

## Does *Nucras livida* (Squamata: Lacertidae) occur along the West Coast of South Africa? A review of historical and recently collected material

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The African lacertid genus *Nucras* Gray 1838 comprises twelve recognised species: *N. aurantiaca* Bauer, Childers, Broeckhoven, Mouton 2019, *N. boulengeri* Neumann 1900, *N. broadleyi* Branch, Conradie, Vaz Pinto, Tolley 2019, *N. caesicaudata* Broadley 1972, *N. holubi* (Steindachner 1882), *N. intertexta* (Smith 1838), *N. lalandii* (Milne-Edwards 1829), *N. livida* (Smith 1838), *N. ornata* (Gray 1864), *N. scalaris* Laurent 1964, *N. taeniolata* (Smith 1838), and *N. tessellata* (Smith 1838). Nine of these species occur in southern Africa, while the others are restricted to Angola and East Africa (Bates et al., 2014; Bauer et al., 2019; Branch et al., 2019).

Currently, three species (*N. aurantiaca*, *N. tessellata*, and *N. livida*) are known to occur along the West Coast of South Africa (Bates et al., 2014; Bauer et al., 2019). However, when Broadley (1972) revised the *N. tessellata* group he only recognised *N. tessellata tessellata* to occur in the region, but divided this species into three varieties (the typical form, var. *elegans* and var. “T”). *Nucras livida* was previously treated as a subspecies of *N. tessellata* but was elevated to specific rank by Branch and Bauer (1995). Among the examined material, Broadley (1972) recorded only seven localities for *N. livida* and subsequently restricted the occurrence of this species from Matjiesfontein eastward to Port

Elizabeth. He further questioned two of Hewitt’s (1910) inland records from Victoria West and Graaff-Reinet. Since the time of Broadley’s (1972) revision, additional material became available, including records from the West Coast region (Du Toit and Albas, 2003; Bates et al., 2014). During the most recent IUCN Red List assessment, the distribution of *N. livida* was revised to reflect the occurrence recorded by Broadley (1972) and excluded the recently collected material without proper justification (Burger and Tolley, 2018).

Recently Oosthuizen (2018) reported the most northern West Coast record of *N. livida* from just south of Springbok. The unusual dorsal pattern of the specimen leads to the current investigation of the presence of this species along the West Coast of South Africa. Here we review all West Coast material currently assigned to *N. livida* and compare their dorsal and lateral colour pattern with voucher material housed in the herpetological collection of the Port Elizabeth Museum (PEM) and photos deposited on virtual museum platforms (ReptileMap ~ <http://vmus.adu.org.za> and iNaturalist ~ [www.inaturalist.org](http://www.inaturalist.org)).

According to Broadley (1972) in typical *N. livida* the dorsal colour pattern consists of six continuous pale stripes (especially on the nape) with each pair getting more widely spaced as one proceeds outwards from the mid-line. The two vertebral lines often fuse posteriorly, and all stripes fade onto the tail. The flanks are black with white vertical blotches or spots that can form bars anteriorly on the neck (Fig. 1A).

Two outlier records exist for this species and we briefly discuss them here (Fig. 2). The Port Elizabeth (Natural History Museum London ~ NHML 1917 1.17.9) (examined by Broadley, 1972) record has no precise locality details and could therefore have been collected from anywhere in the greater Port Elizabeth-Uitenhage region. *Nucras taeniolata* has, however, been recorded from within this region in the Albany thicket biome from Thornhill to Groendal Nature Reserve, with

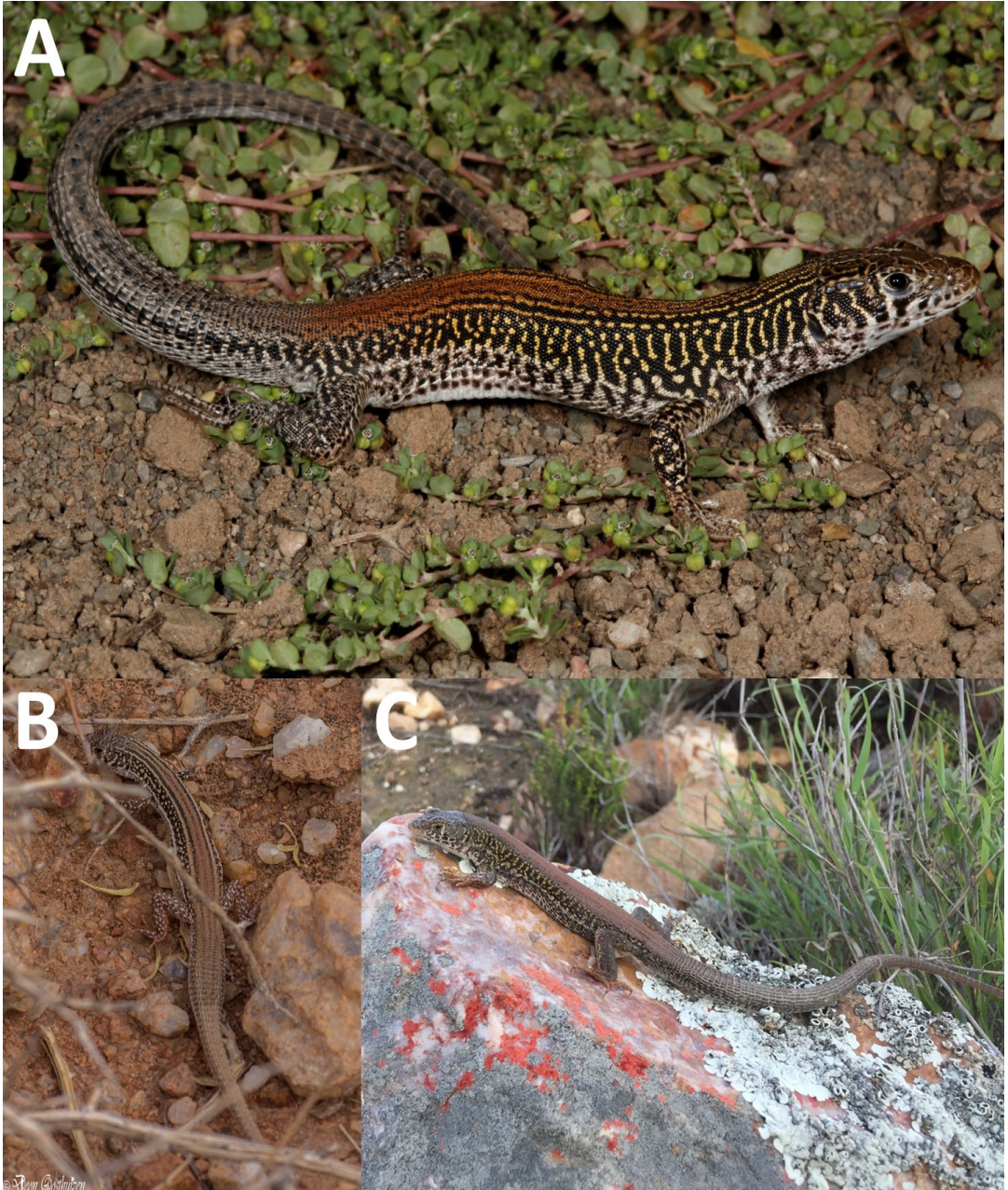
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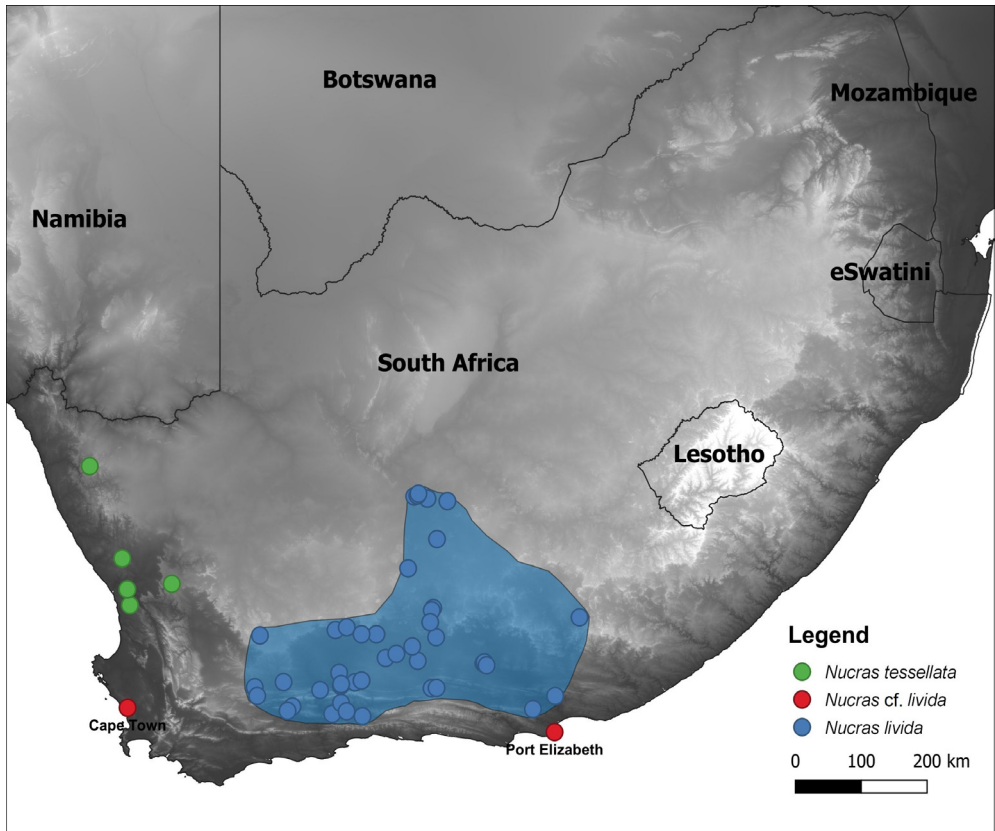
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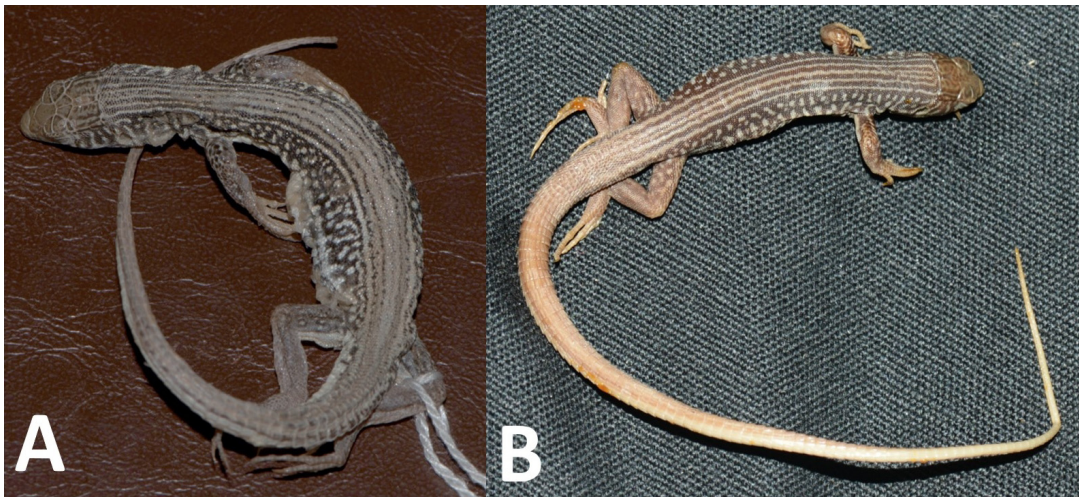
**Figure 1.** A - Typical *Nucras livida* from Karoo National Park (PEM R22591) (Photo: Werner Conradie), B - *Nucras tessellata* from near Springbok (Oosthuizen, 2018), C - *Nucras tessellata* from Nuwerus (iNaturalist no. 14108083).

its northern distribution extending from Addo National Park to Great Fish River Nature Reserve (Conradie, 2012; Burger, 2014a), whereas *N. livida* is known to occur in karroid habitat just north to northwest of Uitenhage (Burger, 2014b). Thus, it is more likely that

the Port Elizabeth specimen originated from northwest of Uitenhage and not from the greater Port Elizabeth-Uitenhage region. This is further supported by the fact that no *N. livida* material has been collected from Port Elizabeth since 1917. The Cape Town (Ditsong National



**Figure 2.** The distribution of *Nucras livida* and *N. tessellata* for South Africa. Red dots – two questionable historical records. Blue dots – all known *N. livida* records. Green dots – reassigned records to *N. tessellata*.



**Figure 3.** A - *Nucras livida* from the Cape Town region (TM 63817) (Photo: Adriaan Jordaan), B - *Nucras livida* from the Port Elizabeth region (NHML 1917 1.17.9) (Photo: Patrick Campbell).



**Figure 4.** A - *Nucas tessellata* from Nieuwoudtville (USEC H5787-88) (Photo: Theo Busschau), B - *Nucas tessellata* from the Vredendal region (PEM R15531) (Photo: Werner Conradie).

Museum of Natural History ~ TM 63817) record has more precise locality data of 38 km north of Cape Town, putting it in range of *N. tessellata*, but it clearly exhibits the distinct colour pattern of *N. livida*. Broadley (1972) made no reference to this specific specimen, although it would have been available for him to examine. No recent *N. livida* material has been collected from this region, but there are some known records and material of typical *N. tessellata* (e.g. Robertson and Piketberg). The status of this waif record needs to be investigated. The appearance of both these records conforms to typical *N. livida* (Fig. 3A, B) in having the diagnostic six vertebral stripes on the nape and the blotched flanks.

In recently collected material from Nieuwoudtville (John Ellerman Collection, Stellenbosch University ~ USEC H5787-88; Fig. 4A), the stripes on the nape

are more faded and form five identifiable stripes. The central stripe is very short and fades between the neck and arms. The remaining four stripes continue to mid-body where they fade and fuse. The flanks are striped and form no vertical bars. The recently documented specimen from near Springbok (Oosthuizen, 2018; ADU 162644; Fig. 1B) exhibits similar colouration pattern to that of the Nieuwoudtville material. In material from the Vredendal region (PEM R15531; Fig. 4B) the stripes on the nape are almost indistinguishable and appear to form a uniform pale cream vertebral band from the nape onto the tail with thin vertebral bars on the flanks. Specimens from Nuwerus (iNaturalist no. 14108083 and 13981186; Fig. 1C) exhibit similar colouration and pattern to the Vredendal material. All the West Coast material, excluding the historical specimen from north

of Cape Town, conform to Broadley's (1972) typical *N. t. tessellata* or his var. "T". The status of the latter variation, however, has not been genetically tested, and thus, we refer to the West Coast material as the typical form (Fig. 2).

Based on the available records and specimens examined in the present review, there is a better understanding of the distribution of *N. livida*, with all records restricted to the arid interior of South Africa. Recent phylogenetic studies further validate the species status of *N. livida* which is sister to *N. tessellata* + *N. taeniolata* (Edwards et al., 2013; Bauer et al., 2019; Branch et al., 2019). The recent records suggest that *N. livida* is restricted to the more arid Karoo region of the southern Cape, occurring from Matjiesfontein in the west to Dunbrody in the east and north to Britstown (see Appendix 1, Fig. 2). The Albany Museum collection was transferred to the PEM in the early 1990s and the specimens upon which Hewitt's (1910) questionable *N. livida* records from Graaff-Reinet and Victoria West are based are currently unaccounted for in the PEM and might have been destroyed in the fire that struck the Albany Museum in 1941 or the subsequent move to PEM (see Conradie et al. 2015). Recent collections from the Victoria West region (Karoo BioGaps Project: Foundational Biodiversity Information Programme) and Commandodrift (PEM R8186), however, indicate that these questionable records are within the known distribution of *N. livida* and should, therefore, be regarded as valid.

We here restrict the known distribution of *N. livida* to the more inland karroid habitats of South Africa. We omitted the two questionable records of Cape Town and Port Elizabeth from the current distribution of *N. livida* until new material becomes available and we reassign the previously assigned West Coast material to *N. tessellata*.

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**Material used in this study:**

*Nucras livida*: BioGaps, Kalkdam farm, -32.80631, 23.31869; BioGaps FP097, Tafelkop, -32.30714, 21.93802; BioGaps S275, Victoria West, Farm Uitsig, -31.30679, 23.15731; CapeNature, Gamkapoort Nature Reserve, -33.28, 21.68; iSpot 474326, nr Oudtshoorn, Little Karoo, -33, 22; iSpot 879139, Aberdeen District, -32.4233, 23.6269; National Museum Bloemfontein ~ NMB R10428, Farm Lemoenfontein (about 35 km SE of Britstown), -30.83194, 23.64194; PEM R11336, Farm Renostervlei, -30.21667, 23.81667; PEM R15969, Dunbrody, -33.375, 25.625; PEM R18746, Little Karoo Area, -33.54717, 21.21525; PEM R18747, Little Karoo Area, -33.54717, 21.21525; PEM R18789, Vodacom Tower/ quarry, -32.39525, 20.67047; PEM R19087, Farm Kareehoek (about 30km N of Britstown), -30.17694, 23.48167; PEM R19094, 44 km SW Strydenburg, -30.14083, 23.25861; PEM R19103, Farm Goodhope (about 28km NNW of Britstown), -30.12444, 23.31333; PEM R19108, Farm Kareehoek (about 30km N of Britstown), -30.17694, 23.48167; PEM R19116, 44 km SW Strydenburg, -30.12444, 23.31333; PEM R19116, Farm Goodhope (about 28km NNW of Britstown), -30.12444, 23.31333; PEM R22591, Karoo National Park, Main area, -32.26194, 22.12722; PEM R22820, Farm Suurhoek, NW of Jansenville, -32.86028, 24.45694; PEM R22821, Farm Matjiesfontein, NW of Jansenville, -32.84722, 24.42; PEM R22822, Farm Matjiesfontein, NW of Jansenville, -32.835, 24.44111; PEM R22823, Farm Tierberg, NE of Prince Albert, -33.15333, 22.26556; PEM R23639, Murraysburg, Vliegkraal cliffs on way to Visgat, -31.94981, 23.5789; PEM R23667, Farm Landsig, Murraysburg, -31.98811, 23.55375; PEM R25165, Farm Matjiesfontein, 24km NW of Jansenville, -32.83, 24.43889; PEM R25166, Farm Osplaas, 20km NW of Jansenville, -32.8775, 24.47333; PEM R25167, Farm Tierberg, NE of Prince Albert, -33.15333, 22.26556; PEM R4300, Puttersvlei, Karoo National Park, -32.375, 22.625; PEM R4401, North of Gamka turn off, Prince Albert, -33.20972, 22.02639; PEM R4637, Ou Plaas, Stolzhoek No. 2, Karoo National Park, -32.375, 22.625; PEM R4763, Puttersvlei, Karoo National Park, -32.375, 22.375; PEM R541, Farm Kleinsleutelfontein, 5km west of Bruinrante, -33.125, 22.375; PEM R542, Prince Albert area, -33.125, 22.375; PEM R6547, Discorea Hill, Spitskop, Farm De Hoop, 10km East of Willowmore, -33.25, 23.55; PEM R6714, 3.7km West of Groot River bridge, -33.61667, 21.13333 PEM R7681, Kammanassie dam 20km south of De Rust, -33.70278, 22.39083; PEM

R8186, Damwall West of Tarka River, Commandodrift National Reserve, -32.10139, 26.03333 PEM R8726, Gamka Mountain National Reserve, -33.66667, 21.88333; ReptileMAP 150223, Farm Koetzerskraal, -33.48889, 22.0325; ReptileMap 5397, south of Beaufort West, Karoo, -32.76, 22.77917; ReptileMap 7225, Vierfontein, Murraysburg, -32.18, 23.52806; Southern African Reptile Conservation Assessment ~ SARCA-SIGHT, Wolwekraal, PA, -33.18333, 22.03333; SARCA-SURVEY, 44 km SW Strydenburg, -30.09583, 23.33056; Sight record, East of Willowmore, -33.24511, 23.63426; Sight record, Groot Winterberge, -33.58725, 25.25164; Sight record, south of Beaufort West, Karoo, -32.69222, 22.95972; Sight record, south of Beaufort West, Karoo, -32.57222, 23.22667; TM 19533, Matjiesfontein, -33.25, 20.58333; TM 20129, Welbedacht, W of Oudtshoorn, -33.625, 22.125; TM 29997, Matjiesfontein, -33.23333, 20.58333; TM 29997, Prince Albert, 38 KM NE, -33.125, 22.375; TM 39920, Matjiesfontein, -33.375, 20.625; USEC H-3896, Vleifontein, Laingsburg, -33.15, 21.06667.

*Nucras livida* (questionable): TM 70631, NHML 1917 1.17.9, Port Elizabeth, -33.96083, 25.61472; TM 63817, Cape Town, 38 KM NE, -33.56667, 18.45

*Nucras tessellata* (West Coast): ReptileMap 162644, Morewag Guest Farm, -29.65019, 17.81418; iNaturalist 14108083, 13981186, Nuwerus, -31.14603, 18.35924; SARCA-LIT, South of Vredendal, NE of Lambert's Bay, near Koeivleiberg and Elandsvlei, -31.90278, 18.48806; PEM R15531, Outside Vredendal on way from Lutzville, -31.64694, 18.44528; USEC H5787-88, Farm Papkuilsfontein, 20 km S of Nieuwoudtville, -31.55722, 19.19083 (same specimens recorded as USEC/H-2861 and USEC/H-2862 in Du Toit and Albas, 2003).