

CHRYSOGONUM (ASTERACEAE) REVISITED AGAIN

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ABSTRACT

Three species are recognized in *Chrysogonum*: *C. virginianum*, *C. australe*, and ***Chrysogonum repens*** (Cass.) Nesom, **comb. nov.** (= *C. virginianum* var. *brevistolon*). *Diotostephus repens* Cass. is neotypified. Molecular data (Nowicki et al. 2019) support the recognition of these three entities (their "Ocoee-type" corresponds to *C. repens*). A detailed distribution map of the three species is provided and representative specimens are shown for each.

A taxonomic summary of *Chrysogonum* L. (Nesom 2001), widely distributed through the southeastern USA (Fig. 1), recognized three entities: *C. virginianum* L. var. *virginianum*, var. *brevistolon* Nesom, and var. *australe* (Alex. ex Small) Ahles. The southernmost entity has been treated at specific rank, as *C. australe* Alex. ex Small (Weakley 2020), emphasizing its discontinuous morphology and geography. Molecular data support recognition of the three entities (Nowicki et al. 2019; and see Fig. 2 and comments below). Data of Nowicki et al. and of Schilling and Floden (2018) suggest that *C. australe* sensu stricto is the most evolutionarily distinct entity.

The original description of var. *brevistolon* noted that it is sharply delimited from var. *virginianum* by production of short stolons or rhizomes and shorter stems and that it also is contiguous and non-overlapping in geographic range, as determined at the time by both field and herbarium observations. A review reaffirms the observations of discontinuity and var. *brevistolon* is recognized here at specific rank, matching the current treatment of *C. australe* and with the same rationale.

CHRYSOGONUM REPENS (Cass.) Nesom, **comb. nov.** *Diotostephus repens* Cass. in Cuvier, Dict. Sci. Nat. 48: 544-545. 1827. *Chrysogonum diotostephus* DC., Prodr. 5: 510. 1836 (nom. illeg., replacement name for *Diotostephus repens*). Protologue: "Nous avons fait cette description, générique et spécifique, sur un très petit échantillon sec, incomplet, en mauvais état, et dont nous ignorons l'origine." **ORIGINAL TYPE**: (P?, not seen). As noted by Stuessy (1977), Cassini's description of this taxon is explicit enough that its identity as *C. virginianum* sensu lato seems reasonable, and de Candolle, who indicated that he saw the specimen, treated it (as *C. diotostephus*) with *C. virginianum* as a second species of the genus. Cassini noted the plant produced a horizontal, hairy stolon with rooted tuft of leaves at the tip — its placement here (following Stuessy) apart from *C. australe* is based on de Candolle's description of its habitat as "in siccis pinguibus Carolinae." **NEOTYPE** (designated here): **South Carolina**. Beaufort Co.: 0.5 mi W of Gardens Corner on US Hwy 17, deciduous woods, 3 Apr 1956, *C.R. Bell 1705* (NCU, Fig. 15).

Chrysogonum virginianum var. *brevistolon* Nesom, Sida 19: 817. 2001. **TYPE**: **South Carolina**. Lexington Co.: Riverbanks Zoo Botanical Garden, old Saluda Mill site, shaded slope near ravine just S of tram line clearing, occasional herbs, somewhat trailing but with flowering stems generally erect, 7 May 1993, *J.B. Nelson 14,062* (holotype: BRIT; isotype: USCH).

The basis for recognition of *Chrysogonum repens* as a distinct entity is essentially the same as earlier (Nesom 2001; Weakley 2020) — the key below essentially repeats the one from 2001. Additional comments regarding geography and morphology are given in Nesom (2001).

1. Plants occurring individually, sometimes with short rhizomes but not with elongate stolons; earliest flowering stems leafless, later flowering stems leafy; leafy flowering stems mostly 15–35(–50) cm high; leaf blade base truncate **Chrysogonum virginianum**

1. Plants colonial, stoloniferous, forming mats or interconnected colonies of individuals; flowering stems leafless or leafy; leafy flowering stems (if present) 15–25 cm high; leaf blade base cuneate.

2. Earliest flowering stems leafless, mostly 2–10 cm high; later flowering stems leafy, 15–25 cm high; longest stolon internodes 2–6 cm long **Chrysogonum repens**

2. Earliest flowering stems leafless, 2–10 cm high; later flowering stems leafless as well, 2–10 cm high; longest stolon internodes 12–60 cm long **Chrysogonum australe**

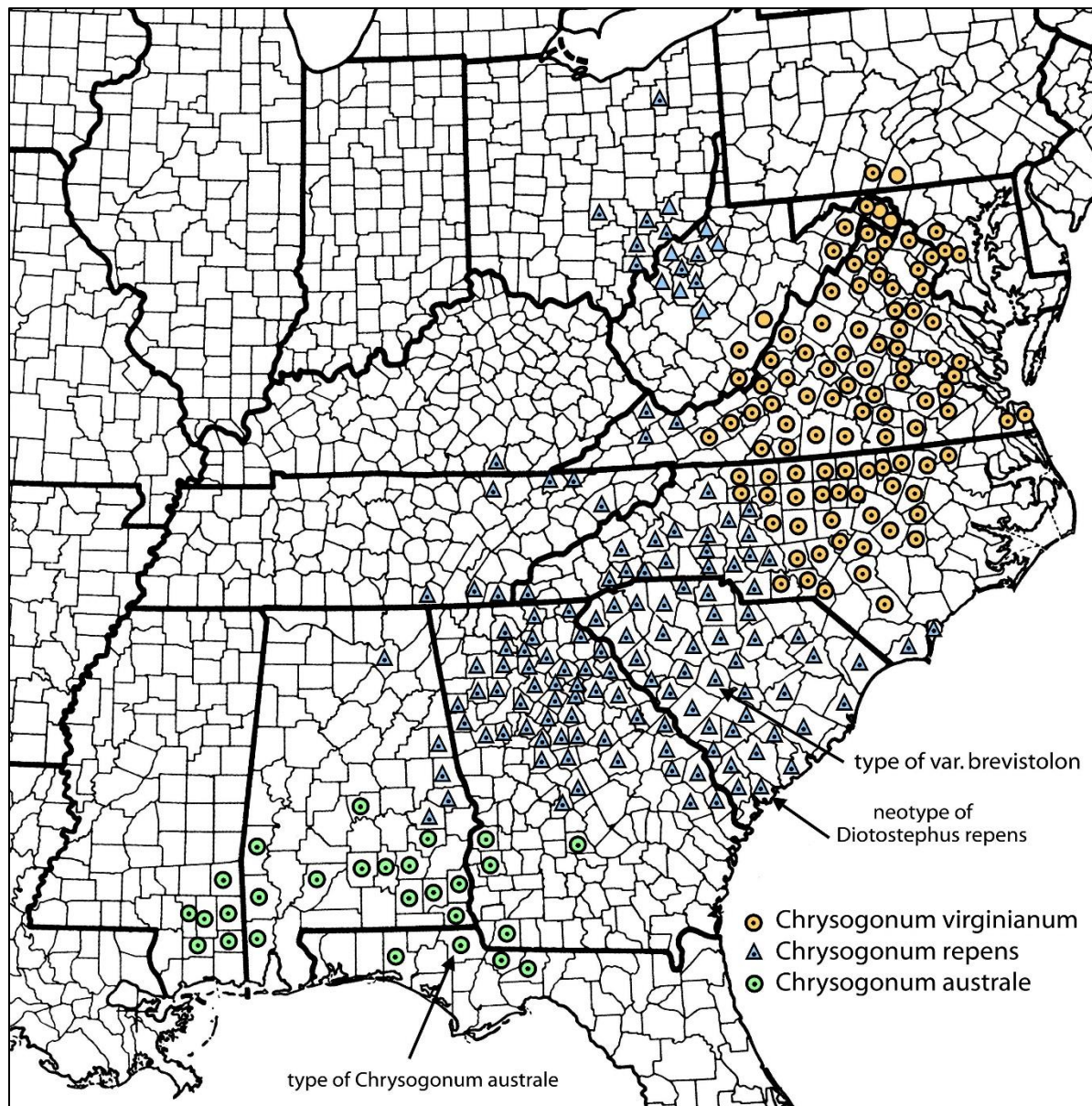


Figure 1. Distribution of *Chrysogonum* species. Based on records/images available via SERNEC and herbarium US — vouchers seen for all records except those marked by undotted symbols. A voucher cannot be located for the Louisiana occurrence (West Feliciana Parish) earlier mapped (Nesom 2001).

Nowicki et al. (2019) sought molecular characterizations of entities within *Chrysogonum*. Their clearly delimited "virginianum," "australe," and "recently discovered putative new form" "Ocoee-type" correspond with *C. virginianum*, *C. australe*, and *C. repens* as treated here. Their "brevistolon" (excluding the sample from Shenandoah Co., Va.; e.g., see Fig. 9) is included here within *C. repens* and presumably would include plants from southwestern Virginia, western West Virginia, and Ohio — their "brevistolon" populations (e.g., Figs. 22 and 23, from Scott Co., Tenn.) have the morphology of *C. repens* but in their analysis are not molecularly differentiated from "virginianum."

Nowicki et al. (2019) noted that their Ocoee-type has a tapering, cuneate leaf base similar to var. *australe* but lacks its distinctive stolons. Among their cited samples of the Ocoee-type, however, all plants that I have seen produce stolons and are indistinguishable from var. *brevistolon* = *C. repens* (Kral collections from McDuffie, Dawson, and Lumpkin cos., Ga. (VDB images!); *Floden 2879* (APSC image!) and 2880 (APSC, Fig. 24) from Polk Co., Tenn. Various other collections from Polk Co. are similar — *Pistrang s.n.* (TENN, Fig. 26), *Williams 1573* (UCHT image!), *Wilson 85* (MTSU image!), and three collections by *Shaw et al. s.n.* (APSC images!, e.g., Fig. 25).

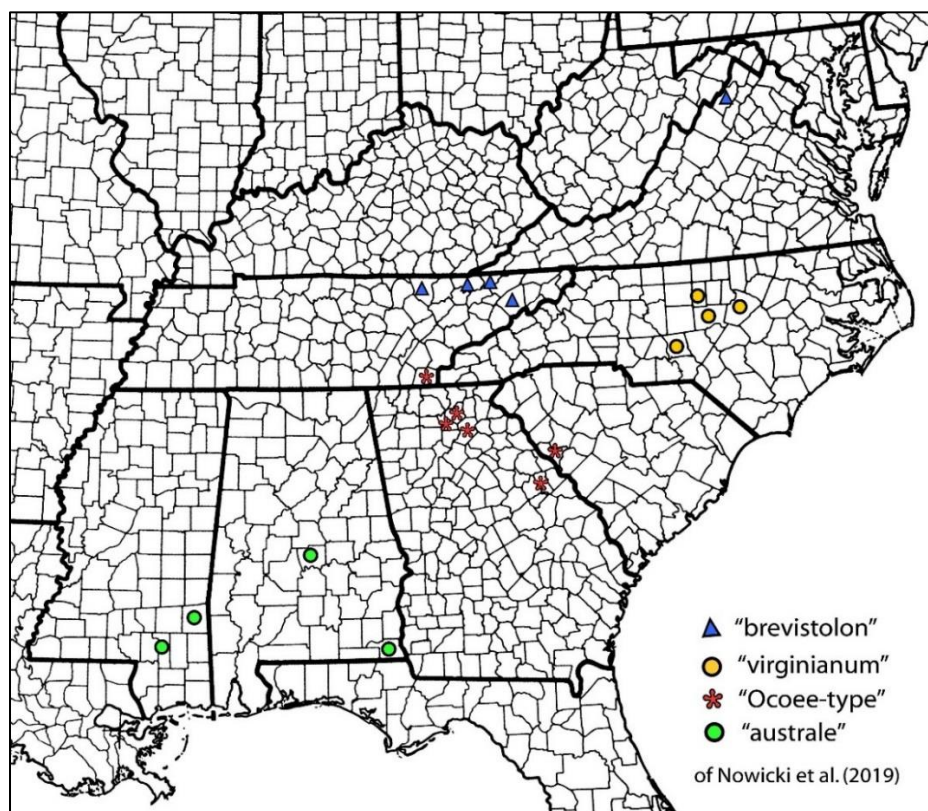


Figure 2. Distribution of the molecular entities within *Chrysogonum* found by Nowicki et al. (2019), as mapped from data in their Table 1.

In contrast to my earlier identifications, the range of *Chrysogonum repens* is recognized here to extend from northeastern Tennessee (eg., Figs. 22 and 23) into West Virginia (e.g., Figs. 20 and 21) and Ohio. Data of Nowicki et al. (2019) indicate that this population system is molecularly undifferentiated from typical *C. virginianum* (their samples from central North Carolina), in contrast to typical *C. repens* (their samples from Georgia and South Carolina), which is molecularly distinct from both *C. virginianum* and *C. australe*. I have not found a corresponding morphological difference between northern and southern systems of *C. repens* but more detailed study should apply. If the molecular differentiation is confirmed, the two systems perhaps originated independently or the northern may be involved in the evolutionary parentage of the southern.



Figure 3. *Chrysogonum australe*. Jackson, Co., Florida. Holotype: R.L. Harper s.n. (NY).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 4. *Chrysogonum australe*. Jackson, Co., Florida, Gholson 408 (FLAS).



Figure 5. *Chrysogonum australe*. Jackson, Co., Florida, Godfrey 78745 (TTRS).



Figure 6. *Chrysogonum australe*. Stewart Co., Georgia, Allison 3050 (GA).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*

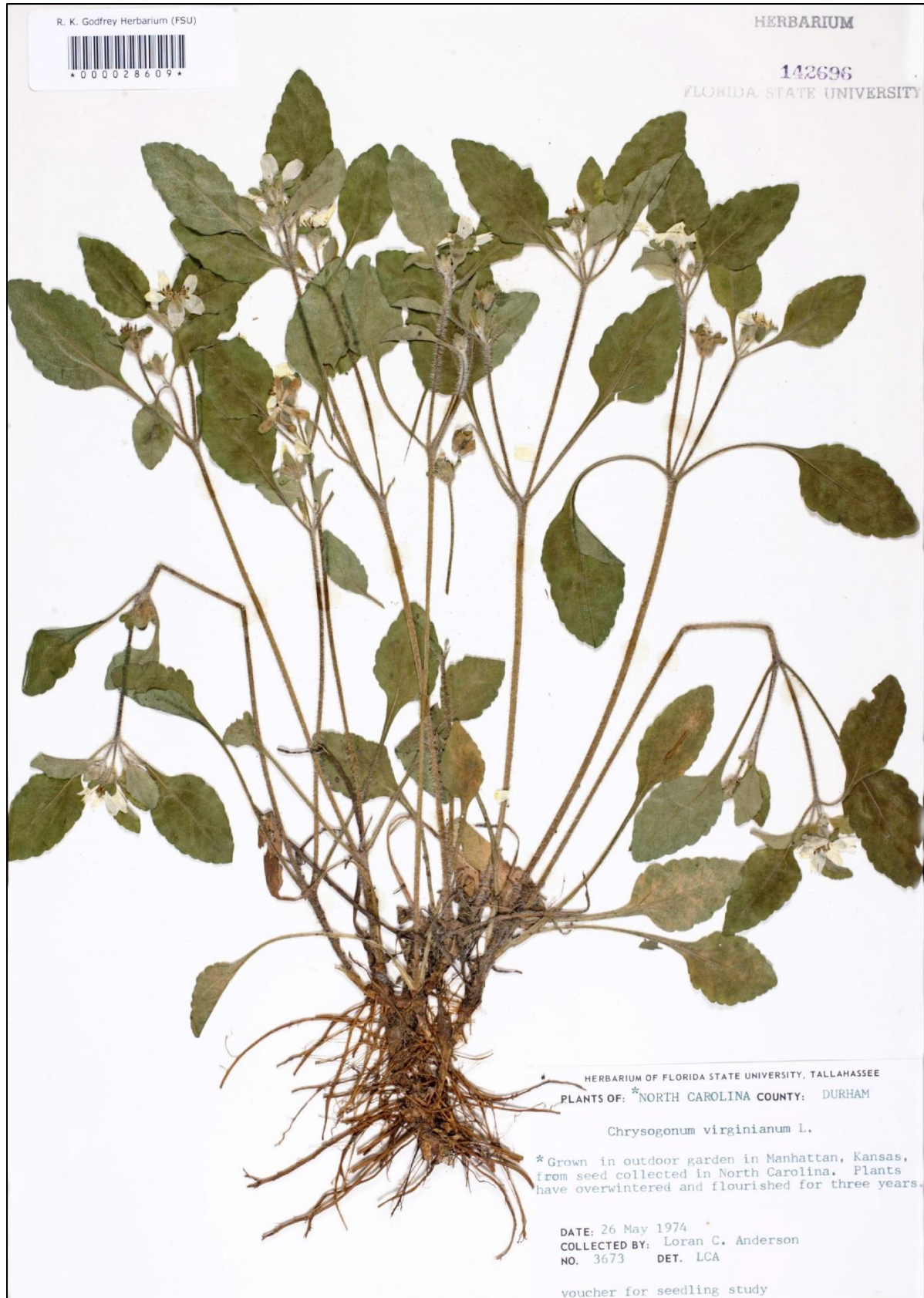


Figure 7. *Chrysogonum virginianum*. Durham Co., North Carolina, Anderson 3673 (FSU).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 8. *Chrysogonum virginianum*. Orange Co., North Carolina, *Levesque 193* (NCU).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 9. *Chrysogonum virginianum*. Shenandoah Co., Virginia, Allard 4636 (VPI).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 10. *Chrysogonum virginianum*. Hardy Co., West Virginia, Cusick 23,551 (NCU).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 11. *Chrysogonum virginianum*. Chatham Co., North Carolina, Massey 3209 (NCU).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 12. *Chrysogonum virginianum*. Orange Co., North Carolina, Edwards & Johnson 25 (NCU).

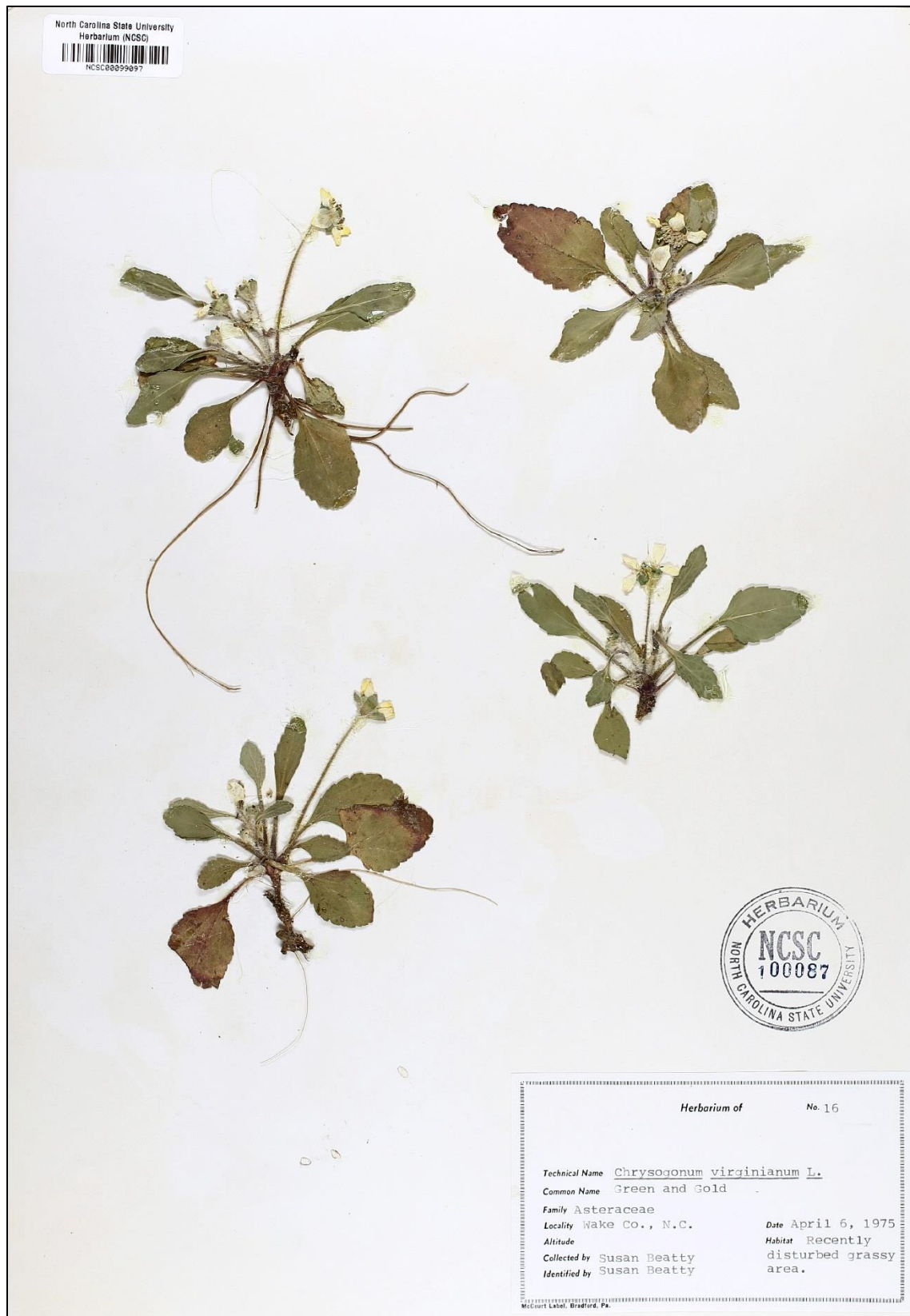
Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*

Figure 13. *Chrysogonum virginianum*. Wake Co., North Carolina, *Beatty 16* (NCSC). Juvenile form, with scapose peduncles.

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 14. *Chrysogonum repens*. Berkeley Co., South Carolina, Nelson 25776 (USCH).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*

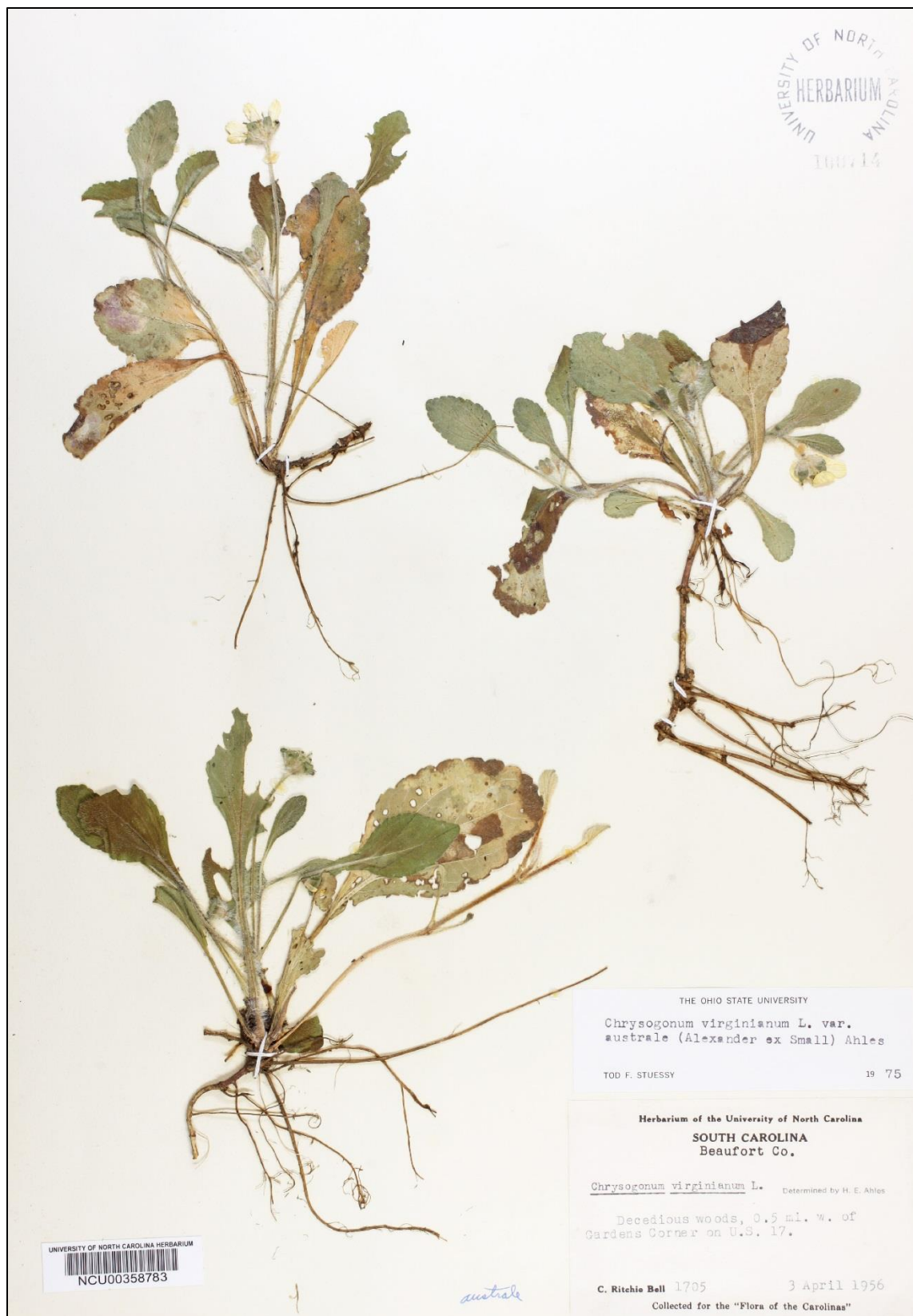


Figure 15. *Chrysogonum repens*. Beaufort Co., South Carolina. Neotype of *Diotostephus repens*, Bell 1705 (NCU).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 16. *Chrysogonum repens*. Colleton Co., South Carolina, Woodward 18 (CLEMS).

Figure 17. *Chrysogonum repens*. Effingham Co., Georgia, Hardin 15150 (GA).



Figure 18. *Chrysogonum repens*. Lumpkin Co., Georgia, Kruse 01-59b (GA). Juvenile form, with scapose peduncles.



Figure 19. *Chrysogonum repens*. DeKalb Co., Georgia, Moore 1914 (GA). Juvenile form.

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 20. *Chrysogonum repens*. Ritchie Co., West Virginia, Cusick 24,196 (NCU).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 21. *Chrysogonum repens*. Wirt Co., West Virginia, Bartholomew W1941-1034 (GAS).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 22. *Chrysogonum repens*. Scott Co., Tennessee, Panero 695 (TENN).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 23. *Chrysogonum repens*. Scott Co., Tennessee, Goodson 994 (HTTU).



Figure 24. *Chrysogonum repens*. Polk Co., Tennessee, Floden 2880 (APSC). Cited by Nowicki et al. (2019) as "Ocoee-type."

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 25. *Chrysogonum repens*. Polk Co., Tennessee, Shaw s.n., 11 May 2011 (APSC).

Nesom: *Chrysogonum repens* = *C. virginianum* var. *brevistolon*



Figure 26. *Chrysogonum repens*. Polk Co., Tennessee, Pistrang s.n. (TENN).

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LITERATURE CITED

- Nesom, G.L. 2001. Taxonomic review of *Chrysogonum* (Asteraceae: Heliantheae). *Sida* 19: 811 – 820.
- Nesom, G.L. 2006. *Chrysogonum*. Pp. 74–75, in *Flora of North America North of Mexico*, Vol. 21. Oxford Univ. Press, New York and Oxford.
- Nowicki, M., E.E. Schilling, S.L. Boggess, L.C. Houston, M.L. Huff, M.E. Staton, J.A. Lampley, and R.N. Trigiano. 2019. Development and characterization of genic microsatellites for the ornamental plant Green and Gold (*Chrysogonum virginianum*). *HortScience* 54: 395–400.
- Schilling, E.E. and A.J. Floden. 2018. Barcoding the Asteraceae of Tennessee, tribes Heliantheae and Millerieae. *Phytoneuron* 2018-83: 1–9.
- Stuessy, T.F. 1977. Revision of *Chrysogonum* (Compositae, Heliantheae). *Rhodora* 79: 190–202.
- Weakley, A.S. 2020. *Chrysogonum*. Pp. 1462–1463, in *Flora of the Southeastern United States* (Edition of 20 October 2020). Univ. of North Carolina at Chapel Hill Herbarium (NCU).