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The Current Status of *Cicindela limbalis* Klug in Virginia

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ABSTRACT

We report the discovery of a population of the tiger beetle *Cicindela limbalis* from a powerline in Frederick County, Virginia. We found only two old records of single specimens from Fairfax and Page counties and consider this species rare in the state. A peak count of about 40 adults was recorded during three site visits.

Keywords: rare species, tiger beetle.

Cicindela splendida Hentz, *C. limbalis* Klug, and *C. denverensis* Casey are very closely related tiger beetle species, and although there is uncertainty about their taxonomic status, most workers consider them to be distinct species (e.g., Bousquet, 2012; Pearson et al., 2015). Their ranges overlap in parts of the Midwest, and in some areas all three species and their hybrids may occur (Brust et al., 2012). While *C. splendida* is widespread in the western two-thirds of Virginia, *C. limbalis* is known from only four old and dubious records, and was considered to be extirpated or perhaps viable populations never being present in Virginia and other southeastern coastal states (Knisley & Schultz, 1997; Pearson et al., 2015). The second author has collected it near Romney, West Virginia, less than 50 km west of the Virginia state line. Adding to the uncertainty of its status in Virginia was the discovery of a large population in Botetourt County with 85 sampled individuals identified as *C. splendida* (elytra reddish/purple and dorsum of head and pronotum green) and 14 identified as *C. limbalis* (elytra, pronotum, and head reddish/purple) using the key in Pearson et al. (2015). In their recent study, Brust et al. (2012) determined the color of the proepisternum was red/purplish in *C. limbalis* and green in *C. splendida*. Using this additional character, 97 individuals of the Botetourt population were identified as *C. splendida* and only two as *C. limbalis*. The results of a mtDNA analysis of this and other populations of *C. splendida* and *C. limbalis* in Virginia and other states determined that these species could not be separated genetically (Woodcock & Knisley, 2009). The authors noted evidence that recent evolution and possibly interbreeding are factors that could make mtDNA analysis inconclusive in separating species. Consequently, Bousquet (2012) removed *C. limbalis* from the list of confirmed species known from Virginia. This note reports on a newly discovered population of *C. limbalis* in Virginia, an examination of the older *C. limbalis* specimens, and the current status of this species in Virginia.

Knisley & Schultz (1997) recorded *C. limbalis* from Fairfax, Montgomery, and Page counties and the City of Suffolk in Virginia. We could not verify the source of the records for Montgomery County and City of Suffolk but believe these are probably misidentified and actually *C. splendida* because these localities are well beyond the known historic range of *C. limbalis.* We examined single specimens for the other two Virginia records in the National Museum of Natural History. The label for the Page County record was from Skyland, 13-IX-[19]33 from the Nicolay Collection. The label for the other specimen, which we believe corresponds to the Fairfax record, is: Alex. [Alexandria] Co., 1-V-1887, E. Shoemaker. Both specimens are from northern Virginia and identified as *C. limbalis*. Although single specimens from a population may not be definitive for resolving the species' identity, these specimens suggest that *C. limbalis* was historically present in Virginia.

In the spring of 2016, a new population was found by the first author in northwestern Virginia (Frederick County), less than 2 km from the West Virginia state line. The site was the slope of an overgrown powerline with relatively dense vegetation of shrubs, small trees (pine, oak), herbaceous plants, and ground cover of moss, lichens, and scattered rocks. In this and subsequent surveys, all adults and some larvae were found within or at the edges of 6-8 small patches of bare to sparsely vegetated soil. The results of the three site visits were as follows: 15 April 2017, 15-20 *C. limbalis*, 1 *C. purpurea* Olivier; 27 April 2017, 20 *C. limbalis*, 5 *C. purpurea*, and several *C. sexguttata* Fabricius; 11 September 2017, about 40 adults of *C. limbalis* and two *Cicindelidia rufiventris* Dejean. Our examination of 46 specimens collected or observed in the field during the site visits revealed two specimens from 11 September 2017 had a green head and pronotum and reddish/purple elytra, but these and the others with a reddish/purple head and pronotum all had the red/purple proepisternum (Fig. 1). Based on these

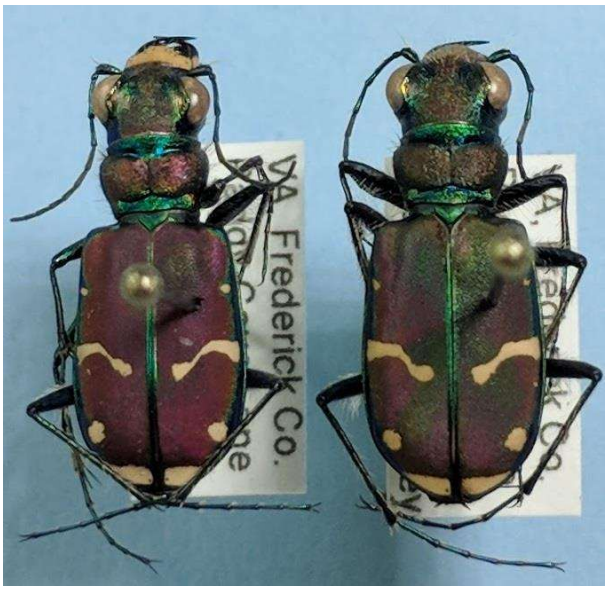

Fig. 1. Dorsal view of two specimens of *Cicindela limbalis* Klug from Frederick County, Virginia.

findings and the current literature, we conclude that all individuals of the new population are *C. limbalis* and consequently, the species is currently extant in Virginia. While future surveys may find additional populations, it is likely that *C. limbalis* will be rare in Virginia and restricted to the northern, and especially the northwestern, part of the state. Since this new population occupied a very small portion (approximate 3 km) of the powerline surveyed with dense, encroaching vegetation, it may be threatened by loss of habitat from natural succession. We found some recently cut small trees, but the extent of vegetation control along the powerline is unknown. Vegetation reduction of the powerline cut would likely improve the status of the population. We checked the powerline to the east of the occupied area, but it was low, mesic, densely vegetated, and unsuitable habitat. The powerline continues to the west into West Virginia and may provide suitable habitat, but we surveyed only about 1-2 km west of the area occupied by the beetles. Voucher specimens will be deposited in the Virginia Museum of Natural History and Virginia Tech collections.

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