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THE WOLF SPIDERS OF AUSTRALIA (ARANEAE: LYCOSIDAE): 5. TWO NEW SPECIES OF THE BICOLOR GROUP

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ABSTRACT

Two new species *Lycosa snelli* and *Lycosa duracki* from north Western Australia are added to the bicolor group of Australian Wolf Spiders.

McKay (1973) defined the 'bicolor group' of lycosid spiders as being similar in coloration, form of epigynum, and internal genitalia. Two new species found on open gravel areas in the Pilbara and Kimberley regions of Western Australia are described and are placed in the bicolor group of species. The concept of this species group was originally morphological in nature, but the species are also characterised by a number of behavioural and ecological parameters. An expanded definition of the bicolor group can be given:

1. The carapace is uniformly coloured and lacks median or lateral stripes.
2. All species are robust with heavy legs and well developed eyes.
3. The female epigynum and internal genitalia are similar in morphology in all species (McKay 1973, figs. 2, 3).
4. Capture of prey is made at the burrow entrance and females rarely if ever leave the immediate vicinity of the burrow; the characteristic positions are: straddling above, straddling to one side with a leg in contact, or draping over the mouth of the burrow. All species rapidly retreat into the burrow when disturbed, and appear highly sensitive to ground vibrations or movement.
5. The burrow is usually vertical with an open entrance flush with the soil surface; more rarely closed with a pebble, a silk and sand-grain lid, or a well constructed hinged door.
6. The habitat is always open, largely unvegetated areas, with compact soils, usually in arid or semi-arid regions.

In most details these spiders agree well with the American species of the genus *Geolycosa*. Their behaviour is remarkably similar (see Kaston 1948, p. 316). All the American species lack dorsal spines on tibia 4 of females, this is considered by most authors to be important in the diagnosis of the genus *Geolycosa*. 1 + 1 dorsal spines are present on tibia 4 of females of Australian species as on the males of Australian and American *Geolycosa*, so the generic significance of such spines is open to doubt. The genus *Geolycosa* can be defined by using behavioural data, but not yet in a completely satisfactory manner by using morphological characters. A redefinition of the genus *Geolycosa* is considered to be premature at this stage of our knowledge of the Australian Lycosinae.

The male palpal organs of *Lycosa snelli* and *Lycosa duracki* have been figured but the structure of the palpal organs of other members of the bicolor group is unknown. I have placed these new species in the older genus *Lycosa* pending a generic revision of the Australian lycosid spiders.

Lycosa snelli sp. nov.

(Figs. 1 a–g)

MATERIAL EXAMINED

HOLOTYPE: Western Australian Museum, WAM 69–797, ♀ M, C.L. 12·0 mm, Towera Station, north of Lyndon River, W.A., collected by Mr A. Snell, January, 1952. In spirit.

PARATYPES: Western Australia; Barradale 18 km south, 29.v.1972, RJM, 1 ♀ P, 1 ♂ P, QM W4021; Barrow Island, 18.vi.1964, HB, 1♀ M, WAM 71-1716, 20.ii.1969, A. R. Main, 2 ♂ M, WAM 74-498–9; Carnarvon 14·5 km north, 22.v.1969, JG, 1 ♀ M, WAM 69-1035; Lyndon Station, i.1952, A. Snell, 1 ♀ P 1J, WAM 69-798–9, vii.1951, A. Snell, 1 ♀ M 2 ♀ P, WAM 69-803–5; Manberry 11 km towards Wandagee, 9.iv.1969, G. W. Kendrick, T. A. Darragh, 1 ♀ P 11J, WAM 73-117–28; Mardie Station, 23.v.1962, W. D. L. Ride, 1 ♀ P, WAM 71-1718; Marilla Station, 29.v.1972, RJM, 1 ♀ P 1 ♂ P

3J, QM W4022; near Marilla Station turnoff, 4.ii.1970, JG, RH, 1 ♀ M 1J, WAM 70-163–4; Yannarie River, 13.xi.1953, A. R. Main, 1 ♀ M, WAM 71–1717, 13.v.1952, RJM, JG, 1 ♀ M 2 ♂ P, QM W4023.

DESCRIPTION: (Based on the holotype)

Carapace fawn to buff without lateral or median stripes, but becoming light brown with slightly darker brown stripes radiating from the fovea after preservation in alcohol; face brown with fawn hair; paturon dark brown with the anterior surface fawn or buff; lateral condyle orange-red; fangs dark brown; labium and maxillae brown; sternum light brown. Abdomen fawn to buff with vague slightly darker lanceolate stripe reaching almost to the mid-length of the dorsal surface, and becoming more conspicuous after preservation; ventral surface fawn to buff with a darker brown transverse crossbar behind the epigynum; spinnerets fawn. Legs with coxae buff above, darker below, remainder of legs buff to light brown, the joints slightly darker, spines dark brown; palpi buff.

TABLE 1: MEASUREMENTS OF LEG SEGMENTS OF HOLOTYPE OF *L. snelli* IN MM

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus
1	8·5	4·3	5·9	6·2	3·2
2	7·7	4·3	5·5	6·2	3·2
3	6·9	4·0	4·8	6·7	3·2
4	8·8	4·3	7·2	8·0	4·0
Palp	4·5	2·3	2·6	—	3·3

Anterior row of eyes with the upper tangent procurved, AM larger than AL, PM very large and protruding, more than twice the diameter of the AM and about half their diameter apart, the AL are situated close to the PM, PL eyes about twice the diameter of the AM. Ratio of eyes AM:AL:PM:PL = 17:11:42:38; distance AM:AM 6, AM:AL 5, AM:PM 4, AL:PM 3, PM:PM 26. Ocular quadrangle 103 × 118. Clypeus to AM 8. PM to PL 32. Width of the first row of eyes 71; width of second row 104.

Chelicerae with three promarginal teeth, the middle one largest; three retromarginal teeth of equal size (all specimens examined). Labium slightly longer than broad.

VARIATION: Juveniles are orange-buff to sandy brown and resemble the adults in coloration. On dark red substrates the adults may become dark orange-buff to pale brown, sometimes with a faint golden tinge. The brown cross-bar behind the epigynum is sometimes lacking in juveniles, may be almost absent in some adults, or may be a well defined black bar.

The eye measurements of 10 specimens are expressed as a percent of the total width of the first eye row in Table 2.

Variation in the shape of the epigynum is shown in Fig. 1c, g, the male palpal organ in Fig. 1b, and the internal genitalia of a female in Fig. 1e.

SIZE RANGE: Mature females 11·1 to 12·0 mm.

DIAGNOSIS: *Lycosa snelli* differs from all other Australian species of the genus *Lycosa* in having the following combination of characters: no median or lateral stripes on the carapace; venter of abdomen fawn or light brown with a dark transverse bar usually situated behind the epigynum in females, and present or absent in males; large protruding PM eyes; epigynum with the anterior part of the median guide expanded; male palp with a long tapered embolic guide.

LIFE HISTORY

Mature females may be collected throughout the year, but appear to be most abundant during the late summer months. Two mature males were collected at Barrow Island in February. Juvenile specimens are common during April and May, and

TABLE 2: EYE DIAMETERS AND INTERSPACES OF *Lycosa snelli* CONVERTED TO PERCENT OF THE TOTAL WIDTH OF THE FIRST ROW OF EYES

Regd No.	Sex	C.L.	AM	AL	PM	PL	AM:AM	AM:AL	PM:PM	AM:PM
Holotype	♀M	12·0	24	15	59	53	8	7	37	6
WAM 69.798	♀P	11·2	23	14	63	55	9	9	35	5
WAM 69:799	♀J	9·0	21	14	60	50	10	10	34	5
WAM 71.1716	♀M	11·5	22	15	60	53	8	8	33	7
WAM 71.1717	♀M	11·1	23	13	61	50	11	9	33	7
QM W4022	♂P	11·5	23	15	60	52	9	9	36	6
QM W4022	♀J	8·3	22	13	60	53	9	7	31	8
QM W4022	♀P	11·3	22	15	59	51	10	9	32	6
QM W4021	♀P	11·7	23	14	61	54	9	11	36	8
QM W4021	♂P	10·0	22	13	60	55	12	8	32	3

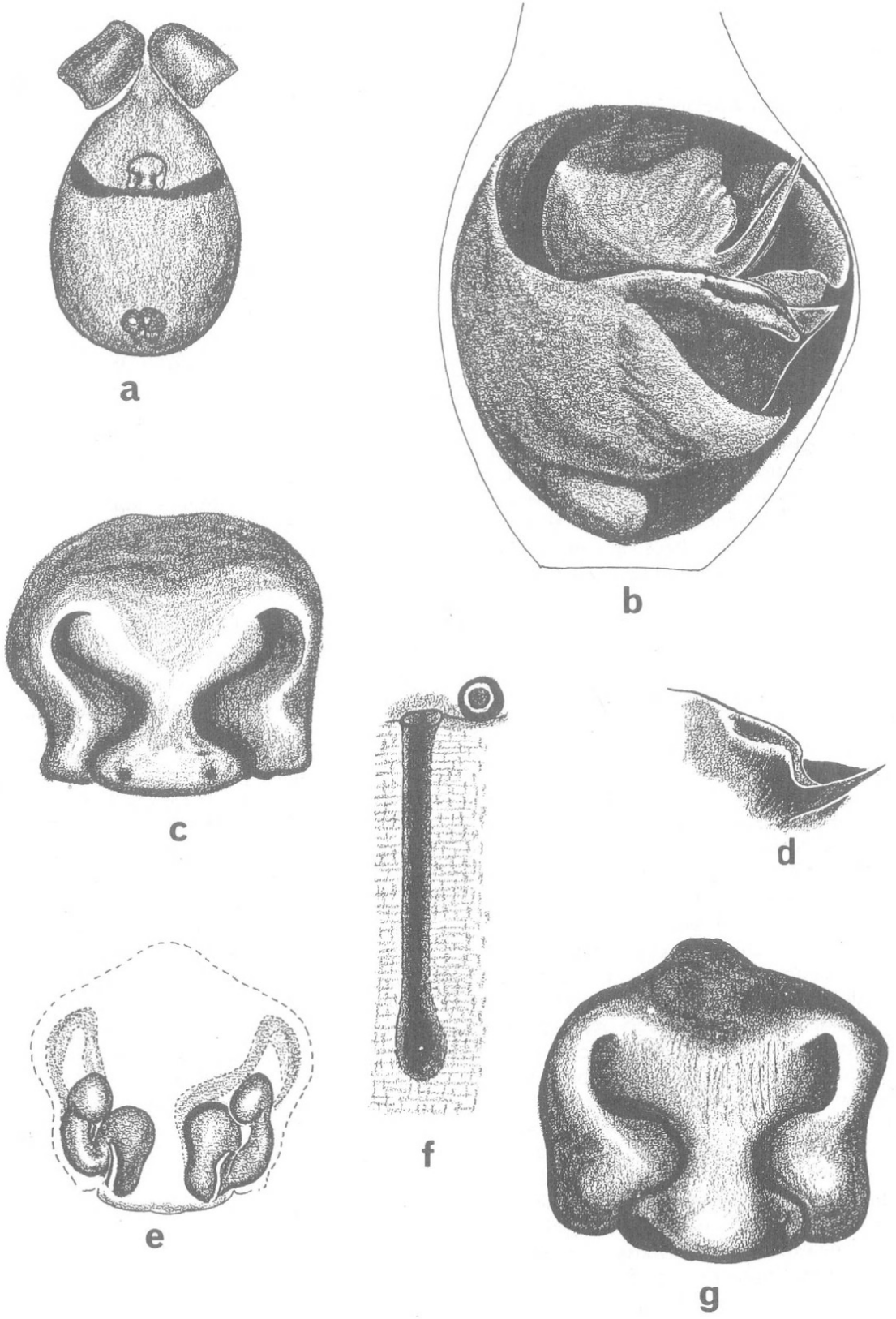

FIG. 1: a–g, *Lycosa snelli*. a, ventral surface of abdomen; b, male palpal organ; c, epigynum of holotype; d, median apophysis of male palp; e, internal genitalia of WAM 71-1717; f, burrow and pebble door showing silk seal; g, epigynum of female from Barrow Island WAM 71-1716.

penultimate males and females are found during May, June, July, and possibly through to August.

HABITAT

Open areas of spinifex, low acacia bushes, or bare gravel slopes without vegetation. The soils are always well compacted red to brown clay-loams, usually in sheet-washed gravel areas covered with small pebbles and rounded stones. Occasional specimens may be found on light clay-loams near clay pans or clay depressions in rocky areas. Most mature specimens are found at night on bare open gravel slopes well away from vegetation.

BURROW

Lycosa snelli has a very characteristic burrow up to 16 mm in diameter and 12–24 cm in depth. The burrow is normally vertical with or without a slightly cone-shaped entrance, and always sealed securely during the day with a round pebble, piece of wood, or on many occasions the dung pellet of introduced rabbits or sheep. The pebble 'door' is rolled back at dusk when a thick ring of silk betrays the door stone: the door is sealed shut late at night when the temperature drops to about 6°C., or at the first light of day on warm nights. Repeated sealing of the burrow occurs on the same side of the stone where a ring of silk builds up; no doors, even the lighter doors of sheep dung, had more than one ring of silk, suggesting that the door was juggled into position on top of the burrow (Fig. 1f).

At night *Lycosa snelli* straddles the burrow usually with the tarsus of at least one posterior leg in contact with the burrow entrance, and retreats rapidly head-first into the burrow if disturbed. This species appears to be highly sensitive to any movements or vibration near the burrow, and on still nights is very difficult to approach without the spider retreating into the burrow, frequently leaving the 'door' upturned some 1 to 2 cm from the entrance. The spider is then very reluctant to be enticed from the burrow by careful teasing with a straw or insect prey. If the disturbed spider is left in the burrow it may emerge some time later to seal the burrow with the door or resume its stance over the burrow entrance. Some disturbed females may sit just below the burrow entrance for 10 to 20 minutes before re-emerging. I have collected *L. snelli* quite successfully by approaching the spider with great stealth and then striking just before the burrow with the blade of a spade to dislodge the spider from above the entrance; once removed from the burrow the spider appears quite disoriented and makes a somewhat circular search for the entrance.

DISCUSSION

In the form of the burrow, the robust size of the spider, coloration, shape of the epigynum, and behaviour, *Lycosa snelli* is very similar to members of the bicolor group (McKay 1973) and is assigned to that group of species. *L. snelli* like other members of the bicolor group may belong to the genus *Geolycosa* but all species examined (*L. bicolor*, *L. storri*, *L. forresti*, *L. errans* and *L. snelli*) have 1 + 1 dorsal spines on the tibiae of the fourth leg. American species of the genus *Geolycosa* lack dorsal spines on tibia 4 in mature females, although these are present in males.

DISTRIBUTION

Arid regions of northwest Western Australia. Possibly common throughout the Gascoyne, Ashburton and Pilbara regions.

DERIVATION

Named after Mr A. Snell who collected many interesting insects, spiders, and fishes for Australian Natural History Museums.

Lycosa duracki sp. nov.

(Figs. 2, a–e)

MATERIAL EXAMINED

HOLOTYPE: Western Australian Museum, WAM 74 494, ♀ M, C.L. 11·9 mm, Old Argyle Downs Station, Ord River, W.A., collected by R. J. McKay and W. H. Butler, October 23, 1971. In spirit with young spiderlings removed from holotype.

PARATYPES: Old Argyle Downs Station, Ord River, W.A., 5.x.1971, RJM, J. Dell, 2 ♀ M, 1 ♂ M, WAM 74-495 –7.

DESCRIPTION (Based on the holotype)

Carapace light buff without lateral or median stripes, uniformly coloured in life, but with faint slightly darker brown stripes radiating from the fovea after preservation in alcohol; face light brown with buff hair; paturon dark brown with the anterior surface and sides with buff hair; lateral condyle dull red-brown; fangs dark brown; labium and maxilla brown; sternum brown. Abdomen pale brown to buff above and below; anterior slope of

TABLE 3: MEASUREMENTS OF LEG SEGMENTS OF HOLOTYPE OF *L. duracki* IN MM

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus
1	8·1	4·2	6·1	6·3	3·5
2	8·0	4·0	5·6	6·3	3·5
3	7·1	3·9	5·0	6·2	3·5
4	8·6	4·1	6·8	8·3	4·3
Palp	4·8	2·3	2·6	—	3·5

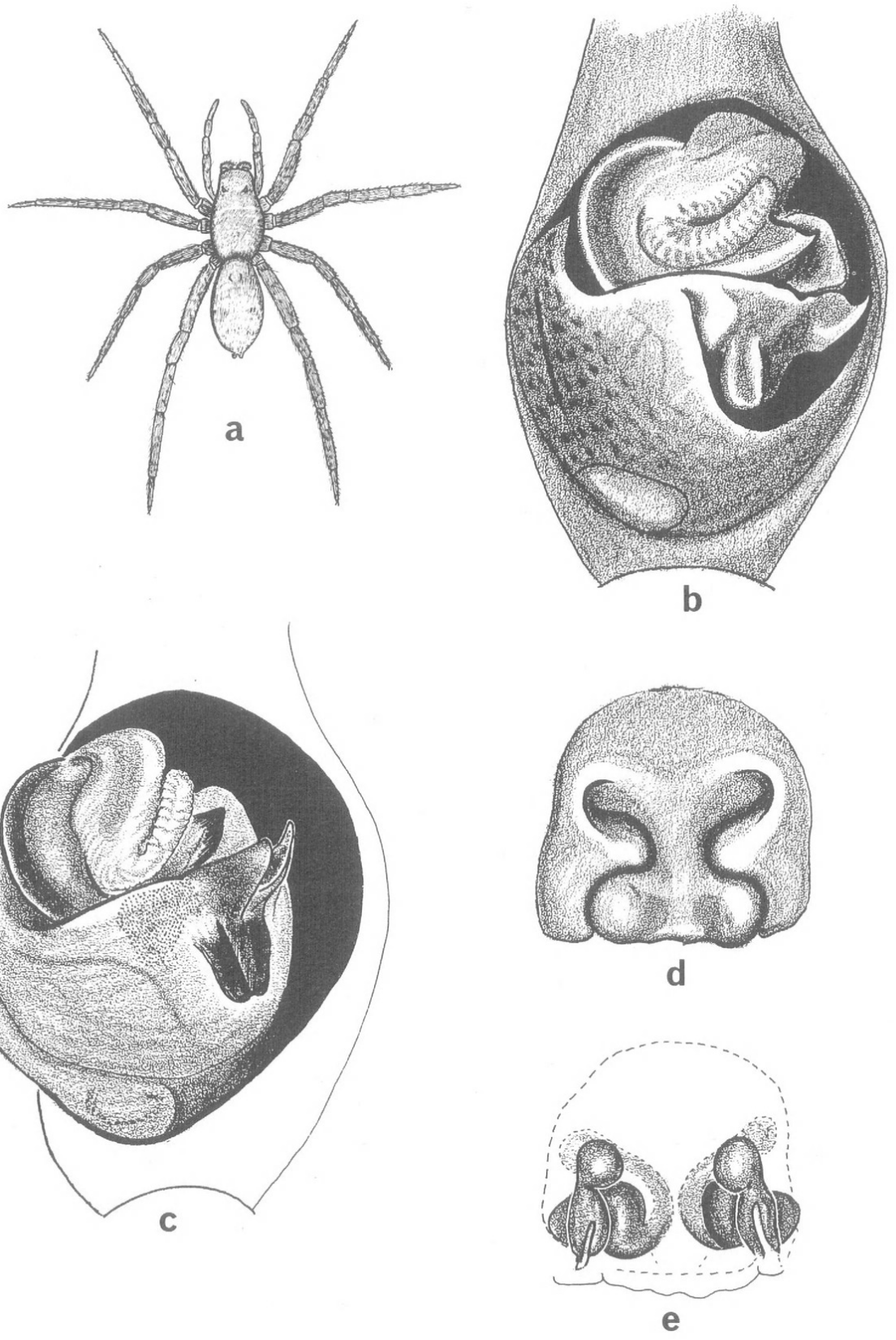

FIG. 2: a–e, *Lycosa duracki*. a, holotype; b–c, male palpal organ; d, epigynum of holotype; e, internal genitalia of female paratype.

TABLE 4: EYE DIAMETERS AND INTERSPACES OF *L. duracki* CONVERTED TO PERCENT OF THE TOTAL WIDTH OF THE FIRST ROW OF EYES

Regd No.	Sex	C.L.	AM	AL	PM	PL	AM:AM	AM:AL	PM:PM	AM:PM
Holotype	♀M	11·9	24	15	54	47	10	7	30	5
WAM 74-495	♀M	11·0	24	16	54	46	11	6	32	9
WAM 74-496	♀M	10·7	23	13	56	49	10	8	30	7
WAM 74-497	♂M	10·3	26	15	57	50	11	5	30	8

abdomen brown and two semicircular brown marks on anterior one third of dorsal surface (Fig. 2a); ventral surface without markings; spinnerets brown. Legs pale brown covered with pale buff hair; patellae slightly darker; ventral surface of tibiae, metatarsi and tarsi ash-grey.

Anterior row of eyes with the upper tangent procurved, AM larger than AL, PM large and protruding, more than twice the diameter of the AM and a little less than half their diameter apart, the AL are situated close to the PM, PL eyes about twice the diameter of the AM. Ratio of eyes AM:AL:PM:PL = 21:13:46:40; distance AM:AM 9, AM:AL 6, AM:PM 4, PM:PM 26. Clypeus to AM 8. Width of first row of eyes 86; width of second row 111.

Chelicerae with three promarginal teeth, the middle one largest; three retromarginal teeth of equal size. Labium slightly longer than broad.

The epigynum is shown in Fig. 2d.

VARIATION: Newly hatched spiderlings are orange in colour with slightly darker radiating stripes on the carapace. Abdomen orange with a well defined dark serrated mark on the anterior dorsal surface of the abdomen which extends over the anterior slope of the abdomen and connects posteriorly to three dark transverse chevrons; venter pale.

Adults may have radiating dark brownish or greyish stripes on the carapace after preservation in alcohol but these are not present in life. The abdomen may have the anterior slope buff or darker brown, in one paratype female two vertical brown marks are present; the dorsal surface of the abdomen may have a pair of semicircular marks on the anterior one third, with three brown or faint grey transverse chevrons on the posterior third of the abdomen. No transverse dark bar behind the epigastric furrow as in *L. snelli*.

The eye measurements of the holotype and three paratypes are expressed as a percent of the total width of the first eye row in Table 4.

SIZE RANGE: Mature females 10·7 to 11·9 mm.

DIAGNOSIS: *Lycosa duracki* is very similar to *L. snelli* but differs in lacking a dark bar behind the epigastric furrow; the male palp has a very short, broad embolic guide, and a more robust median apophysis (Fig. 2b, c). The burrow entrance is sealed with a hinged door, not a loose pebble.

LIFE HISTORY

Three mature females and one mature male were collected in October. The holotype female was carrying young, and was dug from the burrow at night.

HABITAT

Bare pebble-strewn gravel slopes and ridges bare of vegetation.

BURROW

A vertical burrow up to 14 mm in diameter and 15–20 cm in depth is constructed in heavy clay-gravel. One burrow (♀ M) was simply an open hole and did not appear to have a lid although this may have been overlooked as the spider was dislodged by striking the ground with a spade. The other three burrows had a well constructed hinged lid and were not sealed with a pebble 'door' although pebbles similar to those used by *L. snelli* were present. The behaviour of *L. duracki* is remarkably like *L. snelli*.

DISCUSSION

Lycosa duracki is assigned to the bicolor group of species (see discussion under *L. snelli*) and may belong to the genus *Geolycosa* although 1 + 1 dorsal spines are present on tibiae 4 in mature females.

DISTRIBUTION

Kimberley region of Western Australia.

DERIVATION

Named after the Durack family that settled the Kimberley region in 1884 and founded Argyle, Lissadel, and Rosewood stations.

LITERATURE CITED

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