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A NEW SPECIES OF TIGER BEETLE FROM INDIA (COLEOPTERA: CICINDELIDAE)

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ABSTRACT

A new species of unusual tiger beetle, *Cicindela* (*Plutacia*) *notopleuralis,* is described from Balasore, Orissa, India. The relationship of this new species to subgenus *Cicindela* (*Plutacia*) and related subgenera are discussed, and superficial similarities to other subgenera within the Cicindelini, Cicindelina are presented.

INTRODUCTION

In support of the first author's studies of *Cicindela* Linnaeus 1758 (*sensu lato*) of the Indian subcontinent, the second author provided a specimen that he had borrowed from the Muséum National d'Histoire Naturelle, Paris. This single male specimen represents an unexpected and remarkable new species possessing such unusual external characters as to deserve critical examination of its genitalia in relation to the currently known cicindelid fauna of the Indian subcontinent.

Earlier, the specimen on which this paper is based had been examined by Émile Rivalier during his revisionary work on *Cicindela* (*sensu lato*). Although Rivalier never described it, he apparently recognized the specimen as a new species and even considered that it might belong to a new genus, for which he proposed the name *Eucosmia* (*in litteris*). However, the new species described here, despite its unusual external morphological characters, fits within the first author's concept of subgenus *C.* (*Plutacia*), which Rivalier (1961) had established as a monobasic genus for *C.* (*Plutacia*) *dives* Gory 1833, but which the first author presently retains as a subgenus of *Cicindela* in conformity with his revisionary studies of the Indian subcontinent fauna. The decision to place the new species within *Cicindela* (*Plutacia*) is based on the similar morphology of the flagellum within the male genitalia, elytral maculation, cephalo-thoracic surface sculpturing, eye size, femora shape and labral characters.

SYSTEMATICS

Cicindela (*Plutacia*) *notopleuralis,* new species

Description.—General habitus (Fig. 1); body size large (20.5 mm, including labrum); dorsum dull black; head laterally with slight green and purple reflections, pronotum laterally shiny green; elytra dull black with pale nonmetallic epipleura, a small yellow-orange humeral macula, and a wide, transverse, yellow-orange macula medially; proepisterna purple, proepimera green, prosternum black, mes-

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episterna purple black, remainder of pterothorax ventrally darker purplish black tinged with metallic green; abdomen reddish purple, nonmetallic.

Head: Mandible large (chord length 3.5 mm) and broad (base width 1 mm), tapering abruptly in apical third, apical tooth longest, steeply beveled on inner face and dark pigmented with three broadly rounded teeth between apical tooth and basal molar; maxillary and labial palpi large and pale testaceous except for the shiny black distal segment; medial process of mentum large, broadly acute at apex; labrum (Fig. 2) short, broad with a smooth, even surface, except for a small, shallow depression near base on either side of middle, surface nonmetallic, ivory testaceous except for two darkened areas at base and a wide, dark anterior edge, eight anteromarginal teeth, small to minute and irregularly spaced along anterior margin, middle one the largest and lateral ones grouped on each side, six submarginal setae; antennal scape with six to eight basal setae besides the single, subapical sensory seta, fourth antennomere of male with a penicillum of 16–20 stiff pale reddish bristles, antennomeres nonmetallic, basal four dark reddish, distal seven pale yellow; clypeus glabrous with a slightly wrinkled surface; frons glabrous with parallel, finely raised rugae; vertex with moderately raised rugae forming parallel ridges except for a wide, smooth band at inner margin of eye, rugae near eyes converging anteriorly and not extending onto frons, rugae medially becoming oblique and converging along a central line, rugae behind eyes finer, wavy and confused; genae glabrous with moderately raised, parallel rugae; eyes with a pair of supraorbital setae each at anterior margin and medial concavity; eyes large and flattened, bulging only slightly outward.

Prothorax: Pronotal shape subquadrate, almost as wide as long with sides slightly and uniformly arcuate, narrowest at anterior transverse sulcus, and across small, nonbulging posterior angles; surface sculpturing of fine and confused rugae on disc, coarser and slightly wrinkled rugae laterally with a distinct, narrow, highly raised reflexed ridge with numerous short parallel grooves along the entire lateral edge; surface nearly covered with sparse, appressed setae (more numerous at anterior and lateral margins); anterior transverse sulcus shallowly impressed, posterior sulcus more impressed, medial line distinct but shallowly impressed; proepisterna with a wrinkled surface dorsally from finely impressed parallel ridges which are shallow and wavy medially and ventrally, surface nearly glabrous except for scattered long and appressed to semi-erect white setae near anterior margin of coxae; prosternum glabrous; proepimera with long appressed white setae.

Pterothorax: Mesepisterna broad, smooth and glabrous except for sparse setae near ventral and posterior margins; mesepimera covered with dense appressed white setae; metepisterna and metepimera glabrous with a slightly wrinkled surface; metasternum laterally covered with long white appressed setae, glabrous medially; scutellum finely rugose with a broad medial depression.

Elytra: Shape broadly elongate, widest at apical third with a distinct, slightly obtuse humeral angle and an evenly and broadly rounded outer apical angle; surface dull, velvety black, minutely granulate-punctate with small, noncontrasting black punctures uniformly dense throughout and slightly deeper in basal third, except along black impunctate suture; epipleura pale, nonmetallic; a small yellow-orange humeral spot, and a large yellow-orange spot medially, narrowest near lateral margin and longest near middle, then narrowed and slightly arcuate near suture; apex with small microserrulations and a broad, short sutural spine.

Abdomen: Sterna almost completely glabrous except for scattered, appressed

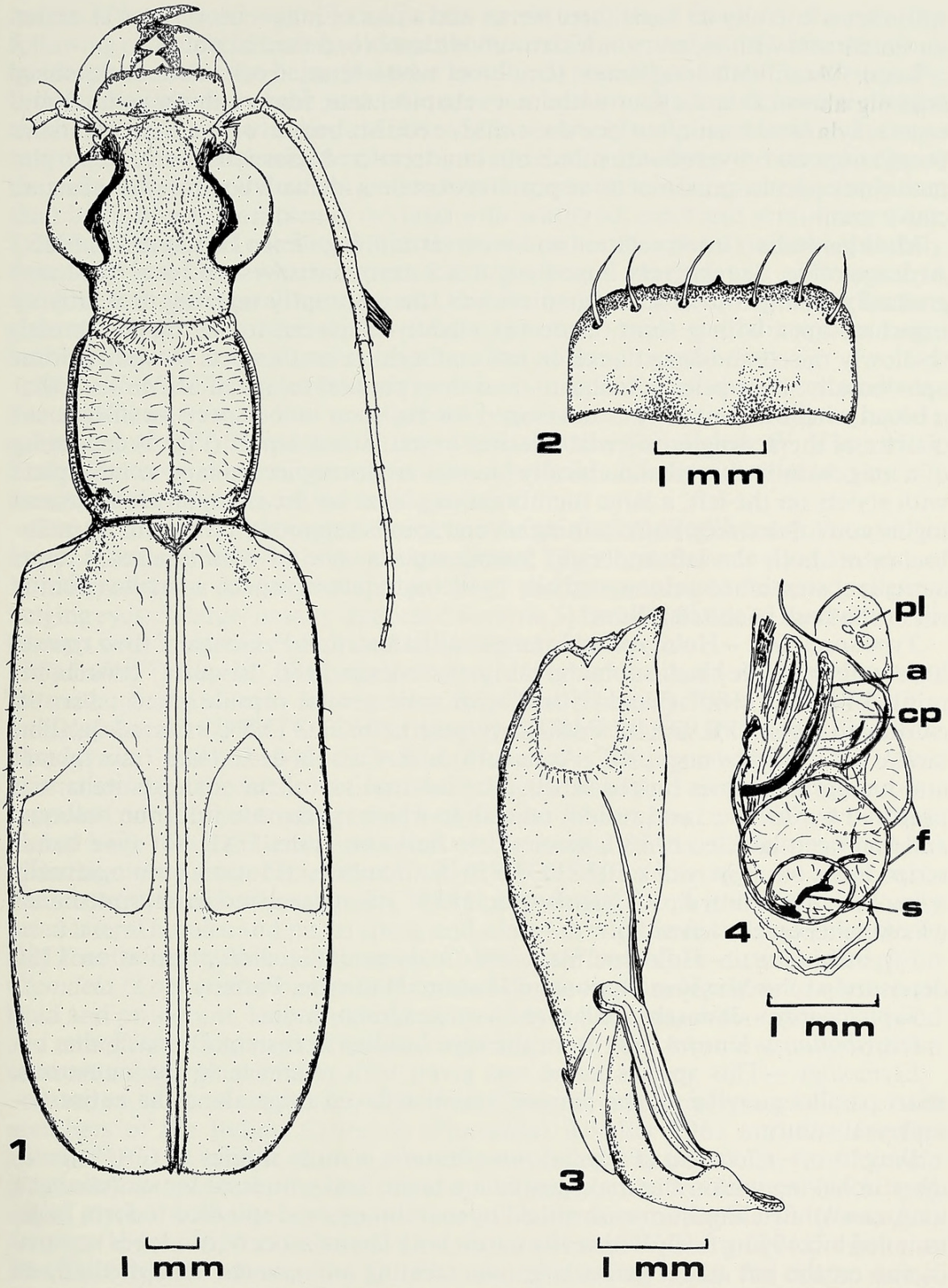

Fig. 1–4.—*Cicindela* (*Plutacia*) *notopleuralis,* new species. 1. Habitus of holotype male. 2. Labrum, dorsal view. 3. Aedeagus, left lateral aspect. 4. Internal sac of aedeagus, left lateral aspect. Abbreviations of sclerites' names: a, arciform piece; cp, central plate; f, flagellum; pl, plume; s, stiffening rib.

white setae laterally on basal three sterna and a pair of long sensory setae at center on fourth and fifth sterna; sixth sternum with a broad medial notch.

Legs: Coxae with long dense semi-erect white setae; trochanters dark, shiny reddish brown, anterior four without a subapical seta; femora thickened basally, especially anterior pair, surface dark shiny reddish brown with a slight metallic purple tinge and covered with numerous large scattered spines; tibiae shiny purple; tarsi shiny purple, proximal three protarsi of male wide with ventral pads of setae, claws small.

Male genitalia: (Interpretation and most terminology from Freitag et al., 1985.) Aedeagus (Fig. 3) relatively huge (length 5.5 mm), narrowest in basal third and gradually enlarged to a bulbous apical half, then abruptly tapering to a broadly truncated apex with a short, acute tip, slightly displaced to the right; a broad, shallowly raised and long flange on left and right lateral aspects extending from apex basally, then perpendicular to, and then parallel to apical orifice such that a broad, shallow concavity is developed medially on both aspects in distal one-quarter of the aedeagus; internal sclerites in left lateral aspect (Fig. 4) consisting of a long, basally curved and apically blunted arciform piece, a large central plate with stylets on the left, a large membranous plume on the right, an elongate and highly convoluted flagellum forming several spirals supported by sustaining membranes on both the left and right lateral aspects, one of which raises a large, auricular, membranous lobe medially in the right lateral aspect, a small stiffening rib at the base of the flagellum.

Type specimen.—Holotype male labelled "Balasore, R.P. Gengler" (two typeset lines within a thin black submarginal line); "edéage 1180, Rivalier" (two handprinted lines); "1180" (handwritten) with male genital capsule glued onto stiff cardboard label; "MUSÉUM PARIS" (typeset); "HOLOTYPUS Cicindela, (Plutacia), notopleuralis n.sp., R.E. Acciavatti &, F. Cassola ded., 1988" (six typeset and handprinted lines on red label). The internal sac of the male genitalia was prepared by Rivalier, and resides on a slide which is separate from the holotype and had been labelled "1180, species?, de Balasore, Inde, 1.XII.57" (five handscript lines on right side); "HOLOTYPUS Cicindela, (Plutacia), notopleuralis n.sp., R.E. Acciavatti &, F. Cassola ded., 1988" (six typeset and handprinted lines on red label on the left side).

Type depository.—Holotype male with male genitalic slide preparation 1180 deposited at the Muséum National d'Histoire Naturelle, Paris.

Type locality.—Balasore, Balasore District, Orissa, India.

Distribution.—Known only from the type locality in eastern Orissa, India.

Etymology.—This species name was given with reference to the numerous, short parallel grooves on the narrow, raised reflexed ridge along the entire notopleural suture.

Diagnosis.—*Cicindela* (*Plutacia*) *notopleuralis* is most similar to *C.* (*Plutacia*) *dives* in having within the male genitalia a large, bulky internal sac containing a long, convoluted flagellum ensheathed by membranes and spiralled to form large, rounded lobes lying freely within the sac on both lateral aspects; two lobes unequal in size on the left aspect and a large one creating an auricular lobe medially in the right aspect. Futhermore, the two species have wide, transverse elytral maculae, moderately to coarsely sculptured head and pronotum, and a broad flattened labrum with six submarginal setae, and feeble teeth which vary in number, size and placement along the anterior margin.

Whereas the morphology of the flagellum and labrum, as well as, head and pronotal sculpturing and elytral maculation, unite these two species within *Cic-*

indela (*Plutacia*), *C. notopleuralis* can be distinguished from *C. dives* by the following external characters: 1) larger body size; 2) antennal scape with numerous basal setae rather than being glabrous basally; 3) penicillum of stiff bristles on the fourth antennomere of the male; 4) narrower labrum with less defined teeth and six differently arranged subapical setae; 5) less coarsely sculptured head and pronotum with an unusual raised reflexed and striated ridge along the lateral edge of the pronotum; 6) body mostly glabrous with sparse areas of appressed setae rather than being almost completely covered with scattered, erect and semi-erect setae; 7) humeral spot and one broad elytral macula rather than three narrow, obliquely transverse markings which almost touch the lateral margin, and correspond to the humeral and apical lunules, and middle band; 8) anterior four trochanters glabrous rather than each with a subapical seta; 9) male genitalia with a large, bulbous capsule at the distal end rather than at the proximal end.

Discussion.—*Cicindela* (*Plutacia*) possesses morphological characters which define its distinctiveness. Its male genitalic structure unite it naturally to certain subgenera of tribe Cicindelini Sloane 1906, subtribe Cicindelina W. Horn 1908. Resemblance to other subgenera is only superficial and not substantiated by important sexual features of the male genitalia.

The following morphological characters define *Cicindela* (*Plutacia*): 1) auricular form of the flagellum within the male genitalia; 2) wide, transverse elytral maculae; 3) moderately to coarsely sculptured head and pronotum; 4) flattened, slightly bulging eyes; 5) large, basally thickened femora; 5) broadly flattened, hexachaetous labrum with numerous small and irregularly spaced teeth.

Cicindela (*Plutacia*) is most naturally grouped with other subgenera in which the male genitalia form an auricular flagellum. These include: *Cicindela* (*Cosmodela*) Rivalier 1961, *Cicindela* (*Lophyra*) Motschulsky 1859 and *Cicindela* (*Lophyridia*) Jeannel 1946. *Cicindela* (*Plutacia*) is distinguished from *Cicindela* (*Cosmodela*) by the latter having a finely rugose head and alutaceous pronotum, rounded, dorsally protruding eyes, long slender femora, and a labrum with three to five large marginal teeth and often with a medial carina. *Cicindela* (*Plutacia*) is distinguished from *Cicindela* (*Lophyra*) by the latter having three acute mandibular teeth distal of basal molar, elytral maculation forming distinct or broadly fused lateral lunules and discal spots, and a labrum with three small teeth medially and four to six submarginal setae. *Cicindela* (*Plutacia*) is distinguished from *Cicindela* (*Lophyridia*) by the latter possessing a very finely rugose to alutaceous head and pronotum, large and bulging eyes, elytral maculae with a marginal band and complete or fragmented lunules extending onto disc, labrum usually with ten or more submarginal setae.

Based on external characters, *Cicindela* (*Plutacia*) superficially resembles certain members of the Indian *Cicindela* (*Pancallia*) Rivalier 1961 and *C.* (*Ancylia*) Rivalier 1961 in certain of their external morphology. In particular, for *Cicindela* (*Plutacia*) *notopleuralis* the lack of subapical setae on the trochanters, black body color, elytral markings and sparse ventral body setae resemble *C.* (*Pancallia*) *princeps* Vigors 1825 as well as *C.* (*Ancylia*) *andrewesi* W. Horn 1894 (form *unica* Fleutiaux 1895); whereas for *C.* (*Plutacia*) *dives* Gory 1833 the coarse dorsal surface sculpturing of the body and pattern of elytral markings resemble *C.* (*Ancylia*) *calligramma* Schaum 1861. These similarities are only superficial, however, as the male genitalia of these two other subgenera possess a simple, short, thickened and hook-shaped flagellum rather than the much more highly developed, spiralled and convoluted flagellum forming auricular lobes as found in *Cicindela* (*Plutacia*).

In the presence of a penicillum, *C.* (*Plutacia*) *notopleuralis* has to be added to

the small number of cicindelid species (mostly belonging to *Cicindela* subgenera *Lophyra* Motshulsky, *Lophyridia* Jeannel and *Chaetodera* Jeannel 1946) which possess such a non-genitalic mating structure (Cassola, 1980).

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