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SOUTHERN RING-NECKED SNAKE (*DIADOPHIS PUNCTATUS PUNCTATUS*) PHENOTYPE IN THE BLUE RIDGE PHYSIOGRAPHIC PROVINCE OF VIRGINIA -- Ring-necked Snakes (*Diadophis punctatus*) are distributed broadly in North America, ranging from Nova Scotia to Florida and coast to coast (Wright & Wright, 1957; Ernst & Ernst, 2003). There are twelve currently-recognized subspecies (Crother, 2000), of which two, the Southern Ring-necked Snake (*D. p. punctatus*) and the Northern Ring-necked Snake (*D. p. edwardsii*), occur in Virginia (Mitchell, 1994). The putative intergrade zone of these two phenotypes in the state is broad, extending in a southwest to northeast zone from Pittsylvania to Greensville counties along the Virginia-North Carolina line to Hanover to Accomack counties (Blem & Roeding, 1983; Mitchell & Reay, 1999). South of this zone, Southern Ring-necked Snakes have a midventral row of large black spots, a broken neck collar, and small black spots on the supralabial and infralabial scales. North of this zone, Northern Ring-necked Snakes lack large, black ventral spots, are usually immaculate or have a variable number of small spots on the venter, and have a complete neck collar and no labial spotting. Intergrades have combinations of these characters and modified characters, such as a neck collar constricted at the midline but not completely broken. Higher frequencies of snakes on the fringes of the putative intergrade zone exhibit the phenotypes of the nearest subspecies. It was thus of considerable interest when we discovered a snake outside the known intergrade zone well to the west that had characters more akin to the southern subspecies than the expected northern subspecies. We describe this snake here and comment on the geography of the intergrade zone in Virginia.

On 1 August 2003, one of us (WDB) caught an adult male *D. punctatus* (213 mm snout-vent length, 55 mm tail length, 4.6 g) 5.2 km NW Stanardsville, Greene County, Virginia (UTM 17s 0719511 E, 4246647 N, NAD 83) that possessed characters more typical of *D. p. punctatus* than *D. p. edwardsii*. It was found on leaf litter under a loose rock in a mixed hardwood/pine forest with White Pine (*Pinus strobus*) and Chestnut Oak (*Quercus prinus*) dominating the canopy and Mountain Laurel (*Kalmia latifolia*) in the understory. The snake was photographed and released at the capture site.

The snake was uniform slate gray dorsally on the head, body, and tail with a yellow neck collar that was constricted along the midline (Fig. 1). The chin was

white and the venter was orange with black half-moon shaped spots on the midline of all of the ventral scales except for the anteriormost six scales. A small black spot occurred on each of the two posterior infralabials on each side of the head, as well as one on the anteriormost infralabial on the left side. Number of ventrals was 157 and number of subcaudals was 53, counts well within the range reported by Mitchell (1994) for this area. Three additional specimens found in the same location since the discovery of this animal had immaculate venters, complete collars, and no labial spotting. A total of 27.7% of the snakes in the southern Coastal Plain sample examined by Mitchell (1994) and considered to be true *D. p. punctatus*, had constricted collars. In contrast, only 3.8% of the snakes in the lower Piedmont had constricted collars and all of the snakes examined from north of this area had complete collars. The characters noted above align this snake with those found along the southern margin of the intergrade zone approximately 165 km to the southeast or well into southeastern Virginia. It represents an unusual phenotype for this species in the Blue Ridge Physiographic Province of Virginia.

The intergrade zone between the two eastern subspecies of *D. punctatus* in Virginia has not been precisely elucidated. An initial evaluation of these snakes in the Southeast (Paul, 1967) used only two samples from Virginia, one from the southeastern corner and another from the southwestern Piedmont. He noted that specimens with heavy mid-ventral spotting, the most consistent character to delineate the range of *D. p. punctatus*, occurred in the lower mountains of Georgia and North Carolina. Blem & Roeding (1983) stated that only populations in the extreme southeastern corner of Virginia are true *D. p. punctatus*, and snakes they labeled as intergrades ranged from a line extending from Hanover County to Mecklenburg County southeast to the cities of Chesapeake and Virginia Beach. Their westernmost population with heavy ventral spotting was in Mecklenburg County. Tobey (1985) stated that intergrades occurred in a broad region between the "real typical southern form in the Norfolk area and the typical northern form in the Blue Ridge." Using specimens assigned to one subspecies or the other and comments on intergrade variation in Mitchell (1994), Mitchell & Reay (1999) delineated an intergrade zone band that curved to the northeast from the southern Piedmont counties to the counties in the lower Coastal Plain along the Potomac River and Accomack County on the Eastern Shore. Finally, Palmer & Braswell (1995) illustrated an intergrade zone in North Carolina that covered the entire Piedmont region and portions of

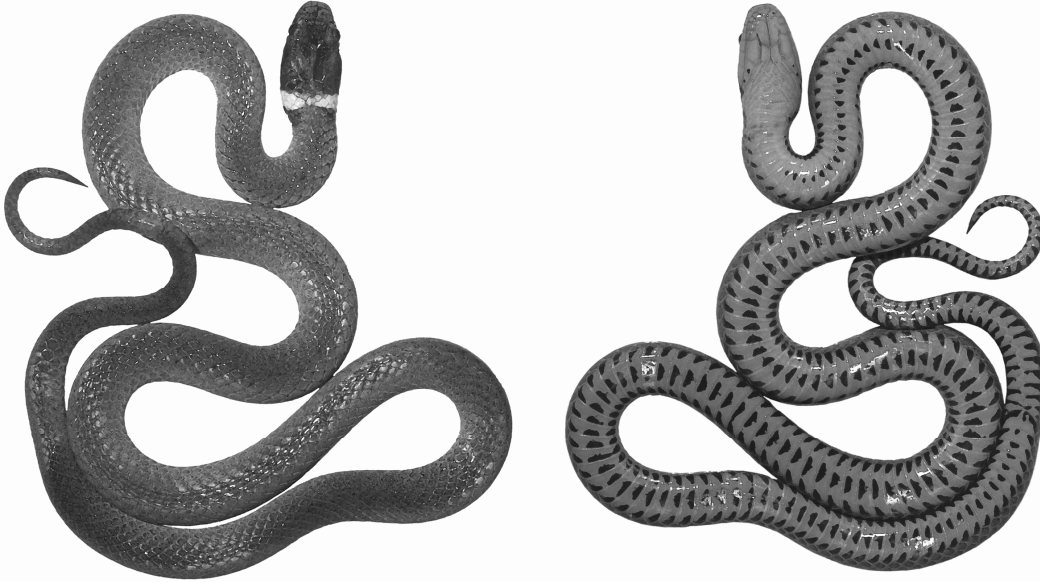


Fig. 1. Dorsal and ventral views of a *Diadophis punctatus* from Greene County, Virginia. Photos by Will Brown.

the upper Coastal Plain. The intergrade zone in Mitchell & Reay (1999) provides the closest match to that known in North Carolina. Unfortunately, we lack specimens from some of the areas along the western portion of this putative intergrade zone and thus are still unable to precisely describe its geographic location and shape. The discovery of a *D. p. punctatus* phenotype from Greene County suggests that considerable additional investigation is needed to reach this goal for Ring-necked Snakes in Virginia.

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