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DESCRIPTIONS OF FEW LAND MOLLUSCS FROM KODAGU DISTRICT OF KARNATAKA, INDIA

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INTRODUCTION

Tropical rainforest floor forms the workshop of diverse interactions between various organisms. The interactions in majority of the cases result in cycling of energy and nutrients. The land snails form the epigeic species *i.e.*, those which live and feed on the soil surface. They form an important link in the recycling chain decomposing the macro litter into microforms facilitating for the action by microorganisms. In India, especially from the Western Ghats in Karnataka, land snails have been least worked out (Madhyastha *et al.*, 2002; Mavinkurve *et al.*, 2003, 2004 a, b; in press). The present report is from our collection from Kodagu district. The collection includes sixty-five examples forty of them have been identified to the species level with the remaining assigned their generic name. The system of Classification followed is that given in 'A Classification of Living Mollusca' (Vaught, 1989). The study assumes significance because about 9 out of the 23 families of land snails found in the Western Ghats (Madhyastha, 2002) are present in this district.

Descriptions of twelve of those identified at species level have been given below :

Key to the Families

1. Shells with operculum 2
- Shells without operculum 3
2. Shells depressed, widely umbilicate *Cyclophoridae*
- Shells elongate/cylindrical, narrowly umbilicate *Diplommatinidae*

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3. Shells without dentition in the aperture (*Mariaella* with internal flattened shell)
 *Ariophantidae*
 — Shells with dentition in the aperture 4
4. Shells with excentric aperture, dentitions at the periphery *Streptaxidae*
 — Shells with normal aperture and deep seated dentitions *Charopidae*

SYSTEMATIC ACCOUNT

Sub Class PROSOBRANCHIA

Order MESOGASTROPODA

Family CYCLOPHORIDAE

Genus *Cyclophorus* Montfort, 1810

Cyclophorus nilagiricus (Benson, 1852)

1852. *Cyclophorus nilagiricum* Benson, *Ann. Mag. nat. Hist.*, (2)10 : 268.

1914. *Cyclophorus nilagiricus* : Gude, *Fauna Brit. India*, Mollusca III : 51.

Shell globose, sturdy, opaque, widely umbilicate, spire short, dark brownish, with distinct chestnut flame like streaks near the sutures, and with distinct spiral lirations criss crossed by transverse striations. Body whorl with an indistinct keel, with 3–5 lirations above the keel prominent, near the suture flattened. Whorls 5, shouldered, rapidly increasing, with visible growth lines, sutures distinct. Apex acute, prominent, chestnut coloured with the periostracum generally corroded. Aperture oblique and rounded, orange coloured, lips thickened and reflected, continuous forming a thick callus on the columellar margin. Operculum thin, concave and concentric.

Measurements : Height = 35 mm, Diameter = 42 mm.

Material observed : Five examples. Kadamakal hills and Sullia, 3/12/2000 (Coll. Madhyastha N.A. and Sandhya P.S.).

Distribution : Tamil Nadu : Nilgiris, Travancore, Walaghat, Koondah hills; Karnataka : South Canara, Balarangam, Kadamakal hills, Sullia.

Remarks : This is much similar to *Cyclophorus jerdoni* varying from it with a comparatively elevated spire.

Genus *Pterocyclus* Gray, 1850

1881. *Pterocyclus cyclophoroideus* G. Nevill, *J. Asiat. Soc. Bengal*, 1 : 145.

1921. *Pterocyclus cyclophoroideus* : Gude, *Fauna Brit. India*, Mollusca III : 103.

Shell globose discoid, widely umbilicate, dark brown, apex darkened. Shell thick with microscopic vertical striations. Whorls 5, increasing regularly, shouldered and sutures impressed.

A peripheral inconspicuous brown band present on the body whorl. Aperture not descending rounded with a wing like projection at the point of attachment to the penultimate whorl. Lips double, outer expanded discontinuous, inner lip continuous with a sinus near the wing. Operculum convex, with much raised concentric lamellae, retracts completely to the aperture. Umbilicus deep and broad, revealing up to the apex.

Measurements : Height = 19 mm, Diameter = 9 mm.

Material observed : Six examples, Thadiyandamoola and Kadamakal hills. 26/10/2003 (Coll. Sandhya P.S. and Rajendra G.M.).

Distribution : Tamil Nadu : Annamalai hills; Karnataka : Kadamakal hills, Thadiyandamoola (new report).

Remarks : The wing is not fully distinct but the sinus present in the inner lip is the distinguishing feature of this species.

Family DIPLOMMATINIDAE

Genus *Nicida* Blanford, 1868

Nicida liricincta (Blanford, 1868)

1868. *Diplommatina* (*Nicida*) *liricincta* Blanford, *Journ. Conchyl.*, **16** : 336, pl. 14, fig. 5.

1921. *Nicida liricincta* : Gude, *Fauna Brit. India*, Mollusca III : 293.

Shell ovate, imperforate, glossy, thin and translucent. Spire elevated, apex obtuse, sutures impressed. Whorls 5½, distinctly sculptured with 2 spiral lirations on third, fourth and 3 on the penultimate whorls, body whorl with 4–5 lirations. The penultimate whorl is the largest, body whorl slightly constricted. Aperture rounded slightly ascending touches nearly half of the penultimate whorl. Lips double, outer lip slightly reflected, Operculum thin, fully retractable much beyond the aperture.

Measurements : Height = 3 mm, Diameter = 1.5 mm.

Material observed : Seven examples, Sampaje Ghat. 9/9/2002 (Coll. Sandhya P.S. and N.A. Madhyastha)

Distribution : Maharashtra : Khandalla; Karnataka : Sharavathi Valley, Kodagu (Sampaje Ghat).

Remarks : This is a widely distributed species endemic to South India.

Nicida nitidula (Blanford, 1868)

1868. *Diplommatina nitidula* Blanford, *Journ. Conchyl.*, **16** : 334, pl. 14, fig. 3.

1921. *Nicida nitidula* : Gude, *Fauna Brit. India*, Mollusca III : 294.

Shell ovate, imperforate, glossy, thin and translucent. Spire elevated, apex obtuse, sutures impressed. Whorls 6, distinctly sculptured with 4 spiral lirations on fourth and penultimate whorls,

body whorl with a fifth indistinct keel. The penultimate whorl is the largest, body whorl slightly constricted. Aperture rounded, ascending. Lips double, inner lip continuous much produced and reflected, outer lip also reflected, discontinuous at the point of attachment to the penultimate whorl. Operculum thin, fully retractable much beyond the aperture.

Measurements : Height = 2 mm, Diameter = 1.5 mm.

Material observed : Three examples, Thalakaveri. 7/12/2002 (Coll. Sandhya. P.S).

Distribution : Kerala : Kulputty hills, Wynaad; Karnataka : Kodagu (Thalakaveri).

Remarks : Distinguished from the former by the presence of a distinct double lip and smaller size.

Sub Class PULMONATA

Order STYLOMMATOPHORA

Family ARIOPHANTIDAE

Genus *Ariophanta* Desmoulins, 1829

Ariophanta cysis (Benson, 1852)

1852. *Helix cysis* Benson, *Ann. Mag. nat. Hist.*, (2)9 : 404.

1908. *Ariophanta cysis* : Blanford and Godwin-Austen, *Fauna Brit. India*, Mollusca I : 33.

Shell sinistral, moderately umbilicate, sturdy, with hay yellow periostracum, underneath paler. Spire moderate, apex obtuse, whorls rapidly increasing, and sutures prominent. Whorls 5, swollen, surface with coarse transverse striations, converging with lines of growth, body whorl slightly angled near the aperture, which is rounded, a pale indistinct band runs around the angulation. Aperture scarcely descending, oblique, lunately rounded, lips slightly thickened. White and nacreous inside. Umbilicus moderate and deep partly covered by the thick triangularly reflected columellar lip.

Measurements : Height = 32 mm, Diameter = 48 mm.

Material observed : An example each from Bhagmandala and Thadiyandamoola. 13/9/2003 (Coll. Sandhya P.S. and N.A. Madhyastha).

Distribution : Tamil Nadu : Nilgiris, Annamalai; Karnataka : Mysore, Bhagmandala, Thadiyandamoola.

Remarks : This is one of the large shells of the genus *Ariophanta* found in thick litter, under the forest canopy. The periostracum is fragile and present in only fresh shells; hence old shells seem to be white in colour.

Ariophanta thyreus (Benson, 1852)

1852. *Helix thyreus* Benson, *Ann. Mag. nat. Hist.*, (2)9 : 405.

1908. *Ariophanta thyreus* : Blanford and Godwin-Austen, *Fauna Brit. India*, Mollusca I : fig. 20, p. 34.

Shell sinistral, moderately umbilicate, thick, sturdy and opaque. Spire flattened, apex obtuse, golden yellow, above with a chestnut band below the periphery after which the colour fades into white nearing the umbilicus, whorls rapidly increasing, and sutures not impressed. Whorls 5, surface with coarse transverse striations, body whorl distinctly keeled, rounded nearing the aperture in mature forms. Aperture oblique, negligibly descending, with nacre just behind the slight darker aperture, lips thickened. Columellar lip triangularly reflected, but does not cover the moderate and deep umbilicus.

Measurements : Height = 18 mm, Diameter = 36 mm.

Material observed : Three examples, from Kadamakal hills. 16/9/2000. (Coll. Sandhya P.S. and Rajendra G.M.).

Distribution : Karnataka : B. R. Hills, Brahmagiri, Kadamakal Hills; Tamil Nadu : Nilgiris and Annamalai.

Remarks : This is clearly distinguished from the other members of the genus by the flat whorls, thickened lips and the distinct sharp keel. The peripheral band may be absent in some specimen.

Genus *Cryptozona* Morch, 1872

This genus was earlier grouped with the sinistral *Ariophanta*.

Cryptozona solata (Benson, 1848)

1848. *Helix solata*, Benson, *Ann. Mag. nat. Hist.*, (2)2 : 159.

1908. *Ariophanta solata* : Blanford and Godwin-Austen, *Fauna Brit. India*, Mollusca I : 31.

Shell dextral, moderately umbilicate and translucent. Spire moderate, apex obtuse, pinkish, turning white as the shell grows. Shell with small specks all over the body whorl; with a chestnut coloured band at the periphery, coinciding with the sutures and another just below it visible only on the body whorl, both the bands end abruptly just behind the aperture. Whorls 5½, rapidly increasing, sutures impressed, surface with smooth transverse striations, body whorl rounded. Aperture negligibly descending, lips thin, white but just behind it is hay coloured, inside it has nacre. Upper lip flattened, basal lip inflated and rounded, columellar lip triangularly reflected, partly covering the umbilicus.

Measurements : Height = 16 mm, Diameter = 26 mm.

Material observed : Ten examples, from Thadiyandamoola. 26/10/2003. (Coll. N.A. Madhyastha)

Distribution : Tamil Nadu : Nilgiris; Karnataka : Sharavathi valley, Kodagu (Thadiyandamoola).:

Remarks : It can be easily distinguished by other members of the genus by its whitish shell and the translucent spots unique to it.

Genus *Mariaella* Gray, 1855

1855. *Mariaella dussumieri* Gray, *Cat. Pulm. B. M.* : 63.

1908. *Mariaella dussumieri* : Blanford and Godwin-Austen, *Fauna Brit. India*, Mollusca I : 205, fig. 71.

Shell internal, flat, solid in mature forms, with beak like apex, sides sharp, hay yellow in colour, spire indistinct. Animal is a slug; yellowish with dark brown spots present in the hind region in older forms, the spots are not distinct in the younger. Shell is internal, partly visible externally through the pore present on the top of the mantle. Mantle lobes united to form a shield enclosing the various systems, surface with two ridges running almost parallel to each other, the right one from the respiratory orifice to the shell aperture the other round the left margin. Posterior portion sharply keeled behind the mantle, ending in the mucus pore. Foot tripartite, edges with short vertical black parallel lines.

Measurements : Animal at full stretch 55 mm.

Material observed : Three examples at Napkolu, two at Kadamakal hills, 26/10/2003 (Coll. N.A. Madhyastha).

Distribution : India : Maharashtra : Mahableshwar, Poona; Karnataka : Kodagu, Sharavathi valley, Karwar, Kudremukh; Kerala; Wynaad. Found in Sri Lanka also.

Remarks : This endemic slug of Western Ghat/Sri Lanka hill ranges is an agricultural pest. In areca nut and coffee plantations it is very common.

Genus *Indrella* Godwin-Austen, 1901

Indrella ampulla (Benson, 1850)

1850. *Helix ampulla* Benson, *Ann. Mag. nat. Hist.*, (2)5 : 213.

1908. *Indrella ampulla* : Blanford and Godwin-Austen, *Fauna Brit. India*, Mollusca I : fig. 28, p. 49.

Shell dextral, imperforate and translucent. Spire small, apex obtuse, generally whitish due to the loss of the periostracum. Shell glossy, golden brown, irregularly dark at some places, near the columellar lip darker. Whorls 3, rapidly increasing, sutures impressed, surface wavy with smooth decussating transverse and spiral striations; body whorl very large, rounded. Aperture disproportionately large, negligibly descending, inside it has nacre. Upper lip sharply slanted, basal lip inflated and rounded, columellar lip slightly thickened.

Measurements : Height = 16 mm, Diameter = 26 mm.

Material observed : Ten examples, from Thadiyandamoola, Kadamakal hills. 16/9/2000. (Coll. Rajendra G.M. and N.A. Madhyastha).

Distribution : Tamil Nadu : Nilgiris, Annamalai hills; Kerala : Wynaad; Karnataka : Thadiyandamoola, Kadamakal Hills (new report).

Remarks : Sir Walter Elliot has described the animal to be Greenish yellow, and Col. Beddome has reported it to be black. But the specimens we have are cream coloured with a fluorescent orange, leaf like pattern on the back. It would be of interest to know which one of them is a variety or a new species. Another point of note is the animal is not fully retractable when disturbed in the active state. When it aestivates the animal covers itself with the white mantle and secretes a thin film of epiphragm.

Family STREPTAXIDAE

Genus *Streptaxis* Gray, 1837

Streptaxis peroteti (Petit, 1841)

1841. *Helix peroteti* Petit, *Rev. zool.* p. 100;

1908. *Streptaxis peroteti* : Blanford and Godwin-Austen, *Fauna Brit. India*, Mollusca I : 10, fig. 8.

Shell dextral, moderately umbilicate, yellowish, glossy, thick and sturdy. Spire short, apex obtuse. Whorls 5½ nearly flat, rapidly increasing, sutures impressed, surface with coarse transverse striations above the angulation, smooth below. Penultimate whorl slightly angled projecting more than the body whorl, which is slightly excentric and flattened below. Aperture axe shaped, with indentations present behind the peristome, which is reflected, lips thin. Aperture with a deeply re entering parietal lamella, scarcely bifid and 4 palatal teeth, a single basal parallel to the lamella, a columellar and of the two on the right margin the upper one is very small. Umbilicus shallow.

Measurements : H = 7 mm; Diameter = 11 mm.

Material observed : A single example at Abbey falls and another at Sampaje Ghat, 14/8/2000 (Coll. N.A. Madhyastha and Sandhya P.S.).

Distribution : Tamil Nadu : Annamalai, Nilgiris, Tirunelveli; Karnataka : Kodagu, Abbey Falls, Sampaje Ghat (new report). Also found in Sri Lanka.

Remarks : This is the first report of this species from Karnataka. As is the norm in this family they are found very rarely.

Streptaxis scalptus Blanford, 1899

1899. *Streptaxis scalptus* Blanford, *Proc. zool. Soc. Lond.*, p. 766, pl. 50, figs. 8, 9, 10.

1908. *Streptaxis scalptus* : Blanford and Godwin-Austen, *Fauna Brit. India*, Mollusca I : 12.

Shell dextral, moderately umbilicate, and white in colour, thick and sturdy. Spire flattened, apex obtuse. Whorls $5\frac{1}{2}$ nearly flat, rapidly increasing, sutures impressed, surface with transverse striations. Penultimate whorl rounded projecting scarcely beyond the ultimate whorl, which is excentric and flattened below. Aperture axe shaped, with indentations present behind the peristome, which is reflected, lips thin. Aperture with bifid re entering parietal lamella and 6 palatal teeth, two basal, two columellar and two on the right margin. Umbilicus shallow.

Measurements : H = 6 mm; Diameter = 11 mm.

Material observed : A single example Bhagmandala and another at Thalakaveri, 23/12/2000 (Coll. Sandhya P.S. and Rajendra G.M.).

Distribution : Karnataka : B. R. Hills, Bhagmandala, Thalakaveri.

Remarks : This species is endemic to Karnataka. It is distinguished from the preceding species by the presence of an extra columellar tooth, basal tooth being slightly left to the lamella and a deeper umbilicus. Also the columellar margin being slightly indented and not as straight in the former.

Family CHAROPIDAE

Genus *Ruthvenia* Draparnaud, 1801

Ruthvenia retifera Pfeiffer, 1845

1845. *Helix retifera* Pfeiffer, *Proc. zool. Soc. Lond.*, p. 73.

1914. *Ruthvenia retifera* : Gude, *Fauna Brit. India*, Mollusca II : fig. 5, 26.

Shell dextral, broadly conic, moderately umbilicate, hay coloured, thin glossy and translucent. Spire short, apex obtuse. Whorls $6\frac{1}{2}$, gradually increasing, sutures impressed, surface with vertical lirations that continues to form hair like appendages from the single prominent spiral liration present just above the sutures. The body whorl keeled, flattened below, and contains dentitions visible at a short distance from the aperture. Dentitions five, of which three are horizontal and parallel to each other; the remaining two are vertical and continuous. Aperture more than double the spire, lips thin, columella chestnut coloured. Umbilicus moderately wide and deep.

Measurements : H = 4 mm, Diameter = 7 mm.

Materials observed : Nine examples from FMKMC campus Madikeri. 13/9/2003 (Coll. Sandhya P.S., N.A. Madhyastha and Rajendra G.M.).

Distribution : Tamil Nadu : Nilgiris, Coonoor, Thirunelveli, Shevroy Hills; Karnataka : Mysore, Madikeri.

Remarks : This interesting species has teeth situated deep and far away from the aperture. The teeth are present in sets of five, at regular intervals.

SUMMARY

This study is the first report on land snails of Kodagu district. The land snails of Western Ghats in particular are important due to their high endemism; 94% including those common with Sri Lanka (Ramakrishna and Mitra 2002, Mavinkurve *et al.*, 2003). A sum of 439 individuals belonging to 9 families, 28 genera and 50 species were collected. Kodagu district land snails fauna shows considerable resemblance with that of Wynad. Many of them are quite interesting. The monotypic genus *Indrella ampulla* in this area marks the extension of the distributional limits and another point to be noted is that of the colour of the animal, which varies considerably from the description given in the Fauna. The presence of two species of the carnivorous snail *Streptaxis* is also interesting as a pointer to high molluscan diversity. *Mariaella dussumieri* is a serious pest causing damage to the economically important plantation crops. It is common in Home Gardens, near water pipes, and wherever there is even slight amount of moisture. All the species described are endemic to Western Ghats and Sri Lanka hill ranges.

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REFERENCES

- Madhyastha, N.A., Mavinkurve, R.G. and Sandhya, P.S. 2002. Land snails of Western Ghats. In *ENVIS Bulletin : Wildlife and protected areas, Conservation of Rainforests in India*, A.K. Gupta, Ajith Kumar and V. Ramakantha (Editors), Vol 4, No. 1, 143-152.
- Mavinkurve, R.G., Sandhya, P.S. and Madhyastha, N.A. 2003. Invertebrates as the new frontier area in Conservation planning. Mollusca : A case study. *Environ Abstract/Souvenir National Seminar on 'Ecorestoration, Biodiversity Conservation and Sustainable Development'* Pp.13.
- Mavinkurve, R.G., Sandhya, P.S. and Madhyastha, N.A. 2004a. Checklist of terrestrial gastropods of Karnataka India. *Zoos' Print Journal*, 9(11) : 1684-1686.
- Mavinkurve, R.G., Sandhya, P.S. and Madhyastha, N.A. 2004b. Non-marine molluscs of Western Ghats : A status review. *Zoos' Print Journal*, 19(12) : 1708-1711.
- Mavinkurve, R.G., Sandhya, P.S and Madhyastha, N.A. 2005. The land snails of Sharavathi Wildlife Sanctuary. *Rec. zool. Surv. India*, 104 (Part 1-2) : 123-131.
- Ramakrishna and Mitra, S.C. 2002. Endemic Land molluscs of India. *Rec. zool. Surv. India, Occ. Paper No. 196* : 1-65 (Published : Director, *Zool. Surv. India*, Kolkatta).
- Vaught, K.C. 1989. A Classification of Living Mollusca. (Eds. Abbott, R.T. and Boss, K.J.) : 15-109.