

Cardamine micranthera Rollins, Small-anthered Bittercress in Patrick County: New to the Virginia Flora

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In 1940 a new species of mustard was described by Reed C. Rollins of the Gray Herbarium from Stokes County, North Carolina, having been discovered by Dovovan S. Correll and G.W. McDowell the previous year (Rollins, 1940). The species was subsequently found in Forsyth County, North Carolina, by Albert E. Radford but these two counties of North Carolina were, for many years, the only known occurrences of this plant. The first publication on North Carolina's endangered and threatened plants (Hardin et al., 1977) treated the species as presumably extinct. Subsequently, persistent efforts to rediscover the plant along Peter's Creek in Stokes County were made by Steven W. Leonard (Leonard, 1986) who succeeded in finding a population in 1985. Soon thereafter, small-anthered bittercress became a candidate for listing as a federal endangered species (becoming officially listed on 21 September 1989, Murdock, 1989), encouraging additional efforts to find more plants in this section of the Dan River drainage. Searches by Leonard and others included visits to sections of Peter's Creek in Patrick County, Virginia, just across the state line from Stokes County, but were without success. These searches were confounded by the presence in Virginia of *Cardamine rotundifolia*, a similar plant which occupies similar habitats. In the spring of 1990, Richard Hoffman, Ali Wieboldt, and I joined Alan Weakley of the North Carolina Heritage Program in searching for *Cardamine micranthera* in Virginia. We found the plant almost immediately upon stepping off the bank into the waters of Peter's Creek as we headed for a small tributary entering on the opposite side. Several primary tributaries were visited during the day, in each case revealing additional populations. Interestingly, small-anthered bittercress was found growing near *Cardamine rotundifolia*, round-leaved bittercress. As the name indicates, *Cardamine micranthera* has very small anthers and might be mistaken for *Cardamine rotundifolia* were it not for additional differences,

namely its upright habit and leaves with longer stalks and more leaflets.

How far into Patrick County does *Cardamine micranthera* extend? Does it occur in other drainages? Working our way east, we next found the species on Russell Creek, in the South Mayo River drainage. Searches to the west of Peter's Creek were unsuccessful. The full range of *Cardamine micranthera* in Virginia is yet to be determined.

The systematics of *Cardamine micranthera* and *C. rotundifolia* begs to be studied. Their morphologies indicate a close relationship. Small anthers (reduction in pollen output) are often associated with the evolution of inbreeding (Gibbs et al, 1975). If apogamy is the means by which *Cardamine micranthera* arose, sufficient time has elapsed to allow additional morphological variation such as the habit and foliar features previously mentioned. In Virginia, *Cardamine rotundifolia* is not infrequent in the more mountainous portion of Patrick County to the north. Yet, only a few miles to the south in North Carolina, it is known only historically. As the streams draining from the Blue Ridge escarpment traverse the hill country outlying the mountains, they cut their way down to the level of the Dan River creating small areas of montane microclimate. Did *Cardamine micranthera* originate from montane *C. rotundifolia* isolated sometime in the past in these outlying hills? The presence of additional populations of *Cardamine micranthera* in Virginia affords the opportunity to investigate these ideas and study the dynamics involved in the evolution of endemism in Virginia's native flora.

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Banisteria, Number 1, 1992
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Notes on the Swampfish (*Chologaster corn uta* Agassiz) in the Dismal Swamp of Virginia

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The swampfish (*Chologaster corn uta*) is a member of the family of cave fishes, Amblyopsidae. It occupies one end of a continuum of species showing adaptations to cave life, such as eye degeneration and pigment reduction. The swampfish is the epigeal representative of the group and has functional eyes, although the optic tectum and optic lobes are reduced (Poulson, 1963); it has a dark pigmentary pattern. It is a small fish (23-57 mm standard length) that occupies cryptic habitats in swamps, ponds, ditches, and slow-moving streams of the Atlantic Coastal Plain (Cooper and Rohde, 1980). Water temperatures in habitats with this nocturnal fish never exceed 23 C (Poulson, 1963). Southeastern Virginia is the northern range limit of the swampfish. Here this species is known from the Chowan drainage, a tributary of the Chickahominy system (James drainage), the Dismal Swamp, and from a pond in Seashore State Park in Virginia Beach (Jenkins and Burkhead, in press).

Between 20 September 1953 and 4 December 1954 I collected a total of 13 *C. corn uta*. All were found in a single pool in the Virginia portion of the Dismal Swamp. They were collected with a dipnet used to sweep the bottom of the pool. The fish were recovered by carefully searching among dead leaves and other debris. In this note I report observations on its habitat, body size, reproduction, habitat associates, and the extirpation of one population.

The habitat in which the specimens were collected was a small, stagnant pool 150 m from Jericho Ditch near

Lake Drummond. The area surrounding the pool was covered with abundant, large deciduous trees which kept the pool shaded during summer. During periods of heavy rain in the fall and winter, water was transferred from a large ditch to the pool via a rivulet. As a result, the water level of the pool varied from approximately 0.8 m in heavy rains to 0.5 m during normal weather, and 0.3- 0.5 m during dry weather. The pool was never completely dry during the study period, even during a prolonged drought.

The specimens were collected as follows: 20 September 1953, adult, 23.5 mm total length (TL), water level 5 cm; 4 December 1953, 4 adults, water level 5 cm; 6 March 1954, 2 adult females, water level 0.6 m; 5 June 1954, 2 juveniles, 17 and 20 mm TL, water level 8 cm; 4 December 1954, 4 adults, water level 0.6 m. One of the females taken on 6 March was 40.5 mm TL and contained 131 undeveloped eggs and 63 mature, yolked ova measuring 1.5-2.0 mm in diameter. The number of mature ova is smaller than the average number of eggs (98) reported by Poulson (1961, in Cooper and Rohde, 1980) from a sample of 13 specimens taken from throughout the range of this species. The sizes of mature ova reported by Poulson (0.9-1.2 mm, 1963) are smaller than those from the single fish reported here. Ova size suggest spawning probably occurred in March or early-April in the Dismal Swamp, comparable to the period reported in Cooper and Rohde (1980).

Habitat associates in the Dismal Swamp included the