** **[TYPE:** Parley's Park, Uintas, [U.S. Geol. Expl. 40th Parallel; C. King], 8000 ft, JUL 1869, *Watson 1166* GH.] **Utah Co.:** Timpanogos Canyon, 26 JUL 1930, *Palmer 38,096* GH. Provo Canyon, North Fork, 27 MAY 1933, *Harrison 7003* RM. **Washington Co.:** Pine Valley Mts, Brown's Point Trail, 7200 ft, T 39S R 14W S 30/31, 13 MAY 1986, *Warrick 1236* NY RM. **Weber Co.:** Ogden, *s.d.*, *Coulter* PH. Ogden, [U.S. Geol. Survey], 1871, *Hayden* US. Cache NF, Ogden Canyon, Pineview Dam, 6000 ft, 25 MAY 1944, *Anderson 1* RM. **WASHINGTON:** 2 mi W of Merritt, Scenic Hwy, 2300 ft, 27 SEP 1916, *Lenzie 144* RM. Columbia NF, Wind River above Trapper Creek, 1200 ft, 4 MAY 1925, *Ingram 1779* RM. **Asotin Co.:** Puffer's Butte, 19 JUN 1949, *Jones 8* WTU [$2n = 22$]. Fields Spring SP, 4 mi S Anatone, 3750 ft, 24 MAY 1975, *Woodley 118* GH, 4.5 mi SW Anatone on WA 129, 1250 m, 18 MAY 1990, *Utech et al. 90–482* CM. **Chelan Co.:** Wenatchee, 7 MAY 1896, *Whited 69* US, 19 JUL

1896, *Whited 43* US. Wenatchee NF, Chiwaukum Creek Trail, 2300 ft, 17 SEP 1916, *Lenzie 154* RM. Fredrickson Ranch, 1850 ft, 24 MAY 1917, *Lenzie 225* RM. Indian Creek, JUL 1948, *Cole* WVA. **Columbia Co.:** Blue Mts, 1 MAY 1897, 7 AUG 1897, *Horner* GH. **Ferry Co.:** Colville NF, 19 Mile Camp, San Poil, 2000 ft, 15 APR 1932, *Ward 107* RM. **Okanogan Co.:** Conconully, 22 JUL 1900, *Whited 1321* OSC. Okanogan, 20 MAY 1919, *(ANS)* OSC. Colville NF, Bonaparte Lake, 3700 ft, 8 JUL 1921, *St. John et al. 5281* GH MO UC WTU. Twisp, 24 MAY 1922, *Batie* RM. Tiffany Mt Range, W Fork Salmon Creek, SW of Conconully, 12 JUN 1932, *Fiker 849* WTU. Rock Lake, 4000 ft, 12 MAY 1933, *Fiker 1171* WTU. **Pend Oreille Co.:** Newport, Pond Oreille River, 5 MAY 1923, *Sprague 145* WTU. **Spokane Co.:** Spokane, 1 JUN 1892, *Henderson* WTU, 2 JUL 1896, *Piper 2286* GH, 16 MAY 1896, *Piper 2285* GH. Waikiki, 28 MAY 1913, *Turesson* RM. Latah Creek, 12 MAY 1916, *Suksdorf 8626* UC WTU. N of Spokane, 15 MAY 1933, *Milburge 700* WTU. **Stevens Co.:** 6 mi NE of Northport, Columbia River valley, 2500 ft, 7 JUL 1932, *Hedgcock* RM WTU. **Whitman Co.:** Kamiak Butte, 12 MAY 1923, *Armstrong & Thayer* UC, 2400 ft, 25 APR 1936, *Packard 46* CM, 26 APR 1936, *Meyer 126* GH MO, 21 MAY 1949, *Jones 2* WTU [$2n = 22$]. **WYOMING:** Wyoming NF, Reese Ranch, 5400 ft, 14 MAY 1926, *McDonald 531* RM. Libby Creek, 1 AUG 1910, *Reynolds 59* F. **Albany Co.:** Laramie Hills, 13 JUN 1896, *Nelson 1933* RM, 7 JUL 1901, *Nelson 52* RM, JUN 1907, *Nelson 9126* RM, 2 JUN 1908, *Nelson 256* MICH. Pale Mt, 1 JUN 1901, *Menson 24* RM. **Big Horn Co.:** 6000 ft, JUL 1899, *Tweedy 2550* NY. Big Horn, MAY 1906, *Worthley 21* RM. Big Horn Mts, Five Springs Camp below Five Springs Falls, 6700 ft, 12 JUN 1960, *Nelson 5492* RM. **Campbell Co.:** 4 mi NW of Rockypoint, 4200 ft, 24 MAY 1978, *Hartman & Dueholm 5427* RM, 6 mi SW, 3800 ft, 25 MAY 1978, *Dueholm & Hartman 1416* RM. 2.5 mi S of MT line, 3800 ft, T 57N R 69W S 6, 26 MAY 1978, *Dueholm & Hartman 1466* RM. **Carbon Co.:** Pass Creek Rd, 12 mi E of junction Hwy 130, 7400 ft, 1 JUN 1970, *Hartman 2966* RM. Chalk Mt, 33.5 mi SSW Casper, 7200 ft, 8 JUL 1978, *Current 402* RM. 27 mi S of Rawlins, 8200 ft, 9 JUL 1980, *Mastrella 95* RM. Rawlins, Middlewood Hills, 7800 ft, 21 AUG 1980, *Holmes 441* RM. Lockheart Place, Davis Creek, 4400 ft, 15 MAY 1983, *Collins 564* RM. Miller Hill, 20 mi S of Rawlins, 8000 ft, 23 AUG 1983, *Henry* RM. Ferris Mts, 8 mi SE of Muddy Gap Junction, 7500 ft, 25 AUG 1985, *Haines & Haines 5825* RM. **Crook Co.:** Sundance Creek, 2 JUL 1896, *Nelson 2135* RM. 7 mi NW of Hulett, 4500 ft, 25 MAY 1935, *Ownbey 581* COLO GH MO NY RM UC WVA, 28 JUL 1949, *Ownbey 3212* GH NY UC WTU [$2n = 22$]. 8 mi NW of Hulett, 14 JUN 1940, *Ownbey 555* RM. Bear Lodge Ranch, Reuters Canyon, N of Sundance on Warren Peak, 5800 ft, 12 JUL 1960, *Porter & Porter 8372* RM UC, 6000 ft, 4 AUG 1965, *Porter & Porter 10,041* UC. 1 mi NW of Lightning Flats, 4200 ft, 24 MAY 1978, *Dueholm & Hartman 1329* NY RM. 7 mi WSW of Sundance, 3900 ft, 31 JUL 1979, *Lichvar 2165* NY. Dugout Gulch, 4000 ft, 31 JUL 1979, *Lichvar 2180* RM, 4000 ft, 15 SEP 1979, *Lichvar 2473* RM. Sundance Mt, 5300 ft, 28 MAY 1984, *Marriott 6403* RM. Government Valley, 8 mi NNE of Sundance, 4600 ft, 6 JUN 1983, *Marriott 2647* RM. Inyan Kara Mt, 21 AUG 1897, *Griffiths* RM, 5300 ft, T 49N R 62W S 30, 18 AUG 1984, *Marriott 9162* RM. Devils Tower NM, S rim, 4100 ft, 9 MAY 1981, *Marriott 631* RM. Upper Corral Creek, 4600 ft, 27 MAY 1983, *Marriott 2358* RM. Calvin Creek headwaters, Coal Divide, 5000 ft, JUN 1983, *Marriott 3497* RM. Sand Creek, Spotted Tail Gulch, 5300 ft, 16 JUN 1984, *Marriott 6790* RM. Black Buttes, E of Iron Mt, 5700 ft, 21 JUN 1984, *Marriott 7004* RM, 4600 ft, 9 JUL 1984, *Hartman 17,587* RM. Bear Lodge Mts, Carlson Ridge, 4600 ft, 20 MAY 1983, *Marriott 2120* RM, NW of Reuter Camp, 5600 ft, 27 MAY 1983, *Marriott 2329* RM. Lame Jones Creek, 5100 ft, 22 AUG 1983, *Marriott 5612* RM. N Redwater Creek, 7 mi SW of Aladdin, 4300 ft, 31 MAY 1983, *Marriott 2480* RM. East Creek, 4 mi SSW of Mona, 4000 ft, 13 JUL 1983, *Hartman 16,006* RM. Rattlesnake Canyon, 4.5 mi NE Moskee, 5600 ft, 14 JUL 1982, *Nelson & Marriott 9212* RM. Mineral Hill, 15 mi ESE of Sundance, 13 JUL 1984, *Hartman 17,989* RM. **Fremont Co.:** Sinks Canyon, 7000 ft, 28 MAY 1986, *Scott 5286* RM. **Johnson Co.:** HF Bar Ranch, Saddlestring, 5000 ft, 4 MAY 1980, *Lichvar 2616* RM. **Lincoln Co.:** E of Afton, 6700 ft, 25 JUN 1923, *Payson &*

Armstrong 3266 GH MO. Hoback River Camp, 2 mi E of Camp Davis, 25 JUN 1940, *Wehmeyer et al. 5154* MICH MO NY. Grey's River near Corrall Creek, 8000 ft, 3 AUG 1949, *Porter 5163* RM. 0.1 mi W of Alpine Junction, 18 AUG 1978, *DeMott 318* MO. **Natrona Co.:** Casper Mt, 26 JUL 1894, *Nelson 609* CM GH MO RM. Garden Creek Canyon, 7400 ft, 7 JUL 1933, *Hanna 1233* MO. 5 mi S of Casper, 7000 ft, 8 JUL 1933, *Hermann 4624* MO. Garden Creek Falls, 6400 ft, 21 AUG 1962, *Jozwik 332* RM. **Park Co.:** Holm Lodge, 40 mi W of Cody, 31 AUG 1922, *von Schrenk* MO. Clark's Fork Valley, Little Rocky, 5500 ft, 22 JUN 1924, *Pearson & Pearson 37* RM. Heart Mt, ravine between W & E summit, 7400 ft, 13 JUL 1983, *Evert 5421* RM. Absaroka Mts, N Fork Shoshone River, W of Kitty Creek, 6600 ft, 19 JUN 1982, *Evert 3963* RM. Camp Creek above Clarks Fork Yellowstone River, 6900 ft, 7 JUN 1988, *Nelson & Nelson 15,515* RM. N Fork Shoshone River, along W Grinnell Creek, 7200 ft, 24 JUN 1983, *Evert 5247* RM. Sunlight Creek, 5800 ft, 12 JUL 1985, *Hartman 20,510* RM. Willow Park along US 212, 7000 ft, 18 JUL 1985, *Nelson & Hartman 12,625* RM. Dead Indian Creek, Sunlight Basin, 6100 ft, 7 AUG 1988, *Nelson 16,507* RM. 2 mi SE of Windy Mt, 3.5 mi N of Sunlight Station, 17 AUG 1985, *Nelson 12,*955 RM. Paint Creek, 10–11 mi E of Sunlight Station, 7200 ft, 19 AUG 1985, *Hartman 22,049* RM, 7500 ft, 24 AUG 1985, *Nelson 13,214* RM. **Sheridan Co.:** Big Horn Mts, 5500 ft, 25 JUN 1897, *Pammel & Stanton 361* MO. Tongue River headwaters, JUL 1898, *Tweedy 67* NY. Willits Spring, 25 MAY 1909, *Willits 35* RM. Big Horn Coal Site, Tongue River, 27 JUN 1977, *Brink 1367* RM, 3600–3820 ft, T 57N R 84W S 14, 12 MAY 1978, *Mayer & Hoag 976* RM. 4 mi SSW of Dayton, 4800 ft, 3 AUG 1979, *Hartman 10,637* RM. 9 mi WNE of Parkman, 5200 ft, 11 AUG 1979, *Dueholm 9019* RM. **Teton Co.:** Gros Ventre Pass, Missouri/Yellowstone Rivers, 6000 ft, 18 JUN 1860, *Hayden* MO. Bacon Creek, tributary of Gros Ventre River, 15 AUG 1894, *Nelson 923* RM. 20 mi S of Jackson, 19 JUL 1901, *Merrill & Wilcox 956* CM GH RM US. Teton NF, Jackson, 7000 ft, 1 AUG 1913, *Moris 238* RM. STS Ranch, Snake River bottom, 6700 ft, 27 AUG 1932, *Williams 1058* CM GH MO NY RM, 1 JUN 1934, *Williams 26* CM MO. Gros Ventre Mts, Sheep Creek, 13 JUN 1933, *Murie 1004* MICH MO, 6900 ft, 5 JUN 1977, *Lichvar 243* RM. Grand Teton NP, Death Canyon, 6200 ft, 31 JUL 1934, *Braun* US, Jackson Lake, Jenny Lake Trail, 7500–8500 ft, 22–30 JUN 1935, *Yuncker 5420* F NY, W of Beaver Dick Lake, 7000–7500 ft, 9 AUG 1938, *Pennell & Schaeffer, Jr. 24,272* GH, Moose Ponds, 1.5 mi W of Moose, 23 JUN 1956, *Henry* CM. Granite Creek, Hot Springs, 12 mi NE of Camp Davis, 23 JUN 1940, *Wehmeyer et al. 5154* MICH NY. Cascade Canyon Trail, 11 JUN 1959, *Wetherell 43* RM. 7 mi W of Moose, Phelps Lake, 17 JUN 1963, *Fogg, Jr. 22,241* PH. **Washakie Co.:** Big Horn Mts, Squaw Creek, Ten Sleep Creek Canyon, 8500 ft, 29 JUN 1936, *Williams & Williams 3159* CM GH MO NY RM WTU. Leigh Canyon off Ten Sleep Canyon, 9 NE of Ten Sleep, 6100 ft, 17 JUN 1980, *Nelson 5679* RM. **Yellowstone National Park:** Mammoth Hot Springs, 6000 ft, 11 MAY 1889, *Dewart* UC, 6200 ft, MAY 1893, *Burglehaus* MICH MO UC US WTU, 4 MAY 1902, *Mearns* F. Druid Peak, 12 JUL 1899, *Nelson & Nelson 5790* RM. Lamar Station, 1.5 mi S of Soda Butte Creek, 6700 ft, 16 AUG 1963, *Bergstrom* RM.

5. *Prosartes maculata* (Buckley) A. Gray, Amer. Journ. Sci., Ser. II, **47**: 201 (1844).

Streptopus maculatus Buckley, Amer. Journ. Sci., Ser II, **45**: 170 (1843); *Disporum maculatum* (Buckley) Britton, Bull. Torrey Bot. Club **15**: 188 (1888); *Lethea cahnae* Farwell, Papers Mich. Acad. Sci. **2**: 19 (1923), *nomen nudum; Disporum cahnae* Farwell, Amer. Midl. Naturalist **8**: 267 (1923); *D. schaffneri* Moldenke, Phytologia **1**: 167 (1935).

Plants sparingly branched, 3—6 (8) dm, glabrescent with age. Leaves ovate to lanceolate, sharply acuminate, rounded to subcordate basally, 4—10 (15) x 2—4 cm, lower surface veins and margins pubescent with scattered, flattened hairs. Flowers 1—3 (4), broadly campanulate; pedicles pubescent, 5—10 (15) mm; perianth segments

ovate–lanceolate, acuminate, abruptly narrowed to a long claw, creamy white speckled with purple spots, (15) 20—25 mm. Stamens exerted; filaments filiform, 15—20 mm; anthers 3—6 mm. Ovaries obconic to obpyriform, papillose with stellate glandular hairs; ovules horizonatal, 2—4 per locule; styles filiform, glabrous, 1.4—2.3 cm; stigma 3–cleft. Berries 3–lobed, the lobes subspherical, papillose with stellate hairs arising from the papillae, pale straw–colored, 10—15 mm; seeds brownish–orange, 4 mm.

Flowering early (April) to late spring (May). Rich, moist, deciduous woods, slopes and ravines, 150–760 m.

Synoptic Distribution: (Jones 1951, Johnson 1968, 1969, Wood, Jr. 1970) **USA**: Alabama, Georgia (Jones, Jr. & Coile 1988), Kentucky, Michigan (Voss 1972), North Carolina (Radford *et al.* 1968), Ohio (Braun 1967, McCanes & Burns 1984), Tennessee, Virginia (Harvill *et al.* 1977), West Virginia. (Fig. 5).

Common Name: Nodding Mandarin

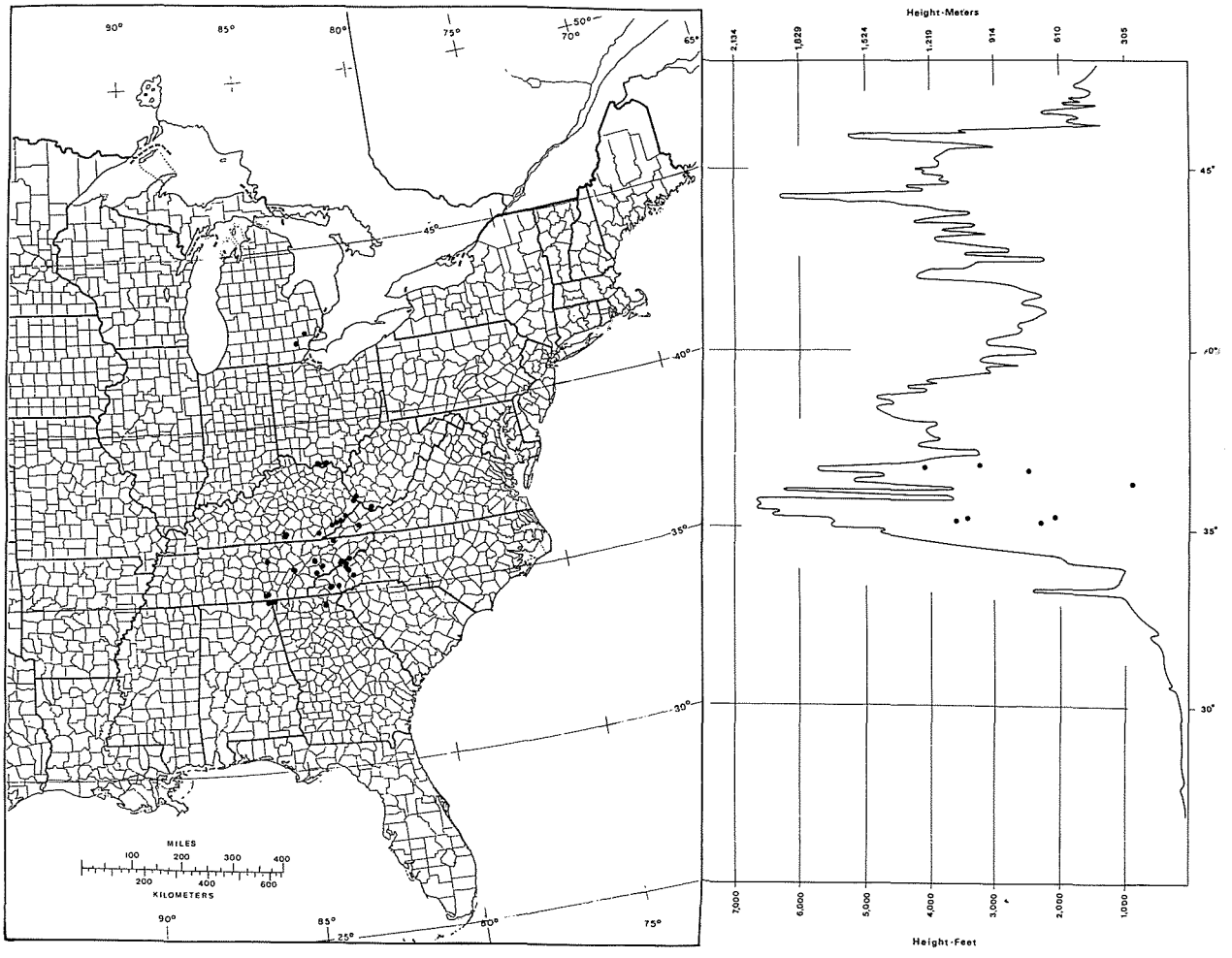


Figure 5. Specimen based distribution map of *Prosartes maculata* (Buckley) A. Gray.

Chromosome Number: $2n = 12$. (Tamura *et al.* 1992)
Comments: This old forest obligate is readily distinguished by its purple–spotted perianth and three–lobed, straw–colored, hairy–papillose fruit.

SPECIMENS EXAMINED: UNITED STATES: ALABAMA: Jackson Co.: Sand Mt, Carpenter, 15 APR 1914, *Howell 824* US. Eliza, APR 1917, *Graves 1082* MO. **GEORGIA:** mountians, [Columbia College Herbarium], *s.d., Chapman* NY. **Walker Co.:** Allen Spring Gap, 2.4 mi W of Cassandra, 1900 ft, 12 MAY 1953, *Duncan & Hardin 15,920* GA. **White Co.:** Anders Creek, 1.7 mi S of Unicoi Gap, 2000 ft, *Duncan & Smith* GA. **KENTUCKY: Bell Co.:** Log Mt, 3000 ft, 8 MAY 1939, *Braun 2350* US. Pine Mt SP, ridge top, 6 MAY 1961, *Lampson 69* NCU. **Harlan Co.:** Black Mt, 23 MAY 1932, *Braun 367* US, 30 APR 1939, *McInteer & Shacklette* MICH. Pine Mt, MAY 1919, *Stone* PH, 23 MAY 1928, *Christensen* GH. **Letcher Co.:** Black Mt, Colliers Creek, 8 JUN 1933, *Braun* GH, 3000–3500 ft, 4 MAY 1934, *Braun 677* GH NY OS US. Pine Mt, Little Joe Day Branch, 2500 ft, 24 JUN 1933, *Braun* GH. Pike Brushy Creek, Willie Davis Farm, ridge, 1700 ft, 23 APR 1981, *Levy* NCU. **Wayne Co.:** Monticello, Beaver Creek, 16 APR 1940, *Braun 2855* OS. **MICHIGAN: Oakland Co.:** Farmington Center, 22 MAY 1921, *Cahn & Farwell 5769* GH. **Washtenaw Co.:** Ann Arbor, 20 MAY 1884, *Sudworth 43* NY. **NORTH CAROLINA: Buncombe Co.:** Pisgah NF, Eagle Place, Bent Creek Forest, 2500 ft, 1 MAY 1937, *Buell 136* RM. Leicester, Blue Ridge Poultry Farm, 28 APR 1936, *Current* NCU. Blue Ridge Parkway (mile 373), 5 MAY 1957, *Justice 199* NCU, (mile 372.9), S of Wasilik Tree, 23 MAY 1970, *Justice* NCU, (mile 372.9), 9 JUN 1970, *Justice* NCU, (mile 372.9), 13 JUN 1977, *Smith* NCU. **Jackson Co.:** Cullowhee Mt, Biology Preserve on Wolf Creek, 27 APR 1968, *Pittillo 2931* NCU. **Macon Co.:** SW of Franklin & NNE of Runaway Knob, Standing Indian Campground, 1100 m, 7 MAY 1980, *Boufford et al. 21,984* NCU. Runaway Knob, E of Rock Cap & S of Wallace Gap, 1050 m, 4 MAY 1986, *Pattillo* 9188 NCU. **Madison Co.:** Hot Springs, 16 APR 1888, *Smith* GH NY PH, APR 1891, *Newberry* NY US, 23 APR 1896, *Newhall* NY, 27 APR 1897, *Biltmore Herbarium 3196–B* GH NY, 3 MAY 1904, *Biltmore Herbarium 3196–C* NY. Doggett Gap, 6 MAY 1936, *Allen* NCU. 1.6 mi WSW of Redmon & 1.8 mi N parallel French Broad River, 26 APR 1958, *Ahles & Duke 39,000* NCU. Big Bald, near Yancy Co & TN line, 19 MAY 1967, *Justice* NCU. 1.0 mi W of Hot Springs, W of Sugartree Branch, 13 JUL 1981, *Sather 1669* NCU. **OHIO: Adams Co.:** Churn Creek, 15 JUL 1928, *Harper* NY. Blue Creek head, 22 APR 1952, *Braun* US. Green Twp, 4 mi SE of West Union, 17 APR 1977, *Bryant 589* MU. Green Twp, between Twp Hwys 155 & 177, Mackenzie Run, 24 APR 1979, *Cusick 19,122* KE. **Pike Co.:** Waverly, 1928, *Finnley* OS. **Scioto Co.:** Shawnee SF, Camp Gordon, Friendship, 1934, *Demaree 10,579* US, 21 JUN 1934, *Demaree 10,748* NY, 4 APR 1934, *Demaree* NY, 30 APR 1935, *Demaree 11,279* US, 5 MAY 1935, *Demaree 11,301* PH US. Shawnee SF, Nils Twp, Wolf Den Reservior, 7.5 mi NW of Friendship, 17 APR 1977, *Bryant 588* MU, 4 AUG 1990, *Koyama et al. 3384* CM KYO. Shawnee SF, Lampblack Run, NW side of Forest Rd 16, 14 MAY 1985, *Carr 6481* MU, 16 MAY 1985, Carr 6509 MU, 19 MAY 1985, *Carr 6514* MICH, 4 AUG 1990, *Koyama et al. 3389* CM KYO. Mackletree Pond, Lick Bridle Trail, Rocky Hollow, 25 APR 1985, *Rankin* KE. **TENNESSEE:** Cumberland Mts, *s.d., S. B. Buckley* [ex A. Gray Herbarium] GH **(Type)**, *S.B. Buckley* GH **(Isotype)**, *S.B. Buckley* [ex Torrey Herbarium] NY **(Isotype). Blount Co.:** GSM NP, Rich Mt Rd from Cades Cove to Townsend, 15 APR 1977, *Utech 77–110* CM. **Cocke Co.:** Wolf Creek, 15 APR 1898, *Allan* US, MAY 1898, *Ruth 145* NY, JUN 1900, *Ruth* NY. **Cumberland Co.:** Warm Springs, APR 1942, *Rugel* NY. **Hancock Co.:** Sneedville, bluffs along Clinch River at TN 31 & 66, 20 APR 1980, *Thomas et al. 70,751* NY. **Knox Co:** MAY 1891, *Kearney, Jr.* OS. Knoxville, MAY 1897, *Ruth* NY. Tennessee River bluffs, APR 1911, *Kearney, Jr.* F. S of Knoxville, University of Tennessee Valley Farm, 17 APR 1951, *Kessler* NCU. **Marion Co.:** Fiery Gizzard Gorge, SE of Raven Point, 10 APR 1965, *Clark et al.* NCU. Monteagle, 1.25 mi NW junction Hwy 41A & US 64 along I–24, 23 APR 1969, *Kral 34,330* GH NCU. **Putnan Co.:** 3.4 mi E of Smithville on US 70, 25 APR 1963, *Williams 103* WVA. **Rhea Co.:** Devil's Hole Gorge, 22 APR

1962, *Shanks 26,352* WVA. **Roane Co.:** Walden's Ridge, APR 1893, *Kearney, Jr.* OS. **Sevier Co.:** DuPont, Sugar Loaf Mt, 23 APR 1969, *Thomas et al. 13,167* COLO. **VIRGINIA: Russell Co.:** Clinch Mt, 4 mi NW of Mendota, 1 MAY 1965, *Kral 23,856* WVA. **WEST VIRGINIA: McDowell Co.:** Coalwood Mt, 3 MAY 1962, *Music* WVA, SEP 1967, *Music* WVA. Panther Forest, 21 APR 1968, *Music* WVA. **Mingo Co.:** Chattaroy, 22 APR 1955, *DeFoe* WVA.

The following codes have been associated with the specimen citations: Hwy = highway, NF = National Forest, NM = National Momument, NP = National Park, Rd = road, SF = State Forest, PP = Provincial Park, SP = State Park, CP = County Forest, Twp = Township and Co = County.

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