

The Taxonomy of Parthenium Section
Partheniastrum DC. (Asteraceae-Ambrosiinae)

James A. Mears

Department of Botany, Academy of
Natural Sciences, Philadelphia, Pennsylvania

The taxonomic results of a comprehensive study of the morphological, chemical and edaphic characteristics of Parthenium Section Partheniastrum are presented here to facilitate citations in certain floristic treatments while the complex manuscript on the morphological, chemical and edaphic studies is being prepared for publication. The results reported here follow a thorough examination of herbarium collections and field populations and will be explained in detail in a forthcoming paper (Mears, in preparation).

Parthenium, Sect. Partheniastrum DC.

Parthenium, Sect. I. Partheniastrum DC. Prodr. 5: 532 (1836)

Perennial herbs, with over-wintering lateral root systems; general pubescence composed of straight to recurved trichomes; stems rarely branched below the inflorescence; leaves entire to deeply lobed (subpinnatifid), with dentations complex to absent; based leaves petiolate, with the petiole sometimes winged; cauline leaves petiolate to sessile to sometimes auriculate; inflorescence corymbose to (rarely) loosely spicate, composed of 10 to 600 heads; 17 to 95 florets per head; 2 or 3 (or sometimes 0) linear to deltoid awns a top each achene; achenes glabrous to densely pubescent, black; pollen white, typically 13.5 to 18.2 μ ; diploid ($2n = 36$) or tetraploid ($4n = 72$).

Type species, P. integrifolium L.

Key to the Taxa of Section Partheniastrum

1. Basal leaves linear-lanceolate, subpinnatifid-undulate, with double dentations. P. radfordii Mears
1. Basal leaves integral, not subpinnatifid-undulate, with winged or simple petiole 2
 2. Less than 100 capitula in the whole inflorescence 3
 2. 100 or more capitula in the whole inflorescence 7
 3. Largest capitulum 7 or more mm in diameter 4
 3. Largest capitulum less than 7 mm in diameter 5
 4. Basal leaves with simple petioles and smooth dentations P. integrifolium var. hispidum (Raf.) Mears
 4. Basal leaves with winged petioles and sharp dentations P. integrifolium var. hispidum f. repens (Eggert) Mears
 5. Largest basal leaf blades linear-lanceolate or 4 or less cm in width, if ovate-lanceolate . . . P. integrifolium var. mabryanum Mears
 5. Largest basal leaf blades ovate-lanceolate and more than 4 cm in width 6
 6. Upper cauline leaf petiole not auriculate; basal leaf petiole not winged . . . P. integrifolium var. henryanum Mears
 6. Upper cauline leaf petiole auriculate; basal leaf petiole winged P. integrifolium var. auriculatum (Britton) Cornelius ex Cronquist
 7. Largest capitulum less than 7 mm in diameter . 8
 7. Largest capitulum 7 or more mm in diameter intermediates to P. integrifolium var. hispidum

8. Basal leaves sometimes with winged petioles;
 basal leaf blades usually more than 15 cm
 long; usually with complex dentations . .
 P. integrifolium var.
integrifolium

8. Basal leaves without winged petioles; basal
 leaf blades usually less than 10 cm long,
 usually with simple dentations
 . . . P. integrifolium var.
henryanum Mears

1. Parthenium integrifolium L. Sp. PL. Ed I: 1402 (1753).

Perennial herb; root at first vertical then developing laterally, sometimes expanded (tuberous); stems one to several; 30 to 130 cm high, rarely branched below the inflorescence, corymbosely branched within the compound inflorescence; stems often striate, pubescent to glabrous (below); basal leaves petiolate, with the petiole sometimes winged; basal petiole (2.5-)8 to 15(-21) cm long; basal leaf blade ovate to linear-lanceolate, with dentations complex to inconspicuous, scabrous, moderately pubescent with simple to recurved trichomes, (2-)5 to 12(-15) cm wide by (4-)8 to 20(-27) cm long; lower cauline leaf petiolate, with the petiole sometimes winged, blade (0.5-)1.0 to 8(-12) cm long; lower cauline leaf blade ovate to lanceolate, variously dentate; upper cauline leaves sessile to auriculate, variously dentate, subtending branches of the inflorescence; inflorescence corymbose to loosely spicate, composed of 10 to 650 capitula, including few to many chlorophyllous leaves subtending pedicels and inflorescence branches; capitula 3 to 5 mm deep by 4 to 11 mm wide, densely pubescent with simple trichomes; outer phyllaries chlorophyllous, ovate to obovate, apiculate, densely pilose; inner phyllaries broadly obovate to auriculate, with rounded apex, with turgid pubescence atop inner phyllaries, subtending 5 pistillate florets; pistillate floret with (0-)2 to 3(-4) linear to deltoid awns atop achene, usually two lateral and one ventral, with erect zygomorphic corolla (ray); achene densely to sparsely pubescent ventrally dorsally pubescent over 50 to 70% of achene to glabrous; margins of the achene simple, firmly attached to the bases of the subtending bracts of two associated polliniferous florets; associated polliniferous florets emergent from the enclosing, subtending bracts; inner, polliniferous florets emergent in centripetal sequence from the subtending bracts during dehiscence; all the bracts with turgid pubescence along top edge; chromosomes $2n = 36, 72$.
 HOLOTYPE: Maryland (or Virginia), Clayton (LINN!).

The range of P. integrifolium is Massachusetts to Georgia to eastern Texas to Minnesota in forest clearings, prairies, roadsides and on granite and limestone outcrops. This species includes all the taxa previously published in section Partheniastrum and spans the geographic range of the section. Several regional varieties can be recognized.

1a. P. integrifolium var. integrifolium

Plants (0.8-)1.0-1.3 m high. Root expanded; basal leaf petiole often winged; basal leaf blade ovate-lanceolate, (5-)7 to 12(-15) cm wide by (9-)12 to 21(-27) cm long; cauline leaf petiole often winged; cauline leaf blade ovate to lanceolate; upper cauline leaf sessile to auriculate; leaf dentations sharp to smooth and simple to complex; inflorescence corymbose, composed of (40-)150 to 400(-650) capitula, 4.5 to 7 mm in diameter; pistillate florets with (1-)2 or 3 sturdy awns, achenes glabrous to pubescent; diploid,* tetraploid ($2n = 72$; Rollins, 1950).

DISTRIBUTION:**

ALABAMA: G. R. Vasey, s.n., 1878 (F); CALHOUN CO.: Anniston, A. H. Howell 805 (US).

ARKANSAS: BENTON CO.: Plank, s.n. (MO); CARROLL CO.: P. L. Redfearn, Jr. 15300 (FSU); CLEBURNE CO.: S of Heber Spring, R. D. Thomas et al. 10224 (NCU); FRANKLIN CO.: S of Franklin-Madison Co. line, E. B. Smith 922 (NCU); INDEPENDENCE CO.: Bat Cave, Thomas 10645 (NCU), 7773 (TENN); LOGAN CO.: Magazine Mt., D. Demaree 22882 (NY); MARION CO.: Bull Shoals, Demaree 31856 (NCU, VPI, DUKE, GA, GH); MONROE CO.: E of Carlisle, J. Baskin & C. Caudle 374 (VDB); NEWTON CO.: N of Jasper, G. E. Tucker 4300 (NCU); POLK CO.: E of Mena, W. L. Graham 643 (NCU); POPE CO.: SW of Sandgap, Redfearn, Jr. 21509 (NCU); PRAIRIE CO.: Hazen, Demaree 56464 (NCU); PULASKI CO.: Little Rock, G. M. Merrill 2104 (MO); WASHINGTON CO.: Lake Weddington, F. McCormick 71 & S. Hines 115 (NCU); WHITE CO.: Bald Knob, Demaree 47726 (NCU); YELL CO.: Mt. Nebo State Park, Tucker 5096 (NCU).

GEORGIA: BANKS CO.: near Habersham Co. line, W. H. Duncan 5293 (GA); CATOOSA CO.: NE of Ringold, A. Cronquist 5397 (GA); CHATTOOGA CO.: Summerville, C. L. Pollard and W. R. Maxon 447 (NY, US, GH); CLARKE CO.: Middle Oconee River, R. M. Harper 154 (NY, US); CLAYTON CO.: Harper 231 (NY, US); DEKALB CO.:

*Estimate from pollen measurements (Mears, in preparation).

**Included here are the many intermediates to variety integrifolium and var. hispidum found in the Midwest.

Stone Mt., Huron H. Smith 2374 (F); FULTON CO.: Atlanta, R. C. Darby 232 (FSU); GWINNETT CO.: McGuire's Mill, J. K. Small, s.n., 11 July 1893 (F); HARRIS CO.: W of Manchester, Cronquist 5251 (GA, MO, NY, PH, US, GH); LUMPKIN CO.: N of Dahlonga, A. N. Leeds 2092 (PH); MERIWETHER CO.: Warm Springs, S. M. Tracy 8940 (MO); RABUN CO.: Glade Mt., Duncan 10096 (UGA), Clayton, J. M. Reade E171 (GA); STEPHENS CO.: SW of Toccoa, Duncan 11205 (GA); TOWNS CO.: E of Young Harris, S. R. L. McKittrick 144 (Auburn); WALKER CO.: Lookout Mt., Duncan 5377 (GA).

ILLINOIS: CHAMPAIGN CO.: A. B. Seymour, s.n., 30 June 1884 (DUKE); COOK CO.: S of Arlington Heights, H. R. Bennett 7640 (F, FSU); Berwyn, W. W. Calkins 7 (F); Che-che-pui-qua Forest Preserve, R. J. Reich 447 (F)*; Chicago, H. H. Smith 5688 (F); Lisle, L. M. Umbach s.n., 18 August 1897 (F); DUPAGE CO.: Villa Park, F. A. Swink 1480 (F); GRUNDY CO.: E of Morris, A. C. Koelling 3198 (TENN); HANCOCK CO.: Denver, F. C. Gates 10073 (F); IROQUOIS CO.: E of Watseka, Koelling 2030 (Auburn, TENN); JACKSON CO.: SE of Elkville, W. M. Bailey and J. R. Swayne 481 (NCU); KANE CO.: W of St. Charles, Bennett 8158 (F, US); KANKAKEE CO.: NE of Essex, Swink 2402 (F); LA SALLE CO.: Utica, Mrs. J. Clemens, s.n., 7 August 1909 (PH); MACON CO.: Decatur, O. S. Knight & R. G. Mills 5 (MO); PUTNAM CO.: Putnam, V. H. Chase 10494 (F); RICHLAND CO.: NW of Calhoun, R. Ridgway 3064 (PH); WILL CO.: SE of Custer Park, Swink 2439 (F); WINNEBAGO CO.: M. S. Bebb, s.n., August 1859 (F, US); Atto (or Otto) A. DeSelm 328 (F); near Elgin, C. Gronemann 49 (F); Glenwood, A. King 518 (F); near Oquawka, H. N. Patterson, s.n., 6 July 1872 (F); near Winnetka, C. A. Reynolds, s.n., 19 August 1909 (F); W of Mt. Morris, E. E. Sherff, s.n., 20 September 1907 (F); Joliet, H. C. Skeels 369 (F); Hinsdale, E. C. Smith 433 (FM); Naperville, Umbach, s.n., 8 July 1898 (F, US).

INDIANA: BENTON CO.: NE of Fowler, C. C. Deam 11844 (IND); CASS CO.: NW of Royal Center, Deam 32134 (IND); DAVIESS CO.: E of Montgomery, Deam 28217 (IND); JASPER CO.: Carpenter township, W. Welch 5452 (IND); LAKE CO.: E of Hobart, Deam 2599 (IND); LAPORTE CO.: W of Wanatak, Deam 34858 (IND); NEWTON CO.: N of Lake Village, Deam 18176 (IND); NOBLE CO.: Rome City, E. B. Uline, s.n., July 1891 (F); PORTER CO.: W of Porter, Deam 21234 (IND); PULASKI CO.: NE of Medarysville, Deam 31759 (IND); STARCKE CO.: SE of North Judson, Deam 31824 (IND); SULLIVAN CO.: SW of Pleasantville, Deam 51002 (IND); TIPPECANOE CO.: N of Battle Ground, Deam 17739

*Virtually the only recent Illinois collection seen.

(IND); VERMILLION CO.: S of Perrysville, R. B. Buser 5285 (IND); WARREN CO.: S of Rainsville, Deam 25861 (IND); WHITE CO.: E of Seafield, Deam 15240 (IND).

IOWA: BLACK HAWK CO.: M. Burk 773 (MO); BREMER CO.: B. Shimek, s.n., 4 September 1926 (KY); CEDAR CO.: W of Lowden, H. Wilkens 10981 (priv.); CHICKASAW CO.: New Hampton, L. H. Pammel 229 (MO); CLAYTON CO.: NW of Edgewood, Shimek, s.n., 19 August 1923 (F); DAVIS CO.: E of Bloomfield, A. Hayden 8755 (NCU); DECATUR CO.: J. P. Anderson, s.n., 4 July 1903 (KY); FAYETTE CO.: B. Fink 234 (US); IOWA CO.: N of Homestead, Shimek, s.n., 22 September 1924 (F); JOHNSON CO.: Iowa City, A. S. Hitchcock, s.n. (MO); JONES CO.: Wayne, T. S. Cooperrider 2150 (NCU); LINN CO.: S. Smith, s.n., 2 September 1871 (PH); MUSCATINE CO.: N of Summit, Shimek, s.n., 15 July 1920 (F); SCOTT CO.: E of Wolcott, Shimek, s.n., 8 August 1927 (PH); VAN BUREN CO.: Stockport, E. W. Graves 1853 (MO); WAPELLO CO.: SW of Cliffland, Hayden 9779 (PH, US); WINNESHIEK CO.: W of Ridgway, Hayden et al., s.n., 1 September 1933 (MO).

KANSAS: CHEROKEE CO.: E of Baxter Springs, R. L. McGregor 15583 (NCU, US).

KENTUCKY: CALLOWAY CO.: Murray to Pine Bluff Ferry, L. B. Smith & A. R. Hodgdon 4203 (F, US); EDMONSON CO.: Mammoth Cave, King 115 (F); HARDIN CO.: NE of Elizabethtown, E. Wherry & F. Pennell 13653 (PH); JEFFERSON CO.: W of Piedmont, H. E. Ahles & H. Smith 54395 (NCU); MARSHALL CO.: Murray State University Bio. Sta., G. E. Hunter & D. F. Austin 1794 (NCU); MC CRACKEN CO.: Paducah, E. J. Palmer 17944 (MO); MC CREARY CO.: Stearns Golf Course, H. J. Rogers 118 (US); WARREN CO.: Bowling Green, S. F. Price, s.n., July 1897 (F).

MARYLAND: C. Hall, s.n. (US).

MASSACHUSETTS: WORCESTER CO.: Jamesville, N. P. Woodward, s.n., 2 August 1915 (GH); N. Orange, Mrs. H. A. Ward, 28 July 1913 (GH).

MINNESOTA: Iowa River, T. J. Hale, s.n., 1861 (GH).

MISSOURI: BARRY CO.: N of Flat Creek, Redfearn, Jr. and M. Sebring 4246 (FSU, VDB); BOONE CO.: Columbia, H. W. Rickett, s.n., 20 July 1929 (DUKE); CARROLL CO.: N of Mandeville, J. A. Steyermark 73007 (F); CASS CO.: Prain, s.n., 24 July 1864 (MO); CHRISTIAN CO.: Chadwick W. Trelease 545 (MO); COOPER CO.: B. F. Bush 14951 (MO); FRANKLIN CO.: NE of Stanton, Wilkens 10811 (priv.); GREENE CO.: Springfield, F. W. Dewart, s.n., 31 July 1892 (MO); HICKORY CO.: E of Nemo, N. C. Henderson 68-511 (FSU); HOWELL CO.: E of West Plains, Thomas 9923 (TENN); IRON CO.: Vulcan, H. H. Smith 1057 (F); JASPER CO.: Asbury, Tucker 5850 (NCU); JEFFERSON CO.:

Kimmswick, J. R. Churchill, s.n., 1 June 1918 (MO); LEWIS CO.: La Grange, J. Davis 1346 (MO); LIVINGSTON CO.: NE of Chillicothe, S. Sparling 1071 (F); MARION CO.: W. Hannibal, Davis 7505 (MO); MC DONALD CO.: Bush 202A (F); MERCER CO.: E of Gainesville, J. Steyermark 85321 (GA); MORGAN CO.: Proctor Creek, Steyermark 13204 (MO); OREGON CO.: Thayer, Pennell 11586 (PH); PHELPS CO.: Jerome, J. H. Kellogg, s.n., 12 July 1912 (MO); PIKE CO.: Eolia, Davis 7594 (MO); RALLS CO.: Ilasco, Davis 4862 (MO); ST. CLAIR CO.: E of Osceola, Henderson 65-413 (MO); ST. LOUIS CO.: Meramec Heights, Sherff 74 (F); H. Eggert, s.n., 22 August 1891 (PH, MO); SCOTLAND CO.: SE of Bible Grove, Steyermark 74470 (F); SHANNON CO.: Montier, Bush 182 (MO); STODDARD CO.: N of Ardeola, Steyermark 20787 (MO); STONE CO.: James River, Redfearn, Jr. & R. D. Hook 4255 (FSU); TEXAS CO.: S of Summersville, Thomas 9861 (TENN); WRIGHT CO.: SE of Cedar Gap, O. E. Lansing, Jr. 3090 (F, US).

NORTH CAROLINA: ALEXANDER CO.: W of Vashti, A. E. Radford 13862 (NCU); BLADEN CO.: SW of Elizabethtown, Ahles & J. G. Haesloop 29079 (NCU); BRUNSWICK CO.: Bolivia, R. H. Godfrey & I. V. Shunk 4220 (US); BUNCOMBE CO.: Ferguson Knob, D. C. Peattie 840 (NCU); CASWELL CO.: S of Estella, C. R. Bell 11923 (NCU); FRANKLIN CO.: E of Franklinton, R. L. Wilbur 3708 (FSU, GH); GATES CO.: W of Hobbsville, Ahles & J. A. Duke 44613 (GA, GH); GRANVILLE CO.: SW of Culbreth, Ahles & R. S. Leisner, 17529 (NCU); FORSYTH CO.: P.O. Schallert, s.n., 24 June 1940 (TENN, MO); HALIFAX CO.: N of Halifax, Godfrey & W. B. Fox 49653 (NCSC, DUKE); HAYWOOD CO.: N of Sunburst, Ahles & Duke 42263 (NCU); HENDERSON CO.: NE of Hendersonville, D. Pittillo 162 (KY); HERTFORD CO.: SE of Murfreesboro, Ahles & Duke 41447 (NCU); IREDELL CO.: E of Catawba River, Ahles & Duke 45065 (FSU); JOHNSTON CO.: W of Emit, Radford 25247 (NCU); MACON CO.: Highlands, L. Stewart & H. Heckenbleikner, s.n., July 27, 1938 (NCU); MECKLENBURG CO.: E of Newell, Ahles & Duke 44822 (NCU); MONTGOMERY CO.: NW of Mt. Gilead, Radford 13234 (NCU); POLK CO.: Ferguson Knob, Peattie 839 (F); RANDOLPH CO.: SW of Ulah, Bell 12211 (NCU); ROBESON CO.: E of Lumberton, Ahles & Haesloop 29004 (NCU, TENN); SURRY CO.: S of Dobson, Radford 13032 (NCU); TRANSYLVANIA CO.: Cedar Mt., O. M. Freeman 58335 (NCU); WAKE CO.: Raleigh, Godfrey 3964 (NCU, NY).

OHIO: CUYAHOGA CO.: near Cleveland, J. M. Greeman 1345 (MO).

OKLAHOMA: SEQUOYAH CO.: NE of Sallisaw, C. S. Wallis 7476 (NCU).

SOUTH CAROLINA: ANDERSON CO.: near Starr, Duncan 9968 (GA, US); CHEROKEE CO.: NNW of Blacksburg, Ahles & J. Haesloop 26774 (NCU); CHESTER CO.: NNW of Leeds, Bell 7330 (NCU); FAIRFIELD CO.:

Dawkins, Freeman 56385 (NCU); KERSHAW CO.: SE of Liberty Hill, Radford 23683 (NCU); LAURENS CO.: Rt. 114 & SC252, Bell 10160 (NCU); MC CORMICK CO.: NW of Mt. Carmel, Radford 26181 (NCU); OCONEE CO.: NE OF Walhalla, Duncan 11254 (GA); PICKENS CO.: Sassafras Mt., Radford 15467 (NCU); UNION CO.: SE of Carlisle, Bell 8385 (NCU); YORK CO.: W of Clover, Ahles & Haesloop 27022 (NCU).

TENNESSEE: ANDERSON CO.: W of Oak Ridge, H. DeSelm & P. Whitford 9138 (TENN); BLEDSOE CO.: E of Pikeville, A. J. Sharp et al. 43719 (TENN); COCKE CO.: English Mt., J. A. Chapman, s.n., 23 June 1954 (TENN); CUMBERLAND CO.: Haley Mt., P. J. Adams, s.n., 26 July 1963 (NCU, TENN); COFFEE CO.: NE Arnold Village, R. Kral 32248 (NCU, VDB); DICKSON CO.: near White Bluffs, Pennell 11472 (PH); FENTRESS CO.: near Allardt, Sharp & J. K. Underwood 2209 (TENN); FRANKLIN CO.: Monteagle, Godfrey 69838 (FSU); GRAINGER CO.: Morristown, J. D. Smith, s.n., 16 Aug. 1880 (US); HICKMAN CO.: Centerville to Wrigley, Sharp et al. 449 (TENN); HOUSTON CO.: WNW of Van Leer, Kral 35857 (VDB); HUMPHREYS CO.: E of McEwen, K. Rogers 33965 (TENN); KNOX CO.: near Solway, H. Gale 18 (TENN); LEWIS CO.: Meriwether Lewis Mon., Kral 36227 (VDB); PICKETT CO.: Pickett State Park, Sharp et al. 4150 (TENN); POLK CO.: Cherokee National Forest, Sharp et al. 46508 (TENN); ROBERTSON CO.: Eggert, s.n., 13 July 1897 (MO); SEVIER CO.: near Pittman Center, R. H. Whittaker 571 (TENN); STEWART CO.: W of Dover, Sharp et al. 7696 (TENN); UNION CO.: Norris Lake Forest, A. W. Morrison, 21 June 1937 (TENN); VAN BUREN CO.: Underwood & Sharp 4012 (TENN); WILLIAMSON CO.: S of Fairview, Kral 31560 (TENN, VDB); WILSON CO.: SE of Gladeville, Kral 26966 (VDB).

TEXAS: Leavenworth, s.n. (PH); GRAYSON CO.: Denison, G. W. Letterman 251 (NY); TITUS CO.: E of Cokeville, V. L. Cory 55888 (US).

VIRGINIA: AMELIA CO.: J. B. Lewis 841 (VPI); AUGUSTA CO.: Little Bald Knob, Freeman, s.n., 5 Sept. 1939 (FSU); BEDFORD CO.: A. B. Massey, s.n., 5 July 1956 (VPI); BOTETOURT CO.: Thunderhill Mt., R. S. Freer 1889 (GH); CAMPBELL CO.: Waterlick Rd., G. W. Ramsey & R. S. Freer 4243 (NCU); CAROLINA CO.: SW of Rutherglen, H. H. Iltis 2383 (US); CHARLES CITY CO.: near Hampton, O. H. Weiss 30 (VPI); CRAIG CO.: Broad Run, Massey, s.n., 19 July 1961 (VPI); FREDERICK CO.: Hayfields, F. W. Hunnewell 10730 (GH); GREENE CO.: Bearface Mt., F. R. Fosberg 17216 (FSU); HALIFAX CO.: S of Hyco River, Ahles & F. James 60596 (NCU); HENRICO CO.: Univ. of Richmond, Asher & Troy, s.n., 9 July 1937 (VPI); JAMES CITY CO.:

Williamsberg, A. C. Barans 300 (NCU); MADISON CO.: H. N. Moldenke 19193 (NY); MONROE CO.: W. M. Canby, s.n., Aug. 1858 (NY); NANSEMOND CO.: M. L. Fernald et al. 5119 (PH); NELSON CO.: Afton, E. S. Steele 48 (US); NORFOLK CO.: Ford's Plane, H. B. Meredith, s.n., 25 June 1924 (DUKE); PAGE CO.: Mt. Marshall, H. A. Allard 777 (NY, US); PITTSYLVANIA CO.: E of Danville, Ahles & James 62195 (NCU); PRINCE GEORGE CO.: NE of Gary Church, Wilkens 6318 (priv.); ROCKBRIDGE CO.: Elk Creek, Freer 3176 (VPI); SHENANDOAH CO.: Hunnewell 12984 (VPI); SUSSEX CO.: near Mason, Ahles & R. Baird 58540 (NCU).

WEST VIRGINIA: GREENBRIER CO.: White Sulphur Springs, K. K. Mackenzie 416 (NY); Hawkes Nest, Bartley & Pontius 510 (NY); HARDY CO.: Lost City, E. L. Core 6829 (NY); MONROE: Red Sulphur Springs, Hunnewell 12983 (GH).

WISCONSIN: RACINE CO.: Sylvania, Mrs. J. M. Milligan, s.n., Aug. 1886 (US); Racine, Hale, s.n. (FM 219665, PH); RACINE or KENOSHA CO.: S. C. Wadmond 1448 (PH).

Variety integrifolium covers nearly the entire range of section Partheniastrum and overlaps every other taxon of the section. There is a tendency for the northern plants to be larger and more robust, although equally robust plants occur in Georgia and S. Carolina.

The identity of the type variety was unexpected since var. henryanum is the major variety in Virginia. However, along the Atlantic seaboard, where Clayton collected his specimen, var. integrifolium with large leaves and many capitula in each inflorescence does now occur and does now match Gronovius' (1743) illustration.

In Virginia, the Carolinas, Georgia and Alabama, the tetraploid pollen type is very rare; in Illinois, Iowa, Missouri and Arkansas the tetraploid pollen type represents about 60% of the population of var. integrifolium. Most of the Parthenium integrifolium specimens of Missouri and Arkansas are intermediate to typical integrifolium and var. hispidum.

1b. Parthenium integrifolium var. henryanum Mears, var. nov.

Folia basalia ovata vel ovato-lanceolata, acuta, (3-)4-8 cm lata, (4-)6-12(-20) cm longa, serrationibus simplicibus, petiolis simplicibus; capitula diametro 4-6 mm.

Plants 0.6 to 1.0 m high; roots expanded; basal leaf petiole simple; basal leaf blade ovate-lanceolate obtuse to acute, (3-)4 to 8 cm wide by (4-)6 to 12(-20) cm long; cauline leaf petiole simple; cauline leaf ovate-lanceolate; upper cauline leaf with simply winged petiole, not auriculate; leaf dentations simple; inflorescence corymbose, composed of (18-)90-180(-400) capitula, 4. to 6. mm. in diameter; pistillate florets with (0-)2 to 3(-4) sturdy awns; achenes glabrous to pubescent; diploid*.

HOLOTYPE: N. Carolina: Yadkin Co.: S of Cycle, Radford 15387

(NCU!)

DISTRIBUTION:

ALABAMA: CHEROKEE CO.: S of Centre, Kral 35030 (VDB); CLAY CO.: Millersville, Pollard & Maxon 177 (NY, US, GA); DE KALB CO.: SE of Fort Payne, S. McDaniel 6392 (VDB); FRANKLIN CO.: N of Liberty Hill, Kral 32928 (VDB); MACON CO.: near Northfox Creek, H. D. Moore 303 (Auburn, VDB); ST. CLAIR CO.: Beason Cove, P. E. Bostick 2889 (NCU); WINSTON CO.: Underwood, s.n., 2 June 1896 (NY).

GEORGIA: CHATTOOGA CO.: W of Cloudland, Cronquist 5314 (US, PH, MO, NY, GH); CLARKE CO.: Athens, K.M.D. s.n., 30 May 1929 (GA); DADE CO.: W of Tennessee line, Duncan 5432 (GA); ELBERT CO.: W of Elberton, Duncan 11650 (GH, NCSC, TENN, GA); FLOYD CO.: Rome, Chapman, s.n., 1872 (MO); FORSYTH CO.: Suwannee Mt., G. W. McDowell & G. H. Venard 375 (GA); FULTON CO.: near Atlanta, Venard V-355 (GA); HART CO.: SW of Hartwell, K. M. Wiegand & W. E. Manning 3342 (GH); HAVERSHAM CO.: Cornelia, A. L. Quaintance, 14 June 1899 (GA); MERIWETHER CO.: Pine Mt., D. Eyles 7206 (GEO, GH); RABUN CO.: near Glade, Duncan 10071 (GEO, GA); WALKER CO.: Lookout Mt., Eyles 5474 (GEO).

NORTH CAROLINA: ALAMANCE CO.: SW of Saxapahaw, G. S. Ramseur & A. E. Hammond 2295 (NCU); BERTIE CO.: SW of Ashland, Ahles & Duke 41399 (NCU); BLADEN CO.: Elizabethtown, L. R. & F. R. Randolph 1048 (GH); BUNCOMBE CO.: Black Mt., P. C. Standley & H. C. Bollman 10442 (US); BURKE CO.: NE of Burke Chapel, Bell 8632 (NCU); CALDWELL CO.: SE of Draco, Radford 14927 (NCU); CARBARRUS CO.: N of Midland, Ahles & Leisner 16075 (NCU); CATAWBA CO.: N of Hickory, J. K. Small & A. A. Heller 94 (F, PH); CHATHAM CO.: S of Chapel Hill, F. J. Crutchfield 1452 (NCU); CHEROCKEE CO.: S of Hiwassee Dam, Radford 11696 (NCU); CHOWAN CO.: W of Small's Crossroads, Ahles & Duke 44232 (NCU); CLEVELAND CO.: NNE of Lawndale, Ahles & Leisner 15256

*Estimate from pollen measurements.

(NCU); CUMBERLAND CO.: S of Roslin, Ahles & Haesloop 29833 (NCU); DAVIDSON CO.: NW of High Rock, Radford 12916 (NCU); DURHAM CO.: near Braggtown, Godfrey et al. 50385 (NCSC, DUKE, GH); EDGECOMBE CO.: E of Rocky Mount, Godfrey & Fox 49329 (NCSC, DUKE); FORSYTH CO.: NE of Donnah, Ahles & Duke 45410 (NCU); FRANKLIN CO.: WNW of Rocky Ford, Ahles & Leisner 16442 (NCU); GREENE CO.: N of Jason, Radford 36630 (NCU); GUILFORD CO.: NW of Greensboro, L. Melvin 3578 (NCU); Halifax, Ahles & Leisner 17104 (NCU); HARNETT CO.: E of Lee Co. Line, H. Laing 1343 (NCU); HENDERSON CO.: Sugarloaf Mt., F.O. Grover, s.n., 25 July, 1933 (TENN); HENRY CO.: E of Martinsville, Ramsey 6862 (NCU); IREDELL CO.: W of Long Camp, Ahles & R. Britt, 41068 (NCU); JONES CO.: E of Pollocksville, Radford 37259 (NCU); LEE CO.: NE of Salem Church, S. Stewart 533 (NCU); LINCOLN CO.: W of Lincolnton, Bell 8828 (NCU); MACON CO.: SW of Highlands, Godfrey 51419 (NCSC, DUKE, FSU); MONTGOMERY CO.: W of Troy, Radford 14547 (NCU); NASH CO.: E of Johnston Co. line, Ahles & Bell 16614 (NCU); NORTHAMPTON CO.: WNW of Garysburg, Ahles & Duke 45582 (NCU); ORANGE CO.: Chapel Hill, F. Foust, s.n., 19 October 1937 (NY); PERSON CO.: N of Bushy Fork, Bell 14678 (NCU); PITT CO.: WNW of Latham, Radford 39710 (NCU); RANDOLPH CO.: Pisgah Forest, P. A. Rydberg 9515 (NY); ROWAN CO.: near Faith, Heller 14157 (MIN, MO); near Salisbury, Heller, s.n. (#94?), 28 June 1890 (F, PH, MO, NY); NNE of Faith, J. H. Horton 1284 (NCU); RUTHERFORD CO.: S of Forest City, D. M. Smith 55 (NCU); SCOTLAND CO.: WNW of Laurel Hill, Ahles & Haesloop 28745 (NCU); Lower Laurel Hill, R. Ward, s.n., 14 October 1928 (NCU)*, STANLY CO.: S of New London, Ahles & Leisner 16091 (NCU); near Carbarrus Co. line, Godfrey & Fox 49892 (NCSC, MIN, DUKE); STOKES CO.: Schallert, s.n., 25 May 1941 (NY); SURREY CO.: Dobson, Wilbur 4217 (NCSC, GH); TRANSYLVANIA CO.: Ravis' Ridge, D. M. Eggers 1435 (VDB); VANCE CO.: N of Epsom, Ahles & Leisner 17351 (NCU); WARREN CO.: N of Centerville, Wilbur 3735 (NCSC, GH); SE of Manson, Bell 4171 (NCU); WAYNE CO.: Newton Groove (sic! Grove), Godfrey 4237 (US); WILSON CO.: S of Bailey, Radford 35533 (NCU).

SOUTH CAROLINA: ABBEVILLE CO.: E of Abbeville, Radford 25988 (NCU); ANDERSON CO.: near Starr, Duncan 9968 (GEO, NCSC, MO); DARLINGTON CO.: near Clyde, B. E. Smith 595 (NCU); GREENVILLE CO.: Hogback Mt., Wherry, s.n., 17 Sept. 1927 (NCU); LANCASTER CO.: SW of Tradesville, Ahles & Haesloop 27489 (NCU); LAURENS CO.: near Little River, Bell 7978 (NCU); OCONEE CO.: Big Bend on Chattooga River, D. M. DuMond 1178 (NCSC); PICKENS CO.: Table Rock, L. Rodgers 204 (DUKE); SPARTANBURG CO.: E of Boiling Springs, Bell 10377 (NCU).

*Infested with Coleosporium terebinthinacea uredinia & telia, det. Olive, 1943.

TENNESSEE: BLEDSOE CO.: S of Herbert Domain, R. E. Shanks et al. 8951 (TENN); COFFEE CO.: S of Manchester, R. McVaugh 4410 (GA); FENTRESS CO.: Shanks 3063 (NCSC, TENN); GRAINGER CO.: Clinch Mt., J. D. Smith, s.n., 11 Aug. 1880 (TENN, US); KNOX CO.: Ft. City, H. M. Jennison, s.n., 19 Sept. 1937 (GA, TENN); MEIGS CO.: Near Decatur, Sharp & Underwood 2306 (TENN, MO); RHEA CO.: Dayton, Shanks et al. 4257 (TENN); RUTHERFORD CO.: ESE of Murfreesboro, H. DeSelm 7230 (TENN); WAYNE CO.: W of Hohenwald, Kral 31607 (VDB); ? CO.: White Cliffs Springs, F. Lamson-Scribner, s.n., 5 July 1890 (NCU, US).

VIRGINIA: ALLEGHANY CO.: C. L. Stump s.n. (VPI); APPOMATOX CO.: Appomatox, R. P. Winton, s.n., 7 July 1950 (VPI); AUGUSTA CO.: Rt. 664, Freer 17151 (NCU); SW of Sherando, Kral 13443 (FSU); BATH CO.: Beard Mt., W. W. Hopkins, s.n., 21 June 1945 (VPI); BEDFORD CO.: A. H. Curtiss 3447 (MO, US); BOTETOURT CO.: Bearwallow Gap, Freer 1610 (GH); BUCKINGHAM CO.: Willis Mountain, A. M. Harvill 16074 (NCU); CAMPBELL CO.: Lynchburg, N. L. Britton et al, s.n., 1 July 1892 (NY); CHARLES CITY CO.: Williamsburg, D.M.E. Ware 2658 (NCU, VDB); CHESTERFIELD CO.: Massey s.n., 13 July 1937 (VPI); CRAIG CO.: L. J. Uttal 6694 (VPI); DINWIDDIE CO.: SSW of Petersburg, Kral 13185 (VDB); FRANKLIN CO.: Rockymount, Winton, s.n., 25 July 1950 (VPI); GREENSVILLE CO.: E of Emporia, Fernald and B. Long 8500 (PH, GH); E of Radium, Harvill 15797 (NCU); MECKLENBURG CO.: US 58, W. D. Seaman 3250 (NCU); NANSEMOND CO.: Suffolk, Heller s.n., 8-13 June 1893 (PH); (or NORFOLK CO.) Dismal Swamp, Pollard 860 (NY); PAGE CO.: Luray, Steele & Mrs. Steele 90 (MIN, MO, GH, US, *NY); PRINCE GEORGE CO.: Blackwater School, Fernald et al. 5945 (GH, PH); PULASKI CO.: Pulaski Mt., L. Hundley, s.n., 10 Aug. 1954 (VPI); ROCKBRIDGE CO.: Goshen, Steele, s.n., 11 Sept. 1904 (US); ROCKINGHAM CO.: H. S. Mosby, s.n., 20 Aug. 1936 (VPI); SHENANDOAH CO.: Massanutten Mt., Wilkens 11327 (priv.); SUSSEX CO.: Waverly, W. P. Blackwell s.n., 27 June 1945 (VPI).

WEST VIRGINIA: GREENBRIER CO.: Slaty Mt., E. E. Berkley 1210 (MO); White Sulphur Springs, G. H. Morton 2973 (TENN); HAMPSHIRE CO.: Lehew, L. Griscom & Hunnewell 18794 (GH); MONROE CO.: Slaty Mt., D. Emory 71037 (NCU); Old Sweet Springs, Steele, s.n., 8 Sept. 1905 (US).

*clearly rhizomatous

Var. henryanum is named to commemorate Mary G. Henry, the gifted explorer and collector of rare American species, and the Henry Foundation for Botanical Research of Gladwyne, Pennsylvania, where many rare or naturally extinct taxa of the southern United States are growing and available for study. Several varieties of Parthenium integrifolium have been growing there for 20 years.

Variety henryanum is a characteristic plant of the hills and mountains of the Virginias, the Carolinas and eastern Tennessee and Kentucky. It intergrades with var. integrifolium at various points of overlap. In many areas of N. Carolina both varieties can be seen together with intermediates. Variety henryanum also overlaps with var. auriculatum and intermediates are known.

1c. Parthenium integrifolium var. mabryanum Mears, var. nov.

Folia basalia lanceolato-ovata, acuta, (1.4-)2-4(-4.5) cm lata, (6-)7-12(-13.5) cm longa, serrationibus simplicibus petiolis simplicibus; capitula diametro 4.5-6 mm.

Plants 0.3-0.6 m tall; roots expanded; basal leaf petiole simple; basal leaf blade linear-lanceolate acute (1.4-)2 to 4(-4.5) cm wide by (6-)7 to 12(-13.5) cm long; cauline leaf petiole simple; cauline leaf blade lanceolate; upper cauline leaf sessile, not auriculate; leaf dentations simple; inflorescence corymbose, composed of (30-) 40 to 75 (-85) capitula, 4.5 to 6 mm. in diameter; pistillate florets with (0-) 2 sturdy awns; achenes nearly glabrous to pubescent; diploid*.

HOLOTYPE: N. Carolina: Cumberland Co.: near Manchester, Ahles & Leisner 33394 (NCU!)

DISTRIBUTION:

NORTH CAROLINA: CRAVEN CO.: SW of Caton, Radford 37608 (NCU); near Lillington, Godfrey & Fox 49441 (NCSC); GATES CO.: S of Merchants Pond, Ahles & Duke 48471 (NY); HARNETT CO.: Spout Springs, Bostick 119-14 (GEO); LEE CO.: E of St. Andrews Church, Stewart 487 (NCU); MARLIN CO.: SE of Jamesville, J. Pringle 31231 (TENN); UNION CO.: S of Monroe, Ahles & Haesloop 31439 (GA, NCU, GH); SE of Monroe, Ahles & Haesloop 27532 (VDB, UNC); WAKE CO.: NE of Rolesville, DuMond 344 (NCSC); WAYNE CO.: Newton Groove (sic!), Godfrey 4237 (DUKE, GH).

*Estimate from pollen measurements.

SOUTH CAROLINA: N of Hartsville, T. Webber, Aug. 1921 (NCU).

VIRGINIA: NANSEMOND CO.: SUFFOLK, E. Bartram, 17 Sept. 1907 (PH); Suffolk, Heller 975 (US, GH, MO, F, MIN).

This variety is named for Professor Tom J. Mabry of the University of Texas at Austin, who has contributed much to the chemical study of the origins and relationships of plant taxa. It is an extreme morphological and edaphic type, restricted to the coastal sands of Virginia and the Carolinas. It is most similar to var. henryanum, with which it interacts in a few areas of overlap.

ld. Parthenium integrifolium var. auriculatum (Britton) Cornelius ex Cronquist Rhodora 347: 399 (1945).

P. auriculatum Britton in Britton & Brown, Ill. Fl. N. Amer. 3:521 (1898).

P. hispidum var. auriculatum (Britton) Rollins Contr. Gray Herb. 172: 61 (1950).

Plants (0.6-)0.8 to 1.0 m high; roots expanded; basal leaf petiole usually winged, sometimes with 2 to 4 wings; basal leaf blade ovate acute, 5 to 8 cm wide by 11 to 18(-20) cm long; cauline leaf petiole often winged to auriculate; cauline leaf blade ovate-lanceolate acute; upper cauline leaf auriculate; leaf pubescence sturdier than in type variety; leaf dentation complex; inflorescence corymbose, composed of 40 to 80(-120) capitula, 5.5 to 6.5 mm in diameter; pistillate florets with (0-)3 sturdy awns; achenes pubescent to densely pubescent; diploid ($n = 18$)**, rarely tetraploid*.

TYPES: Virginia: Mecklenbrug Co.: near Clarksville, W. Ashe 2400 (NY!), which I designate as lectotype; Co. unknown: Allegheny Mt. H. Eaton, May, (June ?) 1831 (NY!), co-type.

DISTRIBUTION:

ALABAMA: CLAY CO.: Horn Mt., E. Grimes, Jr., s.n., 7 July 1968 (Auburn).

*Estimate from pollen diameter.

**Personal count of pollen mother cells.

NORTH CAROLINA: BURKE CO.: SE of Morganton, Bell 8745 (NCU); DURHAM CO.: near Braggtown, Godfrey et al. 50386 (NY, GA, FSU, MIN, NCSC, TENN, US, GH); Eno River, L. Anderson 6265 (PH); GASTON CO.: S of High Shoals, Ahles & Leisner 15150 (NCU); GUILFORD CO.: Lows Church, W. Batson, Jr. 711 (DUKE); ORANGE CO.: Duke Forest, D. Correll 5103 (DUKE); near Eastwood Lake, Titman & Patton 225 (NCU); PERSON CO.: Block Island, W. Ashe (?), 1896 (NCU); "My, 1896, Person Co., N.C." W. Ashe s.n. (NY); ROCKINGHAM CO.: S of Leaksville, Radford 13650 (FSU, NCU); WARREN CO.: N of Enterprise, Ahles & Bell 12872 (NCU, GA).

TENNESSEE: ANDERSON CO.: E of Clinton, Wilkins 3509 (priv.); KNOX CO.: Mascot, L. Finn, s.n., 5 July 1967 (TENN); Knoxville, A. Ruth, s.n., June, 1897 (NCU).

VIRGINIA: Leidy, s.n., July, 1867 (PH); AMELIA CO.: J. Lewis 2030 (VPI); FREDERICK CO.: Meadow Mills, Freeman, s.n., 9 June 1935 (US); Cedar Creed, Hunnewell, s.n., 5 Aug. 1929 (VPI, GH); MECKLENBURG CO.: MONTGOMERY CO.: SE of Ellett, Kral 10395 (NCU, VPI, FSU); E of Blacksburg, R. Martin 1988 (FSU, KY); W of Shawsville, Massey, s.n., 24 May 1937 (VPI); PRINCE EDWARD CO.: Ramsey et al. 7985 (NCU); ROANOKE CO.: Dixie Caverns, C. Wood, Jr. 3633 (GH); SHENANDOAH CO.: near Cedar Creek, Hunnewell, s.n., 26 June 1931 (GH); WARREN CO.: Front Royal, F. Sargent, s.n., 27 Aug. 1949 (MIN).

WEST VIRGINIA: HAMPSHIRE CO.: Capon Springs, Core, s.n., 19 Aug. 1931 (NY).

Variety auriculatum probably is related most closely to var. hispidum f. repens of Missouri. However there are reasons to believe that var. auriculatum and P. radfordii also are closely related. Variety auriculatum is restricted to soils of high limestone content (Godfrey et al. label; Wilkins, priv. comm.). Var. auriculatum overlaps in general distribution with var. henryanum, and there are many intermediates. The intermediates have fully viable pollen, as determined by the lactophenol blue test.

1e. Parthenium integrifolium var. hispidum (Rafinesque) Mears, comb. nov.

Parthenium hispidum Rafinesque New Fl. N. Amer. 2:25-6. (1837)

Parthenium hispidum var. typicum Rollins Contr. Gray Herb. 172:60. (1950)

Plants 0.3 to 0.7 m tall; roots not expanded (rhizomatous); basal leaf petiole simple; basal leaf blade ovate-lanceolate acute to obtuse, (2-)4 to 8(-9) cm wide by (5.5-)7 to 15(-19.5) cm long; often no cauline leaves except subtending the inflorescence;

lower cauline petioles (if present) simple; upper cauline leaf sessile, not auriculate; leaf pubescence sturdier and less recurved than that of type variety; dentations inconspicuous to complex; inflorescence corymbose composed of (10-)20-50(-150) capitula, (6-)8-9(-11) mm in diameter; pistillate florets with 0-2(-3) awns, usually linear laterally; achenes nearly glabrous to (usually) densely pubescent; tetraploid. ($2n = 72$; Rollins)

NEOTYPE: MISSOURI: St. Louis Co., rocky limestone woods S. of Allenton, F. W. Pennell 11692 (PH!).

DISTRIBUTION:

ARKANSAS: ARKANSAS CO.: Stuttgart, Demaree 15423 (F, MO) 21105 (GA); ASHLEY CO.: Portland, Demaree 14749 (F, MO); CARROLL CO.: Beaver, Palmer 5591 (F, MO, US); CLARK CO.: Arkadelphia, Demaree 55357 (VDB); DREW CO.: Monticello, Demaree 23160 (MIN, NY, MO, GA), 24939 (NCU, GA, FSU, VPI, GH); GREENE CO.: Lake Springfield, Redfearn, Jr. 3603 (GA); HEMPSTEAD CO.: Fulton, Palmer 8062 (NY, MO); LONOKE CO.: Carlisle, Demaree 17584 (MIN, FSU, NY, F, MO); MONROE CO.: Roe, Demaree 12951 (NY); NEWTON CO.: NW of Boxley, Redfearn, Jr. and W. Weber 25371 (NCU); PRAIRIE CO.: Ulm, Demaree 14915 (F, MO); Hazen, Demaree 38674 (GA); SEBASTIAN CO.: Ft. Smith, J. M. Bigelow, s.n., 21 June 1853 (NY); SHARP CO.: Hardy,

ILLINOIS: Penice, F. Brendel s.n. (F #310723).

KANSAS: CHAUTAUQUA CO.: Hitchcock 1086 (NY, US, MO, GH); COWLEY CO.: M. White, s.n., 1899 (NY); ELK CO.: G. Clothier 1086a (MO, US, GH, NY); GREENWOOD CO.: W of Eureka, H. D. Ripley & R. C. Barneby 7249 (NY).

LOUISIANA: BOISSIER PARISH: Boissier City, Demaree 20813 (GH); E of Filmore, Kral 20240 (VDB); CADDO PARISH: Shreveport to Mooringsport, C. Brown 6077 (GH); Shreveport, J. Gregg 4147 (MO); RED RIVER PARISH: W of Coreshatta, J. Thieret 28624 (FSU); WEBSTER PARISH: S of Doyline, Thieret 24346 (DUKE).

MICHIGAN: KALAMAZOO CO.: W of Schoolcraft, C. R. Hanes 3897 (NY), 4027 (GH), 4511 (GH); W of Schoolcraft, F. J. Hermann 9059 (US, NY, F, PH, MO).

MISSOURI: AUDRAIN CO.: Farber to Vandalia, Steyermark 16301 (US, MO); BARRY CO.: S of Purdy, Wilkens 2522 (priv.); BENTON CO.: N of Warsaw, Steyermark 10695 (MO); CHRISTIAN CO.: SE of Chadwick, Steyermark 22984 (F, MO); CRAWFORD CO.: W of Cuba, Henderson s.n., 9 May 1959 (FSU); DALLAS CO.: S of Windyville, Henderson 67-374 (FSU); DENT CO.: NE of Edgar Springs, Steyermark 25431 (F, MO); FRANKLIN CO.: near Gray

Summit, E. Thatcher 54 (MIN); GASCONADE CO.: Mt. Sterling, G. Ownbey 772 (MIN); GREEN CO.: NE of Springfield, Redfearn, Jr. 14759 (FSU, NCU, VDB); HICKORY CO.: S of Hermitage, Steyermark 13364 (MO); IRON CO.: Buzzard Mt., C. Russell, s.n., August 1897 (MO); JASPER CO.: Carthage, Palmer 3978 (NY, US); JEFFERSON CO.: SW of Pacific, Steyermark 1881 (F); JOHNSON CO.: S of Knob Noster, Henderson 68-626 (FSU); LACLEDE CO.: Pease Mill, Steyermark 10537 (MO); MILLER CO.: Iberia to Tuscumbia, Steyermark 13009 (MO); MONTGOMERY CO.: E of Mineola, Steyermark 65431* (F)**; OREGON CO.: W of Turner Mill Spring, Palmer & Steyermark 41743 (MO); OSAGE CO.: NW of Freeburg, Steyermark 27685 (F); OZARK CO.: Gainesville, Palmer 34768 (US); PHELPS CO.: Jerome, Kellogg 448 (MIN, US); POLK CO.: SE of Pleasant Hope, Steyermark 71316 (F); PULASKI CO.: W of Dixon, Steyermark 19231 (MO); SAINT CLAIR CO.: N of Collins, Henderson 67-954 (FSU); SAINT LOUIS CO.: Eggert, s.n., 3 June 1892 (MIN, PH, US); Allenton, Eggert, s.n., 16 August 1893 (MO, US), s.n., 17 July 1892 (GH); Sutton, Eggert, s.n., 23 May 1896 (F, PH, NY, US); Allenton, Letterman, s.n., June 1884 (F); SHANNON CO.: Montier, Bush 4735 (MIN); Bush 375 (PH, US, GH), 189 (NY, MO, GH); STONE CO.: Galena, Palmer 5782 (F, MO, US); TANEY CO.: N of Ridgedale, Redfearn, Jr. & Eggers 12295 (FSU); TEXAS CO.: W of Dunn, Steyermark 8216 (MIN); WARREN CO.: Wright City, B. Bauer 704 (F); WAYNE CO.: E of Greenville, Steyermark 11271 (MO); WEBSTER CO.: WSW of Fordland, Redfearn, Jr. 9957 (FSU); WRIGHT CO.: E of Grimes Mill, Steyermark 84154 (GA)*.

OKLAHOMA: LEFLORE CO.: near Page, W. W. Blakley 1452 (NY, GH); OSAGE CO.: E of Foraker, U. T. Waterfall 13148 (DUKE, US).

TENNESSEE: DICKSON CO.: W of White Bluffs, H. K. Svenson 4406 (PH)**.

TEXAS: BOWIE CO.: Buchanan, Eggert, s.n., 13 June 1898 (MO); E of new Boston, H. Gentry 2872 (NCU); HARRISON CO.: S of Caddo Lake, D. S. & H. B. Correll 16801 (NCU); E of Caddo Lake, Correll et al. 22185 (NCU).

Variety hispidum is easily distinguished from typical var. integrifolium and is often restricted to dolomitic limestone barrens in Missouri and Arkansas. Variety integrifolium does not invade the barrens, but is often found in adjacent habitats;

*No flowers.

**Mixed collection.

many morphological intermediates of var. integrifolium and var. hispidum exist. Moreover, there is an edaphic type of var. hispidum which is found in prairie conditions in Missouri and Arkansas in mixed populations with var. integrifolium.

The Michigan population is more than 300 miles disjunct from the nearest known population of var. hispidum and more than 50 miles disjunct from the nearest known population var. integrifolium. It is along a railroad. The flowers of var. hispidum usually mature before June 1, while the flowers of var. integrifolium often mature about two weeks later. Mowing and grazing have upset this weak barrier.

P. integrifolium var. hispidum forma repens (Eggert) Mears, comb nov.

P. repens Eggert Catal. Pl. St. Louis p. 16 (1891).

Differing from var. hispidum f. hispidum only in the presence of winged petioles on the basal leaves and in the presence of complex dentations in the leaves. Tetraploid*.

LECTOTYPE (Rollins, 1950): MISSOURI: near St. Louis, May 23, 1879, Eggert s.n. (MO); isotypes (F, NY).

DISTRIBUTION:

✓KANSAS: BUTLER CO.: S of Latham, S. Stephens 3066 (NY).

MINNESOTA: Leroy, Hale, s.n., 1861 (PH).

MISSOURI: CHRISTIAN CO.: E of Garrison, Steyermark 23275 (MO, F, NY, TENN, MIN); CRAWFORD CO.: R. E. Woodson, Jr. 666 (MO); DALLAS CO.: S of Corkery, Steyermark 13832 (MO); FRANKLIN CO.: Pacific, Churchill, s.n., 3 June 1918 (MO); GASCONADE CO.: S of Mt. Sterling, Steyermark 73281 (F); HICKORY CO.: E of Jordan, Steyermark 13271 (MO); JEFFERSON CO.: SE of Catawissa, Steyermark 1037 (MO); OZARK CO.: Gainesville, Palmer 34768 (MO); PULASKI CO.: Waynesville, F. Drouet 227 (MO); ST. LOUIS CO.: Eggert, s.n., 3 June 1892 (F, MO); Glencoe, Eggert, s.n., 16 August 1893 (NY, MO); Laclede, Eggert, s.n., 25 May 1879 (NY); Stonyhills, H. Eggert, s.n., 23 May 1879 (F, NY, MO); Allenton, Glatfelter, s.n., 9 June 1891 (F #15321); Allenton, Glatfelter, s.n., 23 May 1892 (NCU #78637); Allenton, Letterman, s.n., 21 May 1898 (NY); SHANNON CO.: Montier, Bush 375 (NY, MO).

*Estimate from pollen measurements.

Forma repens is clearly a very rare leaf form with lobed petioles similar to those of var. auriculatum. There are no pure populations of that leaf form, but it is clearly restricted to limestone barrens population of var. hispidum in Missouri, Minnesota and Kansas.

2. Parthenium radfordii Mears, spec. nov.

Plantae 0.5-0.7 m altae; folia basalia undulato-lanceolata, 1.6-4.0 cm lata, 9-16 cm longa, duplicato-serrata, petiolis alatis; inflorescentiae corymbosae, capitulis 60-130, diametro (4.5-15.0-6.0(-7.0) mm.

Plants 0.5-0.7 m tall; roots expanded (tuberous) in moss pads; basal leaf blade undulate-pinnatifid with complex dentations, 1.6-4.0 cm wide by 9 to 16 cm long. Cauline leaf sinuate, petiolate; upper cauline leaf pinnatifid, 0.3 to 2.5 cm wide by 0.8 to 6.0 cm long; inflorescence corymbose, composed of (40-) 60-100(-130) capitula, (4.5-)5 to 6(-7) mm in diameter; pistillate florets with 2 sturdy awns; achenes nearly glabrous to pubescent; diploid*; flowering typically August to November.

TYPES: N. Carolina: Johnston Co.: SE of Benson, Radford 27864 (NCU!, holotype; MIN!, isotype).

DISTRIBUTION:

NORTH CAROLINA: BLADEN CO.: NW County, Melvin 3623 (NCU); HARNETT CO.: Overhill, Laing 1453 (NCU).

SOUTH CAROLINA: CHESTERFIELD CO.: Cheraw, Radford 12219 (NCU); W of Patrick, Radford 12444 (NCU); YORK CO.: E of Clover, Ahles 34640 (FSU, NCU).

There are only 6 known sites for P. radfordii. Probably all involve granite barrens surrounded by coastal sands. Parthenium integrifolium var. henryanum occurs on the proximal sands; a few conspicuous intermediates have been collected. In the vicinity of P. radfordii, P. integrifolium var. henryanum has mature flowers by July 15th in most years although plants have been collected in flower as late as September; late flowering plants of P. integrifolium are rare and perhaps represent second growth. Parthenium radfordii is a late summer and fall species, reaching maturity about September 15th and collected as late as November 25th. This seasonal offset affords little chance of hybridization with

*Est. from pollen diameters.

P. integrifolium. The extreme morphological, edaphic and chemical characteristics qualify its recognition as a distinct species. The name of this species acknowledges A. E. Radford's monumental accomplishments with the flora of the Carolinas.

Nomina incertae

Parthenium amplectens Raf., New Fl. N. Am. II. 26 (1837), nom. dub.

P. angustifolium Raf., ibid. p. 25, nom. dub.

P. dillenianum Raf., ibid. p. 26, nom. provis.

P. elliotanum Raf., ibid. p. 26 nom. provis.

P. pumilum Raf., ibid. p. 25, nom. dub.

P. sinuatum Raf., ibid. p. 25, nom. dub.

These are probably all P. integrifolium.

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