

Noteworthy Collections—South Carolina

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ABSTRACT

Discussion is provided for an occurrence of *Macbridea caroliniana* thought to be extirpated (Berkeley County) and five new occurrences collected 2019–2020 on the South Carolina Coastal Plain. One new occurrence is a county record (Charleston County). Four new occurrences along the Black River through Berkeley and Williamsburg counties suggest favorable habitat in that region. Findings suggest that this species may be underreported in South Carolina and effort should be placed in identifying disturbed habitat in conserved natural areas that may harbor this rare plant.

Macbridea caroliniana (Walter) Blake (Lamiaceae)

Berkeley County: Located in the powerline easement on Highway 41 where a stream crosses under the road, about 5.6 km (3.5 mi) southeast of the East Branch Cooper River near Menzer Run and the Francis Marion National Forest. This population consisted of one large patch with 70 stems as observed on 6 September 2020, with 50 stems flowering. On 18 October 2020, plants were observed flowering late in the season. On 7 September 2021, 210 stems were counted, with 180 stems in flower. Later that day, another 178 stems were found about 2.1 km (1.3 mi) away, on private land under conservation easement, sparsely distributed along the margin of a pineland and creek, considered a new occurrence of the same population (388 stems total). Dr. Richard Porcher first observed the population in 2013 along Highway 41 and thought it to be extirpated. Dr. Jean Everett had attempted to locate the population since 2013, but was unsuccessful until 2020 when she also spotted the return of the species to Highway 41. According to South Carolina Department of Natural Resources (SCDNR 2021) records, Jeff Glitzenstein also reported this sighting in 2020 (Keith Bradley, pers. comm.). Herbicide use was observed on 23 July 2021 along the roadside adjacent to this site; there is evidence of mowing to maintain clearance. The site was dense with *Ludwigia pilosa* (taxonomy and nomenclature here and below follows Weakley 2020). Other associates included: *Acalypha gracilens*, *Acer rubrum*, *Amphicarpaea bracteata* var. *bracteata*, *Anchistea virginica*, *Andropogon cretaceus*, *Boehmeria cylindrica*, *Centella asiatica*, *Chamaecrista nictitans* var. *nictitans*, *Cirsium* sp., *Cuphea carthagenensis*, *Cyperus odoratus* var. *odoratus*, *C. polystachyos*, *Dichantheium* sp., *Digitaria ischaemum*, *Diodia harperi*, *Eleocharis tuberculosa*, *Erianthus giganteus*, *Eupatorium capillifolium*, *E. perfoliatum*, *Euphorbia nutans*, *Eryngium integrifolium*, *Fimbristylis annua*, *Fuirena squarrosa*, *Helianthus angustifolius*, *Hydrocotyle bonariensis*, *Hypericum hypericoides*, *Juncus canadensis*, *Lobelia puberula*, *Lonicera japonica*, *Ludwigia virgata*, *Mikania scandens*, *Mitreola petiolata*, *Paspalum laeve*, *P. urvillei*, *Phyllanthus urinaria* ssp. *urinaria*, *Pluchea foetida* var. *foetida*, *Rhexia mariana* var. *mariana*, *Rhynchospora colorata*, *R. gracilentata*, *R. glomerata*, *R. macrostachya*, *R. nitens*, *Rubus* spp., *Scleria muehlenbergii*, *Smilax laurifolia*, *S. walteri*, *Solidago odora*, *Verbena brasiliensis*, *Tridens flavus*, *Xyris difformis*, *X. floridana*, and unknown mosses. 33.04316°N, 79.80897°W; 6 September 2020, C.N. Dailey 1294 (CITA 3865).

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Charleston County: Located in the town of McClellanville along a municipal drainage canal that crosses over a dirt road (Chance Rd.), and a second dirt road (Dupre Rd.), 3 km (1.9 mi) northeast of Chance Rd. The two occurrences, thought to be the same population, are both found in ditches along flooded bottomland. Chance Rd. patches are about 10.3 km (6.4 mi) southwest of the South Santee River and 1.7 km (1.1 mi) northwest of the Intracoastal Waterway. Dupre Rd. patches are bordering a Francis Marion National Forest parcel, and 7.7 km (4.8 mi) southwest of the Santee, and 1.5 km (.9 mi) northwest of the Intracoastal Waterway. No other observations have been made in the 259,000-acre Francis Marion National Forest which has similar habitat. The easement adjacent to the Chance Rd. canal has little canopy cover. The other side of the canal is forested. The canal and easement are maintained by Charleston County Public Works, which reported that herbicide has not been used here since 2016, and mowing occurs once or twice a year (Linker, pers. comm.). Plants were discovered in peak bloom on 25 August 2019. The population consisted of six patches with 87 stems as of 1 September 2019, on the south side of Chance Rd. Upon return on 17 August 2020, plants were observed forming buds in the Chance Rd. area, while populations further inland (Georgetown and Williamsburg counties) were already in flower. Only two patches (3 stems and 7 stems) were found from the observation in 2019, but four new patches (176 stems) were discovered on the north side of Chance Rd., and two new patches (92 stems) on Dupre Rd.; 278 total stems were counted in 2020. Robert Dellinger also reported the Dupre Rd. occurrence in 2020 to SCDNR. A clearcut of the canal and easement on both the north and south side of Chance Rd. was observed on 2 February 2021. Upon return on 19 September 2021, all patches observed in 2019 on the south side of Chance Rd. were extirpated, but 732 stems (about 18 patches) were counted on the north side of Chance Rd.; 338 stems were counted on Dupre Rd. in September 2021. The total stem count for the population is 1,070 in 2021. Associates included: *Alternanthera philoxeroides*, *Anchistea virginica*, *Andropogon cretaceus*, *A. virginicus*, *Arundinaria tecta*, *Baccharis halimifolia*, *Boehmeria cylindrica*, *Canna flaccida*, *Carex glaucescens*, *Centella asiatica*, *Clethra tomentosa*, *Commelina communis*, *Cuphea carthagenensis*, *Cyperus drummondii*, *Cyrtilla racemiflora*, *Desmodium tenuifolium*, *Dichanthelium* spp., *Digitaria sanguinalis*, *Diodia virginiana*, *Diospyros virginiana*, *Eryngium aquaticum*, *Eupatorium capillifolium*, *E. rotundifolium*, *Galium uniflorum*, *Gelsemium sempervirens*, *Hibiscus aculeatus*, *Hydrocotyle* sp., *Hypericum hypericoides*, *Hypericum mutilum* var. *mutilum*, *Hyptis alata* var. *alata*, *Ipomoea sagittata*, *Juncus coriaceus*, *J. polycephalos*, *Lepidium virginicum* var. *virginicum*, *Lespedeza cuneata*, *Liquidambar styraciflua*, *Lorinseria areolata*, *Ludwigia maritima*, *L. pilosa*, *Lycopus* sp., *Magnolia virginiana* var. *virginiana*, *Mikania scandens*, *Morella cerifera*, *Osmunda spectabilis*, *Parthenocissus quinquefolia*, *Persea borbonia*, *Persicaria hydropiperoides*, *Pinus taeda*, *Pluchea foetida* var. *foetida*, *Pontederia cordata* var. *cordata*, *Pteridium pseudocaudatum*, *Quercus nigra*, *Rhexia mariana* var. *mariana*, *Rhexia nashii*, *Rhus copallinum*, *Rhynchospora macrostachya*, *Rubus* sp., *Sacciolepis striata*, *Scirpus cyperinus*, *Scleria* sp., *Scutellaria integrifolia*, *Smilax walteri*, *Sphagnum* sp., *Symphytotrichum* sp., *Triadenum virginicum*, *Wisteria frutescens*, and unknown mosses. 33.09579°N, 79.44825°W; 17 August 2020, C.N. Dailey 1254 (CITA 3864).

Georgetown County: Located on the “Black River Cypress Preserve” owned by the Butler Conservation Fund, about 6 km (3.7 miles) north-northeast of Andrews and 1.4 km (0.9 mi) north-northeast of the Black River. The area was recently timbered (2015), cleared to create a road (November 2018) and burned (March 2019). The population was discovered on 25 July 2019 in full bloom, and consisted of about 41 patches with 1,091 stems as observed in 2019, in ruts and ditches of a 60 m by 250 m swath of former loblolly pine farm, observed near a new roadbed. Upon return, plants were observed first flowering on 27 July 2020, but the area was overgrown and not resurveyed. Upon return in 2021, new areas were found, discontinuous with the 2019 observation: 110 stems were counted in an upland wetland on 6 Aug 2021, an isolated patch of 105 stems was found on 28 August 2021 along a road, and three huge areas, all associated with fire-breaks (5,206 stems and 1,878 stems, both counted on 19 September 2021, and 2,890 stems counted

on 24 September 2021). The occurrence is estimated to have 11,280 stems total (2019 count, plus new findings in 2021). This is a new occurrence 3.4 km (2.1 mi) from the historic occurrence on the Black River at SC-41, not seen since 26 July 1939 (Gaddy 2015). Associates included: *Acer rubrum*, *Anchistea virginica*, *Baccharis halimifolia*, *Carex joozii*, *Centella asiatica*, *Chasmanthium laxum*, *Cuscuta compacta*, *Dichantheium* spp., *Eleocharis tuberculosa*, *Erechtites hieracifolia*, *Eupatorium capillifolium*, *E. semiserratum*, *Eutrochium fistulosum*, *Gelsemium sempervirens*, *Juncus coriaceus*, *J. dichotomus*, *J. effusus* ssp. *solutus*, *Kellochloa verrucosa*, *Liquidambar styraciflua*, *Lorinseria areolata*, *Ludwigia pilosa*, *Lycopus rubellus*, *L. virginicus*, *Mikania scandens*, *Muscadinia rotundifolia* var. *rotundifolia*, *Parthenocissus quinquefolia*, *Persicaria hydropiper*, *Pinus taeda*, *Pluchea foetida* var. *foetida*, *Ptilimnium capillaceum*, *Quercus nigra*, *Rhexia mariana* var. *mariana*, *R. nashii*, *Rhynchospora caduca*, *R. inexpansa*, *R. glomerata*, *Rubus* sp., *Saururus cernuus*, *Scirpus cyperinus*, *Scutellaria integrifolia*, *Smilax rotundifolia*, *Sphagnum* sp., *Viola brittoniana*, *V. lanceolata* var. *lanceolata*, and unknown mosses. 33.49782°N, 79.52942°W; 25 July 2019, C.N. Dailey 702 (CITA 3671). A white-flowering form was also collected from the Georgetown population. The white-flowering plants were less robust, with smaller flowers and no seeds. The corollas were shorter (2 cm) rather than 3 cm, with no striping. 33.49721°N, 79.52962°W; 20 August 2019, C. N. Dailey 749 (CITA 3769).

Georgetown County: Located at the margin of a cutover pineland, descending into a mucky yet sandy stream, small, and somewhat-braided with canopy cover, 1,500–2,000 meters from the Black River and 11,000 meters from Big Dam Swamp. The population was found on property owned by Springwood Timberlands LLC, just outside the boundary of “Graceland” (978-acre tract), managed by Pee Dee Land Trust, owned by Steve Jones. On 21 September 2020, 72 stems (two patches, 16 stems and 56 stems) were found though no plants were flowering. On 13 August 2021, an additional area was located with 75 stems, and previously located patches had expanded (140 stems and 100 stems), for a total of 315 stems observed in 2021. Associates included: *Acer rubrum*, *Arundinaria tecta*, *Athyrium asplenioides*, *Callicarpa americana*, *Chasmanthium laxum*, *Clethra alnifolia*, *Dichantheium* sp., *Desmodium nuttallii*, *Eupatorium capillifolium*, *E. perfoliatum*, *E. semiserratum*, *Gelsemium sempervirens*, *Hamamelis virginiana* var. *virginiana*, *Ilex opaca*, *Juncus effusus* ssp. *solutus*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Lorinseria areolata*, *Magnolia virginiana*, *Mitchella repens*, *Morella cerifera*, *Muscadinia rotundifolia* var. *rotundifolia*, *Persea palustris*, *Pinus taeda*, *Quercus laurifolia*, *Quercus nigra*, *Rhexia mariana* var. *mariana*, *Rubus* sp., *Scutellaria integrifolia*, *Smilax walteri*, *Sphagnum* sp., *Styrax americanus* var. *americanus*, *Toxicodendron radicans* var. *radicans*, *Vaccinium caesariense*, *V. virgatum*, *Viola primulifolia*, and unknown mosses. 33.47677°N, 79.47995°W; 21 September 2020, C.N. Dailey 1386 (CITA 3853).

Williamsburg County: Located on the “Peninsula Tract” owned by the Butler Conservation Fund, about 7.5 km (4.6 mi) north-north west of Andrews and 0.2 km (0.1 mi) northeast of the Black River. Patches were found in the floodplain along a firebreak and roadcut made in October 2018 and in a bottomland of varying canopy cover without recent human disturbance, including one patch at the base of a mature *Pinus taeda* and another patch at the base of young *Betula nigra*. The population consisted of six patches with 237 stems as observed in 2019. Plants were observed flowering as late as 11 December 2019. Upon return, plants were observed first flowering on 27 July 2020. The population consisted of 11 patches with 642 stems as observed in 2020, with five new patches found. All six patches from 2019 were relocated, and five of six had expanded. Upon return in 2021, not all patches were relocated, but four new large patches were found with 1,422 stems; the population is estimated to have 2,064 stems total (2020 count, plus new findings in 2021). Other associates included: *Acer rubrum*, *Arisaema triphyllum*, *Arundinaria tecta*, *Bignonia capreolata*, *Boehmeria cylindrica*, *Campsis radicans*, *Carex joozii*, *Carya aquatica*, *C. glabra*, *Chasmanthium laxum*, *Clematis crispa*, *Commelina virginica*, *Conoclinium coelestinum*, *Cuphea carthagenensis*, *Desmodium tenuifolium*, *Dichantheium* spp., *Dichondra carolinensis*,

Diodia harperi, *D. virginiana*, *Diospyros virginiana*, *Elephantopus nudatus*, *Endodeca serpentaria*, *Erechtites hieraciifolius*, *Erianthus strictus*, *Eupatorium capillifolium*, *E. semiserratum*, *Gelsemium sempervirens*, *Geum canadense*, *Hypericum galioides*, *H. hypericoides*, *Ilex decidua*, *I. opaca*, *Itea virginica*, *Juncus effusus* ssp. *solutus*, *Ligustrum sinense*, *Liquidambar styraciflua*, *Lobelia elongata*, *Lonicera japonica*, *Lorinseria areolata*, *Ludwigia alternifolia*, *L. glandulosa*, *Matelea flavidula*, *Mikania scandens*, *Muscadinia rotundifolia* var. *rotundifolia*, *Nekemias arborea*, *Parthenocissus quinquefolia*, *Passiflora incarnata*, *Persicaria virginianum*, *P. hydropiperoides*, *Pluchea odorata*, *Quercus laurifolia*, *Q. lyrata*, *Q. nigra*, *Q. similis*, *Rhynchospora mixta*, *Rubus* spp., *Sabal minor*, *Saururus cernuus*, *Scirpus cyperinus*, *Smilax bona-nox* var. *bona-nox*, *S. hispida*, *S. walteri*, *Solidago* sp., *Sphagnum* sp., *Styrax americanus* var. *americanus*, *Swida asperifolia*, *Toxicodendron radicans* var. *radicans*, *Ulmus alata*, *Vaccinium arboreum*, *V. elliotii*, *Vernonia acaulis*, *Viburnum obovatum*, *Viola* sp., *Wisteria frutescens*, *Xyris* sp., and unknown mosses. 33.51145°N, 79.58286°W; 27 July 2020, C.N. Dailey 1232 (CITA 3854).

Williamsburg County: Located along the road in a sandy spot with mixed hardwoods and pines in the vicinity of the Black River on a 933-acre tract previously owned by the Mead family, purchased by Open Space Institute in 2021. Bottomland hardwood is found beyond the pineland on both sides of the road. One patch with 44 stems was observed on 7 September 2020. Upon return on 16 August 2021, the first patch had expanded to about 100 stems, and another six patches were located, with a total stem count of about 1,735 in 2021. Heavy rains prevented more accurate and extensive surveying that day. Associates included: *Acer rubrum*, *Dichanthelium sphaerocarpon*, *Eupatorium semiserratum*, *Hypericum galioides*, *Ilex opaca*, *Liquidambar styraciflua*, *Mecardonia acuminata*, *Morella cerifera*, *Paspalum floridanum*, *Persea palustris*, *Pinus taeda*, *Quercus nigra*, *Rubus* sp., *Symplocos tinctoria*, and *Styrax americanus* var. *americanus*. 33.53712°N, 79.63688°W; 7 September 2020, C.N. Dailey 1364 (CITA 3852).

Significance: The rhizomatous perennial herb is endemic to the Coastal Plain in Georgia, South Carolina, and North Carolina, and is considered “rare throughout its range” (Weakley 2020). Occurring from the fall line to outer Coastal Plain, the species can occupy a wide variety of natural and disturbed habitats associated with river systems. The species is currently listed as “at-risk” by USFWS and is a candidate for listing as Endangered or Threatened under the U.S. Endangered Species Act. The USFWS South Carolina Field Office is undertaking a Species Status Assessment for *Macbridea caroliniana* in 2023 to determine if it warrants federal listing. The NatureServe global rank is G2G3 and South Carolina rank is S3. This ranking likely needs revision considering additional populations continue to be found, even though the global range is narrow. The observation in Charleston County is a county record. The two observations from Georgetown County are the only extant sites known for that county. The Williamsburg County “Peninsula Tract” observation is close enough (5.6 km; 3.5 mi from the Georgetown County “Black River Cypress Preserve”) that there may be the opportunity for gene flow. The Georgetown County “Graceland” tract is downriver of the other three Black River sites. The Williamsburg County “Mead” tract is the farthest upriver this species has been found on the Black. Findings suggest that *M. caroliniana* may be underreported in South Carolina and that effort should be placed in identifying disturbed habitat in conserved natural areas that may harbor this rare plant. Fifty-two of 71 known occurrences range-wide were reported by LeBlond and Sorrie as new or extant in 2002, with 19 occurrences reported as historical or ambiguous. Thirty-two of the 71 known occurrences were reported as absent by Gaddy (2015), including 23 reported by LeBlond and Sorrie (2002) as new or extant. Twenty-six of the 71 known occurrences were not visited or not able to be found by Gaddy, leaving only 13 of 71 sites present, about 18%. Gaddy’s 2015 status survey suggests decline or threats to the species, but new, large occurrences suggest additional work is needed. One population reported as new on 9 September 2004 (Jasper County, Slater Tract)—which was not visited by Gaddy in 2015—was revisited by Dailey on 26 August 2021 and plants were not found amid an abundance of *Murdannia*

keisak, which appears to be a threat in continuously wet, disturbed swamps. One of LeBlond and Sorrie's populations noted as ambiguous (Orangeburg County, North Edisto Swamp, last seen 9 July 1997, Ruhlman-Rust and not visited by Gaddy in 2015) was relocated by Dailey on 19 August 2021 and 109 stems were observed in an undisturbed swamp. Since 2015, SCDNR reports 17 new element occurrences in South Carolina (including seven from Dailey) and seven new relocations or updates of occurrences (including two from Dailey), suggesting that the status of the species in South Carolina should be reassessed (Bradley, pers. comm.). We advise checking conserved lands with favorable habitat within a few miles of Gaddy's sites. Twenty-three of the 32 sites where plants were reported absent in 2015 are highway or road right-of-way sites, three are pond margins, two are swamp forests, and one is a seepage forest. Abundant habitat was seen along the roadside but *M. caroliniana* was seldomly found in those locations, suggesting that the primary threat to this species is incompatible roadside and utility easement management. Plants blooming in sunny, often wet conditions, with peak bloom in the hottest months of July–September likely add to this species being underreported in difficult-to-access areas. Floodplain sites where rivers have left an undulating landscape contain many difficult-to-access areas, and the possibility that other extant occurrences are more robust than reported. Our observations show that these newly documented populations are not in decline, at least in the short-term. Upon return to all six populations noted, additional patches and stems were located. Only one population (Charleston County) showed partial decline from 2019 to 2021, but the decline was offset by other plants thriving and the discovery of additional plants. It is notable that all six sites encompass areas of recent disturbance, both natural and anthropogenic, including flood, fire, and mowing. Disturbance might facilitate this species by decreasing competition and increasing light availability. Occasional mowing or burning in winter is recommended management for this species, however the ideal frequency of disturbance is unknown, and may vary based on the intensity and type of the disturbance. Mowing every few years is hypothesized to be better management for this species than annual mowing. Natural floodplain sites appear to maintain populations without any management. Heavy machinery may facilitate invasive species, so care should be taken with human disturbance in natural areas. Stem counts should be considered estimates because accurate counting becomes more difficult with larger numbers. Dailey made effort to count only whole stems, observing that stems may be single or branched. Adding to the difficulty of counting is that plants may be found lying flat on the ground, apparently crushed by deer or other large animals. The species is often found occurring in dense, round patches, but 'patch' as used here also indicates an area with multiple small patches often interrupted with other species, but discrete from another patch-area. Despite the intrinsic difficulties involved in finding or quantifying *M. caroliniana* populations, these new and rediscovered populations suggest that more populations may be undiscovered throughout the range.

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