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Notes on Chrysomelid Beetles (Coleoptera) of India and its Neighboring Areas

Part 10*

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Abstract Forty-three species of the subfamily Cassidinae, Chrysomelidae are enumerated from India and its neighboring areas, with descriptions of 8 new species: *Notosacantha darjeelingensis*, *N. jammuensis*, *N. nathani*, *N. nepalensis*, *N. nilgiriensis*, *Cassida dehradunensis*, *C. devalaensis* and *C. nilgiriensis*.

Key words: Cassidinae; Chrysomelidae; India; new species.

Based on chrysomelid specimens from the Canadian National Collection, Peabody Museum in Yale University, Lyman Museum in Canada, Hokkaido University, Dr. ASKEVOLD's and authors' private collections, 43 species of the subfamily Cassidinae (Coleoptera, Chrysomelidae) are enumerated from India and its neighboring areas. *Notosacantha darjeelingensis*, *N. jammuensis*, *N. nathani*, *N. nepalensis*, *N. nilgiriensis*, *Cassida dehradunensis*, *C. devalaensis* and *C. nilgiriensis* n. spp. are described from India and Nepal.

Abbreviations used for collections: AC, ASKEVOLD's private collection; BC, BOROWIEC's private collection; CNC, Canadian National Collection; EH, Entomological Institute, Hokkaido Univ.; IAES, Institute of Agro-Environmental Sciences, Tsukuba; LM, Lyman Museum in Canada; PM, Peabody Museum in Yale Univ.; TC, TAKIZAWA's private collection; ZSI, Zoological Survey of India in Calcutta.

Enumeration

1. *Aspidomorpha dorsata* (FABRICIUS, 1787)
1 ex., Kumili, 2,500 ft, Tamil Nadu, VI.1986, TRS. Nathan (TN) leg. (TC).
2. *Aspidomorpha furcata* (THUNBERG, 1789)
2 ex., Cinchona, 3,500 ft, Anaimalai Hills, S. India, V.1963, 1964, PS. Nathan (PN) leg. (LM); 5 exs., Devala, 3,200 ft, Nilgiri Hills, S. India, V.1984, TN (TC); 3

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- exs., Thenmala, Quilon, Kerala, VI.1988, TN (TC); 2 exs., Kumili, 2,500 ft, Tamil Nadu, V.1986, TN (AC, TC); 4 exs., Agumbe Ghat, Shimoga, Mysore, V.1981, 1987, TN (AC, TC); 1 ex., Neffapakkam, Pondicherry State, X.1963, PN (LM); 1 ex., Coimbatore, Madras, S. India, X.1979, TN (TC).
3. *Aspidomorpha fuscopunctata* BOHEMAN, 1854
= *Aspidomorpha dorsata*: TAKIZAWA, 1980, Ins. matsum., n.s. 21, p. 25 (larva); 1985, Ent. Rev. Japan, 40, p. 4; 1986, Ent. Rev. Japan, 41, p. 45; 1987, Kontyû, Tokyo, 55, p. 526.
2 exs., Kumili, 2,500 ft, Tamil Nadu, V.1986, TN (AC).
 6. *Laccoptera quadrimaculata* (THUNBERG, 1789)
11 exs., Kadampurai, Cinchona, 3,500 ft, Anaimalai Hills, S. India, V.1963, PN (CNC, LM).
 7. *Laccoptera quatuordecimnotata* BOHEMAN, 1855
1 ex., Agumbe Ghat, 2,000 ft, Shimoga Dist., Mysore, V.1987, TN (AC)
 8. *Laccoptera tredecimpunctata* (FABRICIUS, 1801)
12 exs., Kumili, 2,500 ft, Tamil Nadu, V,VI.1986, TN (AC, TC).
 9. *Epistictinia reicheana* (GUÉRIN, 1844)
1 ex., Kumili, 2,500 ft, Tamil Nadu, V.1986, TN (AC)
 10. *Rhytidocassis indicola* (DUVIVIER, 1892)
= *Cassida indicola*: TAKIZAWA, 1985, Ent. Rev. Japan, 40, p. 7 (Fig. 6 is not *indicola* but *Cassida avia* WEISE)
1 ex., Madras, Tamil Nadu, India, 16-19.XII.1978, Jap.-Ind. Co. Tr. (EHU)
 11. *Chiridopsis binduta* (MAULIK, 1919)
= *Chiridopsis promiscua*: TAKIZAWA, 1980, Ins. matsum. n. s. 21, p. 31 (larva); 1985, Ent. Rev. Japan, 40, p. 7; 1987, Kontyû, Tokyo, 55, p. 527.
5 exs., Agumbe Ghat, 2,000 ft, Shimoga, Mysore, S. India, V.1987, TN (TC); 11 exs., Coimbatore, Madras, S. India, X.1979, TN (AC, TC); 1 ex., Nandi Hills, 1,200 m, Karnataka, 5.X.1985, CW. & LB. O'BRIEN (OB) leg. (AC)
 12. *Chiridopsis bipunctata* (LINNAEUS, 1758)
35 exs., Coimbatore, 1,400 ft, Madras State, IV,XI.1962, PN (CNC); 1 ex., Neffapakkam, Pondicherry State, X.1963, PN (CNC); 2 exs., Madras, S. India, VIII.1984, TN (AC); 1 ex., Karaikal, Pondicherry, S. India, XII.1986, TN (AC); 1 ex., Algal Hills, 21 km N. Madurai, Tamil Nadu, 28.IX.1985, OB (AC); 1 ex., Karnataka, 23 km SW. Bangalore, Mysore, 1.X.1985, OB (AC).
 13. *Chiridopsis novemkalankita* (MAULIK, 1919)
1 ex., Periyar Sanct., Thekkady, Kerala, India, 19-21.XII.1978, Jpn.-Ind. Co. Tr. (EHU); 1 ex., Kumili, 2,500 ft, Tamil Nadu, V.1986, TN (TC).
 14. *Chiridopsis ornata* (FABRICIUS, 1798)
1 ex., Pudukkotai, S. India, X.1984, TN (TC).
 15. *Chiridopsis promiscua* (BOHEMAN, 1855)
1 ex., Karikal, Pondicherry State, S. India, X.1968, PN (MM).
 16. *Chiridopsis sexplagiata* (SPAETH, 1919)
13 exs., Cinchona, 3,500 ft, Anaimalai Hills, S. India, V.1963, 1964, PN (CNC); 1

- ex., Kadampurai, 3,500 ft, Anaimalai Hills, S. India, V.1963, PN (CNC).
17. *Chiridopsis undecimnotata* (BOHEMAN, 1855)
1 ex., Cinchona, 3,500 ft, Anaimalai Hills, S. India, V.1964, PN (LM); 1 ex., Mettupalayam View, ca. 1,000 m, Nilgiri, Tamil Nadu, 30.XI.1978, Jpn.-Ind. Co. Tr. (EHU).
 18. *Sindia clathrata* (FABRICIUS, 1798)
1 ex., Pudukkotai, S. India, XI.1984, TN (TC).
 19. *Oocassida cruenta* (FABRICIUS, 1792)
1 ex., Pudukkotai, S. India, XI.1984, TN (TC); 3 exs., Neffapakkam, Pondicherry State, X.1963, PN (CNC, LM); 2 exs., Karikal, Pondicherry State, X.1963, PN (CNC).
 20. *Notosacantha darjeelingensis* n. sp.
Distribution. N. India.
 21. *Notosacantha jammuensis* n. sp.
Distribution. India.
 22. *Notosacantha maculipennis* (BOHEMAN, 1856)
2 exs., Nagarjun, feeding on *Alnus* sp., Bagmati, Nepal, 16.IX.1987, H. TAKIZAWA leg. (TC); 1 ex., Gokarna, Kathmandu Vall., Nepal, 15.IX.1987, H. TAKIZAWA leg. (TC).
 23. *Notosacantha nathani* n. sp.
Distribution. S. India.
 24. *Notosacantha nepalensis* n. sp.
Distribution. Nepal.
 25. *Notosacantha nilgiriensis* n. sp.
Distribution. S. India.
 26. *Notosacantha severini* (SPAETH, 1913)
1 ex., Agumbe Ghat, 2,000 ft, Shimoga Dist., Mysore, VI.1987, TN (AC).
 27. *Notosacantha vicaria* (SPAETH, 1913)
1 ex., Devala, 3,200 ft, Nilgiri Hills, S. India, V.1984, TN (AC).
Distribution. Sri Lanka, Andaman Is., S. India (new to India).
 28. *Cassida andrewesi* WEISE, 1897
1 ex., Peechi Dam, 24 km E. Trichur, Kerala, 12.X.1985, OB (AC).
 29. *Cassida avia* (WEISE, 1897)
2 exs., Coimbatore, Madras, S. India, X.1979, TN (TC).
 30. *Cassida belliformis* MAULIK, 1919
= *Cassida* sp.: TAKIZAWA, 1989, *Jpn. J. Ent.*, 57, p. 326.
2 exs., Darjeeling, 2,100 m, W. Bengal, 28.IX.1983, M. SAKAI leg. (NSMT).
 31. *Cassida circumdata* HERBST, 1799
4 exs., Canal syst. around Kottayam, Kerala, 9.X.1985, OB (AC); 2 exs., Chalakuby, 32 km S. Trichur, Kerala, 10.X.1985, OB (AC); 20 exs., Bharaptur, Keolado Natl. Park, Rajasthan, 6.IX.1985, OB (AC); 8 exs., Devala, 3,200 ft, Nilgiri, S. India, V.1984, TN (AC, TC); 1 ex., Agumbe Ghat, 2,000 ft, Shimoga,

- Mysore, V.1981, TN (AC).
32. *Cassida conspurcata* BOHEMAN, 1854
 = *Cassida* sp. 1: TAKIZAWA, Ent. Rev. Japan, 38, p. 78
 1 ex., Coimbatore, Tamil Nadu, 5.XII.1978, Jap.-Ind. Co. Tr. (EHU); 1 ex., Coimbatore, Madras, 11.XI.1971, K. SADANAGA leg. (IAES).
33. *Cassida dehradunensis* n. sp.
Distribution. India.
34. *Cassida delesserti* BOHEMAN, 1854
 2 exs., Kadampurai, Anaimalai Hills, S. India, V.1963, PN (CNC, LM).
35. *Cassida develaensis* n. sp.
Distribution. S. India.
36. *Cassida exilis* BOHEMAN, 1854
 = *Cassida (Taiwania)* sp. 2: TAKIZAWA, 1980, Ins. matsum., n. s. 21, p. 36 (larva)
 8 exs., Coimbatore, Tamil Nadu, 9-13.XI, 5.XII.1978, Jpn.-Ind. Co. Tr. (EHU); 3 exs., Coimbatore, Madras State, Tamil Nadu, VIII.1973, X.1975 (CNC); 1 ex., Badkhal Lake, Haryana, India, 22.X.1978, Jap.-Ind. Co. Tr. (EHU).
37. *Cassida icterica* BOHEMAN, 1854
 1 ex., Devala, 3,200 ft, Nilgiri, S. India, V.1984, TN (TC); 2 exs., Balaju, Kathmandu Vall., Nepal, 11.IX.1987, H. TAKIZAWA leg. (TC)
38. *Cassida nilgiriensis* n. sp.
Distribution. S. India, Malaysia.
39. *Cassida obtusata* BOHEMAN, 1854
 16 exs., 30 km NE. Calcutta, Madhyamgram, W. Bengal, 10.IX.1985, OB (AC); 1 ex., Pakkal, 7 km SW. Trichur, Kerala, 11.X.1985, OB (AC); 50 exs., 4 km W. Ghaziabad, Hindon River, N. E. Delhi, 4.IX.1985, OB (AC).
40. *Cassida pulvinata* BOHEMAN, 1854
 5 exs., Madras, Tamil Nadu, 16-19.XII.1978, Jpn.-Ind. Co. Tr. (EHU); 1 ex., Coimbatore, Tamil Nadu, 5.XII.1978, Jpn.-Ind. Co. Tr. (EHU); 1 ex., Karikal, Pondicherry State, S. India, IX.1963, PN (LM); 2 exs., India, 1978, Jap.-Ind. Co. Tr. (EHU).
41. *Cassida saginata* SPAETH, 1914
 2 exs., Agumbe Ghat, Shimoga, Mysore, V.1981, V.1987, TN (AC, TC).
42. *Cassida subtilis* (WEISE, 1905)
 = *Cassida* sp. 2: TAKIZAWA, 1986, Ent. Rev. Japan, 41, p. 46
 = *Cassida (Taiwania)* sp. 1: TAKIZAWA, 1980, Ins. matsum., n. s. 21, p. 35 (larva)
 13 exs., Kumili, 2,500 ft, Tamil Nadu, India, VI.1986, TN (AC, TC); 4 exs., Devala, 3,200 ft, Nilgiri, S. India, V.1984, TN (AC); 1 ex., Nadugani, Tamil Nadu, India, 8.V.1980, M. Ito leg. (TC); 2 exs., Mettupalayam View, ca. 1,000 m, Nilgiri, Tamil Nadu, 10.XII.1978, Jap.-Ind. Co. Tr. (EHU); 1 ex., Coonnor, 1,700-1,900 m, Nilgiri, Tamil Nadu, 23-26.XI.1978, Jap.-Ind. Co. Tr. (EHU); 1 ex., 32 km E. Kodaikanal, 1,050 m, Tamil Nadu, 29.IX.1985, OB (AC); 1 ex., 6 km SW. Mahabaleshwar, Mahar, 19.X.1985, OB (AC).

43. *Cassida syratica* BOHEMAN, 1856

2 exs., Kallar, 700–850 m, Nilgiri, Tamil Nadu, 9.XII.1978, Jpn.-Ind. Co. Tr. (EHU); 1 ex., Yercaud, 1,300–1,500 m, Salem, Tamil Nadu, 1.XII.1978, Jpn.-Ind. Co. Tr. (EHU) 2 exs., Cinchona, 3,500 ft, Anaimalai Hills, S. India, V.1964, PN (CNC). 8 exs., Balaju, Kathmandu Vall., Nepal, 11.IX.1987, H. TAKIZAWA leg. (TC); 1 ex., Nagarjun, Bagmati, Nepal, 16.IX.1987, H. TAKIZAWA leg. (TC); 1 ex., Sundarikal, Kathmandu Vall., Nepal, 11.IX.1987, H. TAKIZAWA leg. (TC).

Descriptions of new species

Cassida dehradunensis n. sp.

(Fig. 1)

Length, 5.0 mm; width: 4.3 mm; length of pronotum, 1.7 mm; width of pronotum, 3.0 mm.

Pale yellow, pronotal disc with two U-shaped spots at base. Elytral disc with several black, irregular spots. Suture yellow except for black postscutellar elevation. On sides of disc black spots coalescing to form a lateral band occupying intervals 7–8; marginal interval yellow; with large yellow spot in the middle of submarginal interval. Yellow spots on anterior half of elytral disc slightly convex,

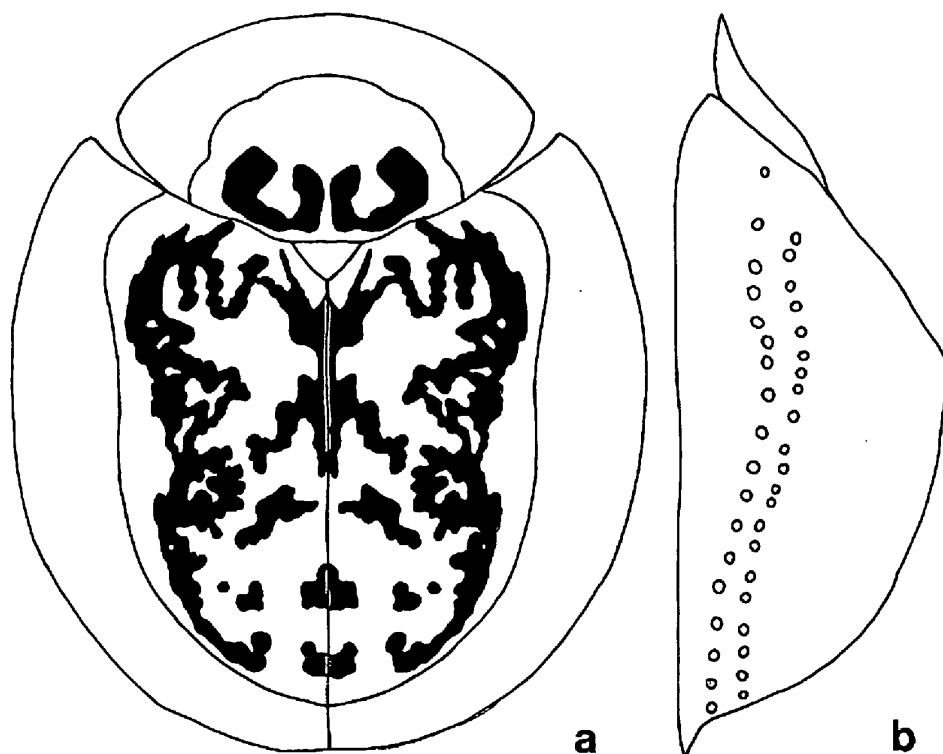


Fig. 1. *Cassida dehradunensis* n. sp.: a, dorsal coloration; b, body profile.

forming a relief. Scutellum yellow. Ventriles and antennae pale yellow.

Pronotum 1.7 times wider than long with maximum width slightly in front of the middle, rounded on sides. Disc strongly convex, distinctly bordered from explanate margin, impunctate, smooth and shiny. Area above head bordered from other part of disc by a shallow sulcus. On each side of disc a shallow depression present. Explanate margin flat, subhorizontal, smooth and shiny with honeycomb structure. Base of elytra slightly wider than pronotum; humeral angles strongly protruding anterad, so body almost circular in outline. Elytral disc almost regularly convex in profile; postscutellar depression shallow, without principal depression. Puncturation of disc partly regular, partly disordered by elytral relief. Punctures large, almost touching to each other. Intervals about twice narrower than punctures. Yellow relief in anterior half of disc impunctate. Surface between punctures smooth and shiny. Explanate margin moderately declivous; external part of margin horizontal, smooth and shiny, with honeycomb structure. Epipleura broad, apex with row of erected hairs. Clypeus broad, about 1.4 times wider than long, flat, impunctate and shiny, without lateral grooves. Labrum incised to 1/6 length. Eyes large; gena obsolete. Antennae moderately long, reaching beyond hind margin of pronotum by last three segments. Length ratio of antennal segments: 100 : 50 : 80 : 85 : 75 : 65 : 70 : 70 : 75 : 75 : 125. Prosternal collar very short, half as long as second antennal segment. Prosternal process strongly expanded apically and flat, with apex punctate. Legs slim, without modifications. Last segment of tarsi about as long as third. Claws simple but appearing strongly appendiculate due to distally projecting flanks of claw segment.

Holotype: India, U [ttar] P [radesh], FRI, Dehra Dun, 650 m, 10-13.XI.1978, Jpn.-Ind. Co. Tr. (preserved in the collection of the Entomological Institute, Hokkaido Univ., Sapporo).

Remarks. It belongs to the subgenus *Crepidaspis* SPAETH sensu BOROWIEC, 1990 (= *Taiwania* SPAETH). It is unique in body coloration. Other species, which have elytra colored irregularly with black and yellow, differ by explanate margin punctate (*C. delesserti* BOHEMAN, *C. aspectabilis* SPAETH), or by base of elytra distinctly wider at apex than pronotum and elytral relief much expressed (*C. ex-promta* (SPAETH), *C. physodes* (BOHEMAN)). No other species has pronotal disc with U-shaped black spots.

Cassida devalaensis n. sp.

(Fig. 2)

Length, 4.3-5.0 mm; width, 3.7-4.3 mm; length of pronotum, 1.4-1.8 mm; width of pronotum, 2.8-3.2 mm.

Body short-oval to subpentagonal in outline. Yellow, pronotal disc except for area above head black, also basal part of explanate margin of pronotum black. Elytral disc black except for small yellow spot at base of humerus. Ex-

planate margin of elytra with large humeral, posterolateral, and sutural black spots. Ventriles yellow, mostly infuscate on abdomen. Antennal segments 1–5th yellow, 6th brownish, 7–10th black, 11th black with apex yellow on ventral side.

Pronotum 1.8–2.0 times wider than long, with maximum width in the middle, broadly rounded on sides. Pronotal disc moderately convex, distinctly bordered from explanate margin, especially on sides, with two distinct depressions on sides, and two small ones laterally to head. Elevated part of disc sparsely but strongly punctate, distance between punctures 1.2–3.0 times larger than punctures. Surface between punctures microreticulate but shiny. Explanate margin flat, horizontal and impunctate, with honeycomb structure on light parts. Elytral disc almost regularly convex in profile, with only slightly marked postscutellar gibbosity. Surface of elytral disc uneven, with two distinct depressions on postscutellar part and H-shaped postscutellar elevation. First and second intervals with irregular transverse fold in the middle of length; second interval with tubercle in 2/3 length; sides with deep principal depression, several small folds and tubercles. Rows regular only in marginal part of disc, in the middle and in sutural parts rows disordered by elytral relief. Intervals as wide as punctures or slightly narrower. Explanate margin of elytra slightly wider than half width of elytron, strongly but shallowly punctate, especially with large punctures on dark spots, appearing uneven to rugose. Surface between punctures shiny; light parts of margin with

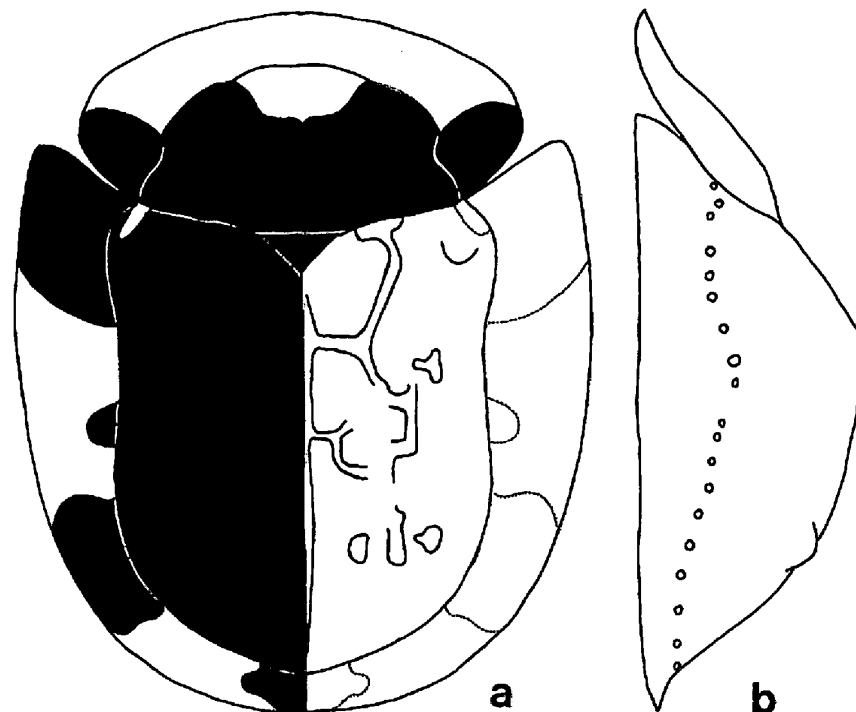


Fig. 2. *Cassida devalaensis* n. sp.: a, dorsal coloration and sculpture; b, body prone.

honeycomb structure. Humeral angles subangulate; margin beyond angle not incised, straight or slightly convex. Elytral epipleura broad and unpubescent. Clypeus slightly longer than wide at base, flat and impunctate, without lateral grooves. Labrum incised to 1/5 length. Prosternal process strongly expanded apically and flat, without special sculpture. Eyes large; gena obsolete. Antennae moderately long, reaching behind hind margin of pronotum by last three segments. Length ratio of antennal segments: 100 : 50 : 70 : 45 : 50 : 60 : 75 : 65 : 70 : 70 : 140. Legs slim, not modified. Last tarsal segment slightly longer than third one; claws large and simple.

Holotype and two paratypes: S. India, Devala, Nilgiri Hills, 3,200 ft, V.1984, TRS. NATHAN leg. (holotype in Canadian National Collection, each paratype in TAKIZAWA's and BOROWIEC's collection)

Remarks. It belongs to the subgenus *Crepidaspis* SPAETH. Characteristic body shape and coloration, and elytral sculpture near this species to *C. ruralis* BOHEMAN only. *C. ruralis* differs in postscutellar elevation higher, which forms a conical tubercle, folds and tubercles on sides and apex of disc lower. Elytral disc is usually not uniformly black or brown but with several small, yellow spots. Abdomen pale yellow, and tarsal claws simple but appearing appendiculate due to distally projecting flanks of the claw segment.

Cassida nilgiriensis n. sp.

(Fig. 3)

Length, 4.6-4.9 mm; width, 4.0-4.2 mm; length of pronotum, 1.6-1.7 mm; width of pronotum, 2.8-2.9 mm.

Body almost circular in outline. Yellow, pronotal disc mostly or completely dark brown to black. Scutellum dark brown to black with yellowish spot in the middle. Explanate margin of elytra with humeral and posterolateral black spots. In dark brown form posterolateral spot smaller than humeral one, in black form posterolateral spot larger than humeral one, occupying almost whole posterior half of explanate margin except for narrow, yellow spot along suture. Antennae yellow or last segment infuscate. Ventrites yellow.

Pronotum 1.7-1.75 times wider than long, with maximum width at the middle, pronotal sides broadly rounded. Pronotal disc moderately convex, indistinctly bordered from explanate margin, smooth, shiny and impunctate or with several indistinct, small and shallow punctures at sides. Each side of disc in the middle and laterally to head with a shallow depression. Explanate margin flat and horizontal, with honeycomb structure. Base of elytra crenulate and distinctly wider than pronotum. Disc almost regularly convex in profile without depressions on sides; postscutellar elevation low; postscutellar depressions small but distinct. Puncturation regular, but slightly disordered by postscutellar elevation; punctures moderately large (6-7 punctures in scutellar row, 25-29 in sutural, 26 in

marginal). Intervals flat, in the middle about as wide as punctures, in sutural and marginal parts about 1.5–2.0 times wider than punctures. Surface of intervals microreticulate but shiny. Explanate margin about twice narrower than elytron, moderately declivous, impunctate and shiny. Humeral angles obtuse, margin behind angle not incised. Elytral epipleura broad, unpubescent. Clypeus about as long as wide at base, flat, impunctate, and microreticulate but shiny, without lateral grooves. Labrum incised to 1/7 length. Eyes large; gena obsolete. Prosternal collar as long as length of second antennal segment. Prosternal process strongly expanded apically and flat, without special sculpture. Antennae moderately long, reaching behind basal margin of pronotum by 3–4 segments. Length ratio of antennal segments: 100 : 45 : 75 : 60 : 55 : 60 : 55 : 50 : 55 : 55 : 120. Legs slim, not modified. Last tarsal segment as long as third; claws simple but appearing slightly appendiculate due to the distally projecting flanks of the claw segment.

Holotype: South India, Nilgiri-Cherangade, 3,500 ft, X.1950, P. S. NATHAN leg.; paratypes: E. Pakistan (now Bangladesh), Andharkola, Rajahahi Dt., VIII.1963, MAPELLI leg.; Malaysia, Perak: Lumut, 6–11.XI.1988, SALLEH & ISMAIL leg. (holotype and paratype in L. BOROWIEC's collection, paratype in Coll. Dept. of Zoology, University Kebangsaan, Malaysia, Bangi).

Remarks. It belongs to the subgenus *Crepidaspis* SPAETH sense BOROWIEC,

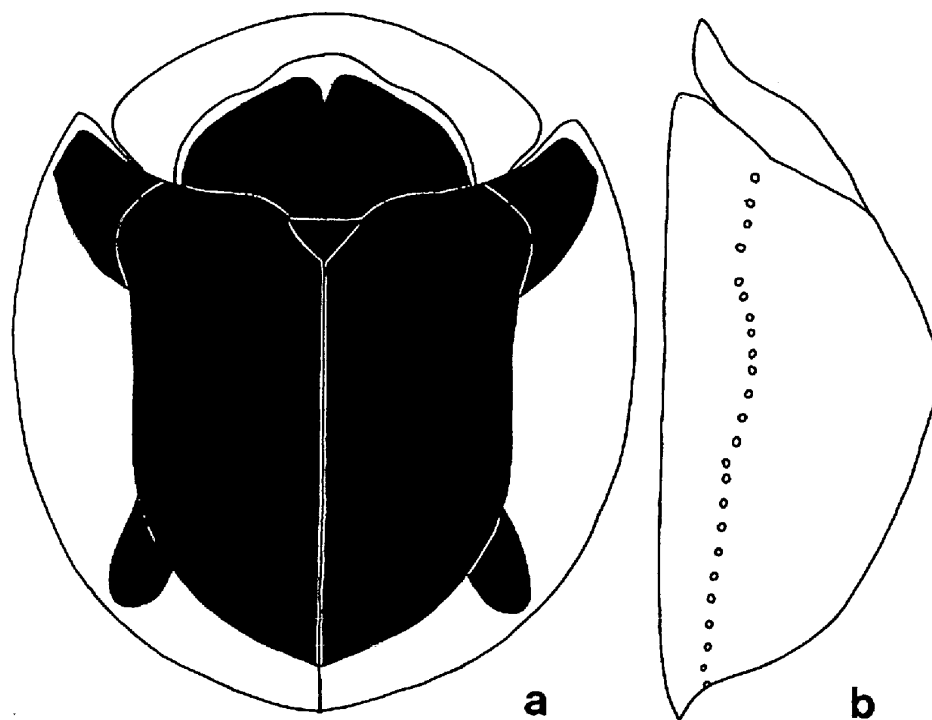


Fig. 3. *Cassida nilgiriensis* n. sp.: a, dorsal coloration; b, body profile.

1990. It is unique in its body coloration and sculpture. Other Oriental species, which are mostly black on elytral disc with black humeral and posterolateral spots on its explanate margin, differ in elytral disc with a conical postscutellar tubercle (*C. ruralis* BOHEMAN, *C. rati* MAULIK, *C. quinqueasteriza* MEDVEDEV et EROSHKINA), or elytra strongly sculptured with several folds and depressions (*C. devalaensis* n. sp.), or pronotal disc purple reddish (*C. purpolicollis* SPAETH).

Notosacantha darjeelingensis n. sp.

(Fig. 4)

Length, 3.9 mm; width, 3.2 mm.

Body short-oval. Brownish yellow, extreme margin of pronotum and elytra, and window on explanate margin of elytra pale yellow. Clypeus, gena, thorax,

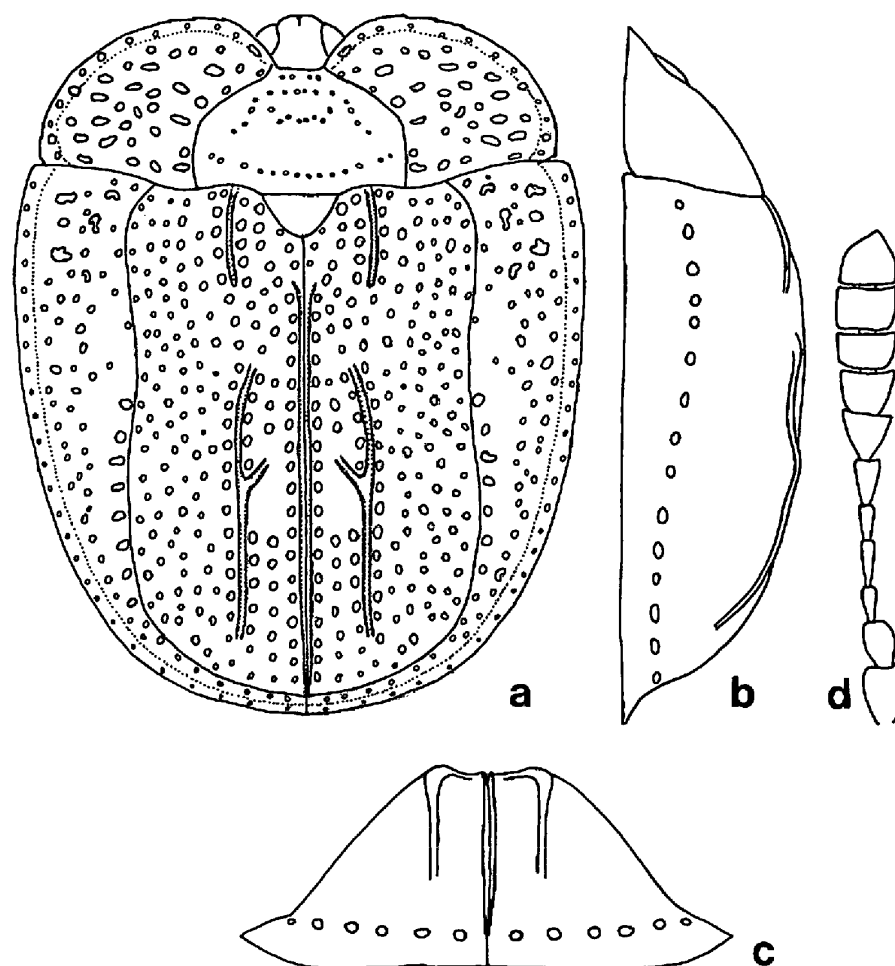


Fig. 4. *Notosacantha darjeelingensis* n. sp.: a, dorsal view; b, lateral view; c, hind view; d, antenna.

basal third of profemora and basal half of midfemora black. Labrum and trochanters yellow. Frontal plate very short, with anterior margin rounded. Antennae 11-segmented, extending to hind angles of pronotum, antennal club with five segments. Basal part of antenna only slightly longer than club. Pronotum widest at base. Pronotal disc with row of punctures at anterior margin and at base, oblique row of punctures on sides. Explanate margin with large pores as in Fig. 4. Anterolateral margin of pronotum only slightly crenulate. Base of elytra not wider than pronotum, sides slightly rounded. Disc with only incomplete dorsal costa, no humeral costa or humeral and apical tubercles, sutural costa turning obliquely anterad, extending to sutural row of punctures. Dorsal costa interrupted between basal and subbasal point. Fourth interval in anterior third slightly more elevated than other intervals but not forming a costa. Puncturation of disc large and dense, punctures almost touching to each other. Explanate margin subhorizontal, strongly and densely punctate, also in window, only internal part of window along margin of disc scarcely punctate. Ventrites without specific characters.

Holotype: India, Bhalukhop, 800 m, 31.III.1983, Darjeeling D., B. BHAKTA leg. (in L. BOROWIEC's collection).

Remarks. It is the only Oriental species with elytral sculpture reduced to dorsal costa only and with principal point with three branches only: anterior, posterior and sutural. *N. jammuensis* n. sp. which has also only dorsal costa differs in principal point with four branches; anterior, posterior, sutural and lateral; scutellum black, maximum width of pronotum distinctly in front of base, and pronotal disc with two round brownish spots.

Notosacantha jammuensis n. sp.

(Fig. 5)

Length, 4.5 mm; width, 3.6 mm.

Body short-oval. Brownish yellow, explanate margin of pronotum and elytra slightly paler, without elytral window. Scutellum, clypeus, gena, tempora, meso- and metathorax black. Legs yellow, only base of femora slightly infusate. Labrum and prosternum brownish yellow. Basal margin of abdominal sternites infusate. Pronotal disc on each side with small, round, darker brownish spot. Frontal plate very short, with anterior margin rounded. Antennae 11-segmented, extending to hind angles of pronotum, antennal club 5-segmented. Basal part of antenna about 1.3 times longer than club. Pronotum with maximum width in 2/3 length. Pronotal disc with row of punctures at base and oblique row of punctures on each side. Explanate margin of pronotum with large pores as in Fig. 6. Anterolateral margin of pronotum slightly crenulate. Base of elytra not wider than pronotum, sides almost straight. Disc with only dorsal costa, no humeral costa nor humeral and apical tubercles. Principal tubercle with four costae: very

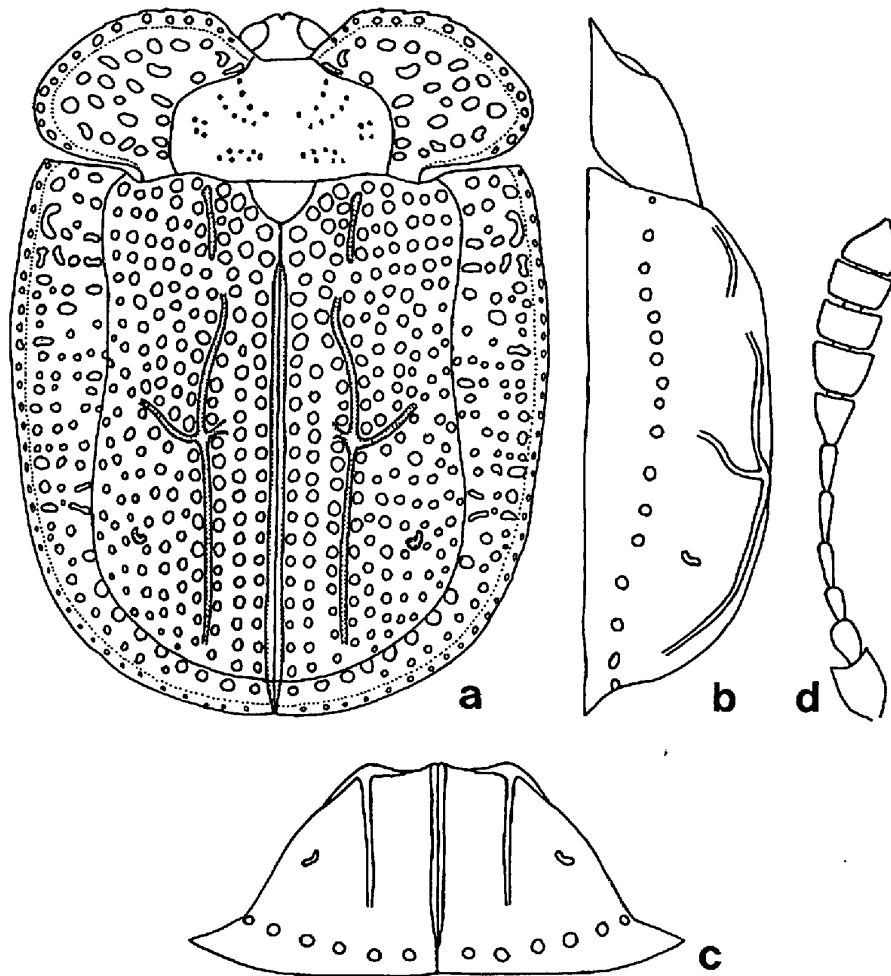


Fig. 5. *Notosacantha jammuensis* n. sp.: a, dorsal view; b, lateral view; c, hind view; d, antenna.

short sutural branch extending to second row of punctures, oblique lateral branch extending to eighth row of punctures, incomplete anterior branch interrupted between basal and subbasal point, and complete posterior branch. Apicolateral costa reduced to a small indistinct fold. Puncturation of disc large, intervals about twice narrower than punctures. Explanate margin subhorizontal, strongly and densely punctate, without impunctate window. Ventrites without specific characters.

Holotype: India, Jammu 1980, Yourdu, 16.7, 2,150–2,400 m (preserved in L. BOROWIEC's collection).

Remarks. It is a very distinct species. The elytron with only dorsal costa nears this species to *N. darjeelingensis* n. sp., but it differs in principal tubercle with three branches only, scutellum yellow, pronotum widest at base, and pronotal disc immaculate. At first glance pale form of *N. maculipennis* is also similar to

this new species, but in *N. maculipennis* apical tubercle has always transverse apical and sutural costae.

Notosacantha nathani n. sp.

(Fig. 6)

Length, 5.4 mm; width, 4.6 mm.

Body short-oval. Deep reddish black, extreme margin of pronotum and elytra yellowish red, ventrites yellow. Without paler window. Frontal plate very short, its anterior margin rounded. Antennae broken in the holotype. Pronotum widest at the base. Pronotal disc with row of punctures at the base and oblique row of punctures in the middle. Explanate margin with large pores as in Fig. 6.

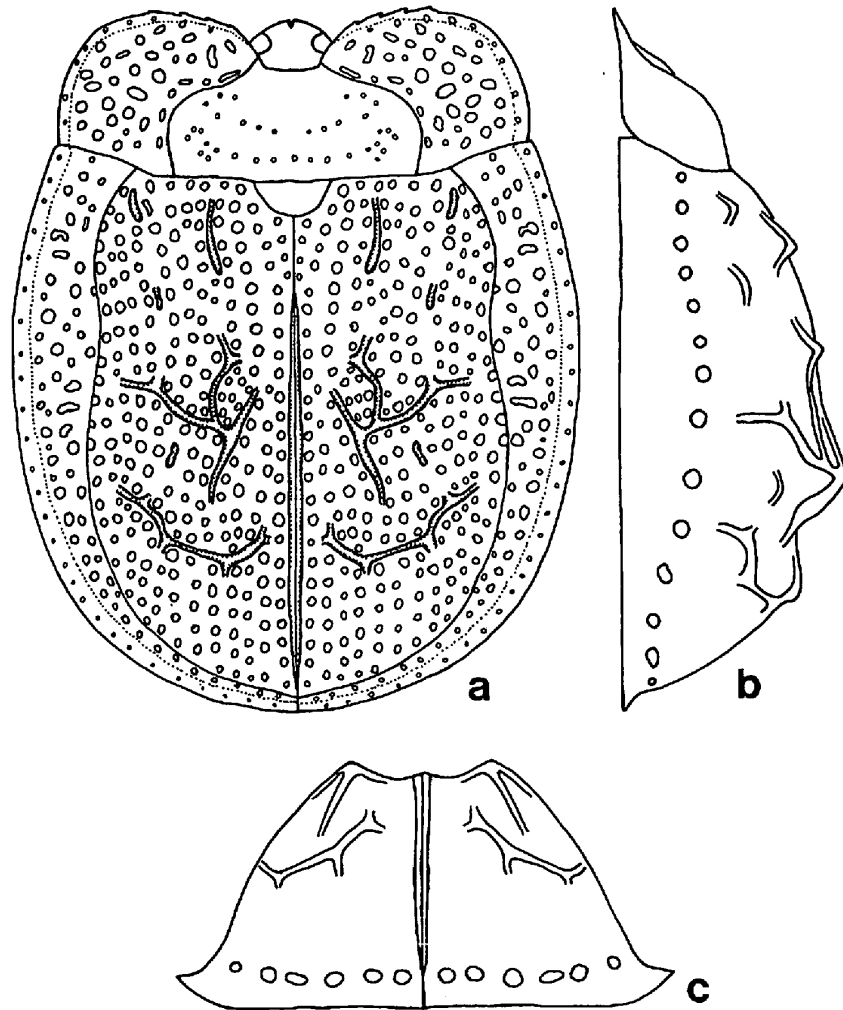


Fig. 6. *Notosacantha nathani* n. sp.: a, dorsal view; b, lateral view; c, hind view.

Anterolateral margin of pronotum slightly serrate. Base of elytra not wider than pronotum, sides convex, with maximum width in the middle. Elytral disc with irregular carinae. Dorsal carina interrupted and divided into three parts: short anterior branch ending in conical basal tubercle, principal tubercle with four branches, and apical tubercle without apicoanterior or apicoposterior branches. Principal tubercle low and broad, anterior and posterior branches converging in different points; anterior branch strongly curved and connected with small sub-basal tubercle; posterior branch oblique, ending distinctly in front of apical tubercle. Apical tubercle low and broad, with oblique apicosutural carina which is bifurcate apically and extending to first row of punctures, and apicolateral carina with very short costa ultima and costa terminalis, and very short furca externa. Furca interna reduced to a small fold in the middle of lateroapical area. Humeral carina reduced to a small humeral tubercle and short posthumeral fold. Humeral interval slightly much convex than adjacent ones. Puncturation of disc large, with intervals slightly narrower than punctures. Explanate margin subhorizontal, strongly punctate on whole surface including window area. Ventrites without specific characters.

Holotype: S. India, S. Coorg-Ammatti, 3,100 ft, II.1952, P. S. NATHAN leg. (preserved in L. BOROWIEC's collection).

Remarks. It belongs to the species group with principal tubercle having four branches, basal tubercle lacking humeral branch, apical carinae present, and with anterior and posterior branches of principal tubercle converging in different point. This group included also *N. singaporica* (SPAETH), *N. siamensis* (SPAETH), *N. flavicornis* (SPAETH), *N. reinecki* (SPAETH), *N. weyersi* (SPAETH), and *N. vicarina* (SPAETH). The last four species distinctly differ in explanate margin of elytra bicoloured with humeral and posterolateral spot. *N. siamensis* distinctly differs in body yellowish-brown and frontal plate elongate. *N. singaporica* is almost parallel-sided. The dorsal carinae are in all species of the group much regular than in *N. nathani*. At first glance, *N. indicola* (SPAETH) and *N. horni* (SPAETH) are similar to *N. nathani*, especially by deep reddish black body colouration and irregular dorsal carinae. Both these species have carinae much reduced than in *N. nathani*. *N. indicola* differs also by having humeral branch of basal tubercle and anterior and posterior branches of dorsal carina converging in the same point. *N. horni* differs in well developed furca interna.

Notosacantha nepalensis n. sp.

(Fig. 7)

Notosacantha tenuicula: TAKIZAWA, 1988, Ent. Rev. Japan, 43: 11, pl. 2, fig. 8

Length, 5.1 mm; width, 4.3 mm.

Body subpentagonal. Specimen not fully sclerotized. Explanate margin of

pronotum and elytra white, slightly infusate except for pure white elytral window. Pronotal disc yellow with brownish depressions and margins. Elytral disc brown with paler suture, costae of principal tubercle, humeral costa and post humeral interval. Scutellum yellow with infusate anterior corners. Antennae and ventrites yellow. Frontal plate short, subtriangular in outline. Antennae 11-segmented with 5-segmented club, extending to hind angles of pronotum. Basal part of antenna about 1.3 times longer than club. Pronotum with maximum width slightly in front of the base. Pronotal disc with two irregular rows of punctures at base, oblique row of punctures in the middle, and group of punctures in front of the middle row. Explanate margin with large pores as in Fig. 7. Anterolateral margin of pronotum slightly serrate. Base of elytra not wider than pronotum, sides convex with maximum width in $1/3$ of elytral length. Elytral disc with almost complete dorsal carina, interrupted only between basal and subbasal

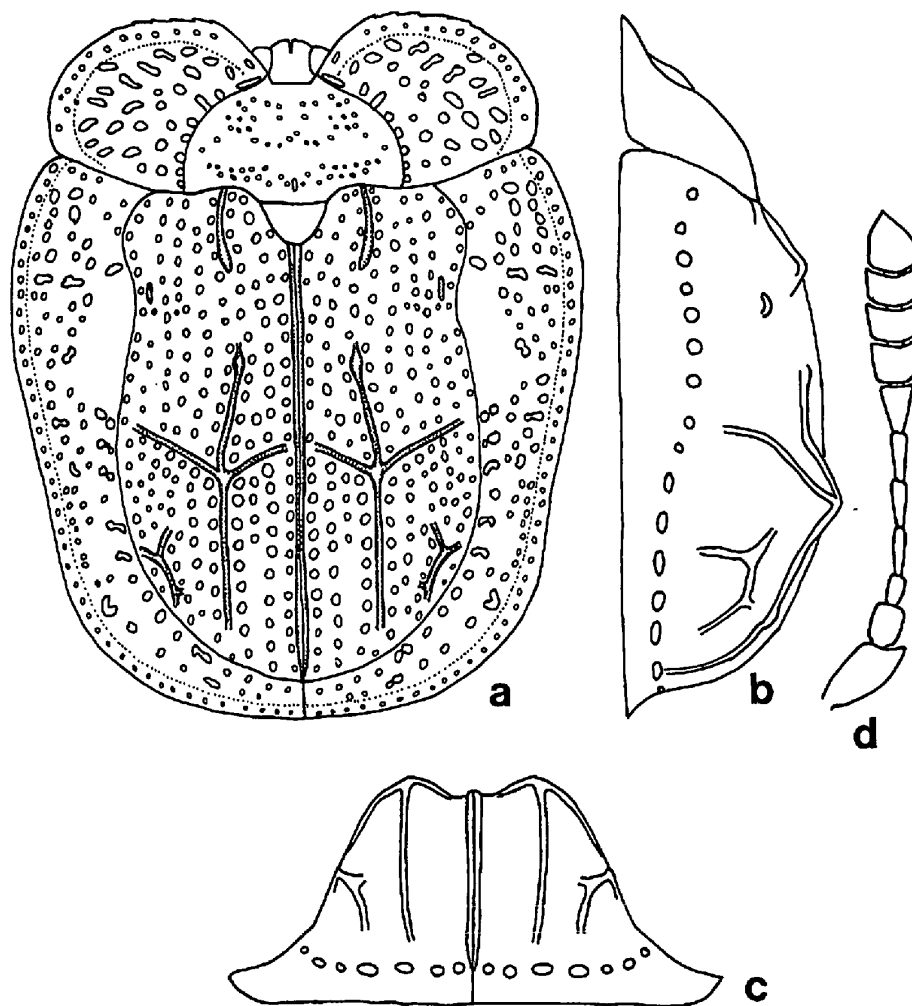


Fig. 7. *Notosacantha nepalensis* n. sp.: a, dorsal view; b, lateral view; c, hind view; d, antenna.

tubercles. Principal tubercle with four straight carinae; sutural branch extending to first row of punctures, lateral branch extending to submarginal interval; anterior and posterior branches converging at the same point. Apical tubercle and apicosutural carina absent; apicolateral carina reduced to costa ultima and costa terminalis. Furca interna present only in basal part. Humeral carina reduced to small posthumeral tubercle. Explanate margin subhorizontal, in anterior part strongly and densely punctate except for impunctate window, in posterior half only with two irregular rows of large punctures. Ventrites without specific characters.

Holotype: Godavari, Kathmandu V., 4.VIII.1983 (Npl-157), T. KUMATA leg., reared from larva mining on *Cleyera japonica* (Theaceae, Host No. Npl-157) (preserved in the collection of the Entomological Institute of Hokkaido Univ.).

Remarks. This new species belongs to the species group with reduced apicosutural carina. This group includes also *N. clura* (SPAETH), *N. centinodia* (SPAETH), *N. bifenestrella* (BOHEMAN), *N. templetoni* (BOHEMAN), *N. andrewesi* (WEISE), *N. birmanica* (SPAETH), *N. fenestralis* (SPAETH), *N. maculipennis* (BOHEMAN), and *N. fumida* (SPAETH). Last seven species differ in pronotum with maximum width at base; *N. bifenestrella* in principal tubercle reduced to a fold; *N. templetoni* in explanate margin of elytra without window; *N. andrewesi* in absence of elytral tubercles and body sculpture reduced to costae only; *N. birmanica* in elytral window large, extending to lateral margin of elytra; *N. fenestralis* in elytral tubercles larger, especially humeral and posthumeral tubercles are well developed; *N. maculipennis* and *N. andrewesi* in body mostly yellow with brown or blackish tubercles and/or costae; *N. centinodia* in thorax black; and *N. clura* differs in well-developed apical tubercles.

Notosacantha nilgiriensis n. sp.

(Fig. 8)

Length, 4.8 mm; width, 4.2 mm.

Body subpentagonal. Brownish-black, with round, pale yellow elytral window: anterior corners and basal margin of pronotum, humeral corners, lateral margin of elytra close to elytral window, and apical margin of elytra yellow. Frontal plate extremely short, its anterior margin rounded. Antennae 10-segmented, with 4-segmented club, short, not extending to hind angles of pronotum. Basal part of antenna about 1.8 times longer than club. Pronotum with maximum width slightly in front of the base. Pronotal disc with row of punctures at base, and group of punctures on each side on the middle. Explanate margin with large pores as in Fig. 8. Anterolateral margin of pronotum slightly serrate. Base of elytra not wider than pronotum, sides convex with maximum width in 1/4 length of elytron. Elytral disc with almost complete set of carinae and tubercles; basal tubercle conical and low, about thrice lower than basal width; principal tubercle

the largest, conical, but low, about thrice lower than basal width; apical tubercle about twice smaller than basal tubercle; subbasal tubercle very small and conical. Dorsal costa complete, only slightly interrupted between basal and subbasal tubercles; basal part of the costa straight, without humeral branch; median part of the costa curved to suture; post medial and apical parts of the costa straight. Principal tubercle with four branches: sutural extending to suture, lateral extending to submarginal row of elytron, anterior and posterior converging at the same point. Apical tubercle with four branches; apicosutural extending to first row of punctures, and apicolateral prolongate into incomplete furca interna and very short furca externa. Costa ultima and costa terminalis present. Humeral costa indistinct, reduced to a small humeral tubercle, small post humeral tubercle and slightly elevated humeral interval extending to lateral branch of principal tubercle-

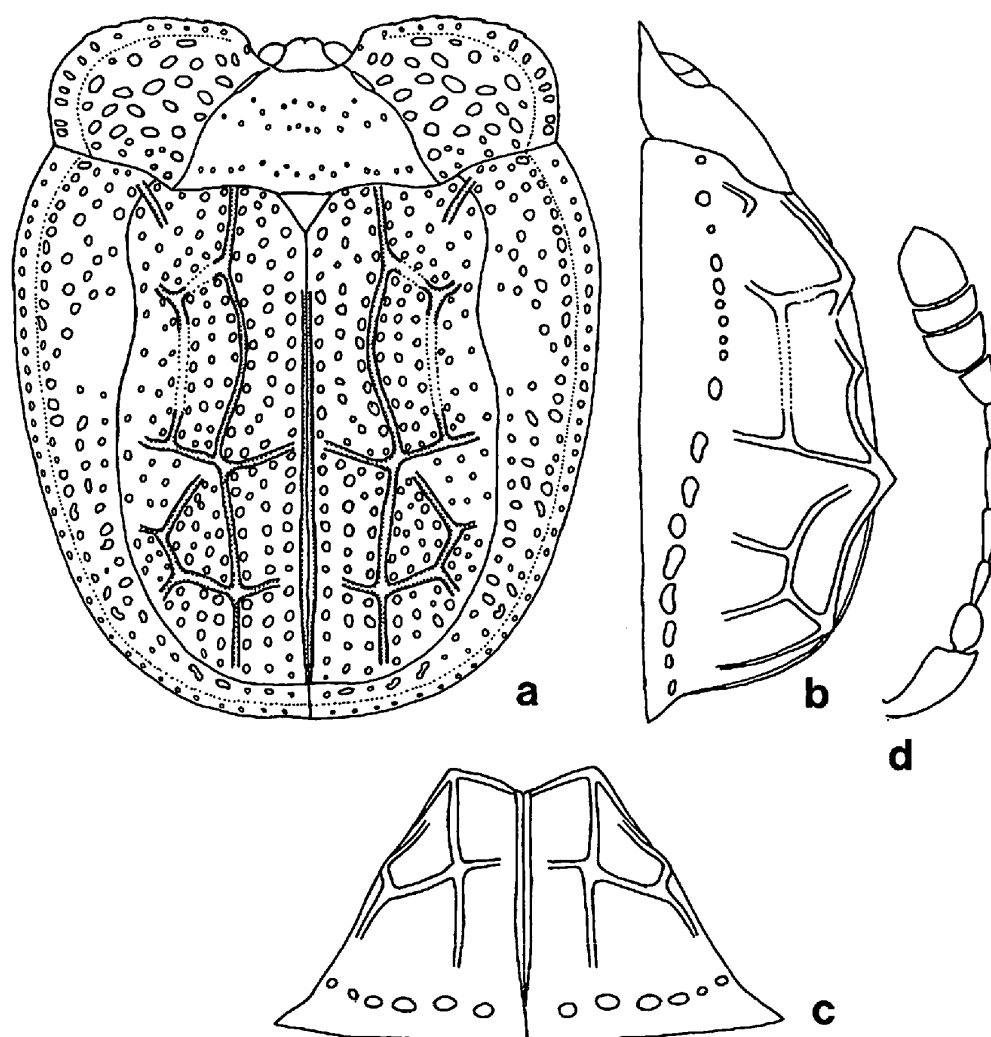


Fig. 8. *Notosacantha nilgiriensis* n. sp.: a, dorsal view; b, lateral view; c, hind view; d, antenna.

le. A slightly elevated transverse fold present between basal and posthumeral tubercles. Puncturation of disc moderately large, intervals only slightly narrower than punctures. Explanate margin subhorizontal, strongly punctate except for impunctate window. Ventrites without specific characters.

Holotype: India, Kotagiri, 1,700 m, Nilgiri, Tamil Nadu, 29.XI.1978, Jap.-Ind. Co. Tr. (preserved in the collection of the Entomological Institute of Hokkaido Univ.)

Remarks. It belongs to the large group of 16 species with almost complete dorsal costae, distinct apical costa, basal part of dorsal costa lacking humeral branch, and anterior and posterior branches of principal tubercle converging at the same point. *N. bryanti* (SPAETH), *N. severini* (SPAETH), *N. horrifica* (SPAETH), *N. appropinquans* (SPAETH), *N. calligera* (SPAETH), *N. corporaali* (SPAETH), *N. quinquecarinata* (MAULIK), and *N. lenta* (SPAETH) differ by complete furca interna and principal tubercle with five costae; *N. duvivieri* (SPAETH) in elytra with maximum width distinctly behind the middle; *N. curta* (SPAETH) and *N. jacobsoni* (SPAETH) by apicolateral costa reduced to small tubercle lacking connection with apical tubercle; *N. brookei* (SPAETH) in body yellow with black elytral disc; *N. quadra* (SPAETH), *N. rufa* (WAGEN.) and *N. taeniata* (FABRICIUS) differs in body uniformly yellow or with only costae and tubercles infuscate. *N. bioculata* (WAGEN.) is the most similar, but distinctly differs in elongate frontal plate, principal tubercle only twice lower than basal width, and post humeral tubercle more prominent with sharp branch to humeral tubercle. The ten-segmented antennae have never been observed in Cassidinae except for in the genus *Calliaspis* DEJEAN from South America, a member of the tribe Imatidiini. This character in *Notosacantha* is a female dimorphic character, and occurs in several species of Asia and Africa. Males of these species have antennae 11-segmented.

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