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A NEW SPECIES-GROUP IN *APHTHONA* CHEVROLAT (COLEOPTERA: CHRYSOMELIDAE) WITH A DESCRIPTION OF A NEW SPECIES FROM SOUTHERN INDIA

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ABSTRACT

A new species-group in the flea beetle genus *Aphthona* Chevrolat is defined and *Aphthona yercaudensis* Prathapan and Konstantinov, **new species**, from southern India is described. A key to *Aphthona* species-groups in the Oriental Region is provided. Herbaceous species of *Phyllanthus* L. (Euphorbiaceae) are recorded as the host plants of *Aphthona bombayensis* Scherer.

Key Words: flea beetles, taxonomy, host plants, key to species-groups

Aphthona Chevrolat, 1836, one of the largest leaf beetle genera with about 350 species, includes nine distinct species groups (Konstantinov 1998a, b). However, many species fall outside these groups as “monotypic”. *Aphthona bombayensis* Scherer, 1969 is such a unique and widely distributed species. Often, *A. bombayensis* is not recognized as a member of *Aphthona* due to its small size, two pairs of fully developed labral setae (instead of three), and regular elytral punctation. This has led to misidentifications such as that made by Medvedev (1984), who described it as a new species in a new genus (*Aphthonotarsa brunnea* Medvedev); *Aphthonotarsa* Medvedev was later synonymized with *Aphthona* by Konstantinov and Lingafelter (2002). Our recent discoveries of its host plants and a closely related new species from southern India provide unequivocal support for its placement in a new species-group in *Aphthona*. Herein, we define the new species-group, describe the new species, and provide a key to the species-groups in *Aphthona*.

Konstantinov and Lingafelter (2002) revised the Oriental *Aphthona*. Members of the genus from the four southern Indian states, viz. Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu, were treated by Prathapan and Konstantinov (2003). The present

study has increased the known number of named species of *Aphthona* occurring in this part of India to 13.

MATERIAL AND METHODS

Descriptive terminology follows Konstantinov (1998a). The holotype of the new species is deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (USNM). Paratypes will be deposited in the National Pusa Collection, Indian Agricultural Research Institute, New Delhi, India (NPC), University of Agricultural Sciences, Bangalore, India (UASB), Natural History Museum, London, United Kingdom (BMNH), and in the personal collection of the first author (PKDC). Plant vouchers are deposited in the Calicut University Herbarium, Calicut, India (Accession nos. 6448, 6494, and 6534).

Aphthona bombayensis species-group

Members of this group share the following characters: color yellow to dark brown; body extremely small (1.2–1.6 mm); head with supraantennal sulci well-developed, postcallinal sulci poorly developed or absent, and antennal calli not raised; elytral

punctures forming nearly regular striae; median lobe of aedeagus ventrally with longitudinal impression and acute apex lacking denticle, with dorsal side membranous and concave; spermatheca with ovoid receptacle and duct making loop away from receptacle; posterior sclerotization of tignum wide, without well-developed arms.

Konstantinov and Lingafelter (2002) observed that many Oriental species of *Aphthona* fall into five species-groups. Members of the *bombayensis* species-group resemble those of the *kanaraensis* species-group because of their yellow color. Species in the *bombayensis* species-group can be separated from the *kanaraensis* species-group by their smaller size (members of *kanaraensis* species-group are distinctly larger, 1.8–2.4 mm), the antero-frontal ridge medially is much lower than the frontal ridge (anterofrontal ridge high, as high as frontal ridge, especially in middle in the *kanaraensis* species-group), the elytral punctures are arranged in nearly regular rows (elytral punctures confused in the *kanaraensis* species-group), the spermatheca has an ovoid receptacle (receptacle oblong in *kanaraensis* species-group), and the spermathecal duct forms a loop away from the receptacle (not so in the the *kanaraensis* species-group).

KEY TO THE SPECIES-GROUPS OF *APHTHONA*

1. Head and pronotum reddish brown, elytron blue. Antennomere 11 wide apically, nearly triangular, much wider than antennomere 7. Metatibia (in lateral view) swollen at apical 1/3 ***laeta* species-group**
- 1'. Head, pronotum, and elytron yellowish, blue, bronze, or black, always similar in color. Antennomere 11 nearly as narrow apically as antennomere 7, nearly cylindrical. Metatibia (in lateral view) not swollen at apical 1/3 2
2. Pronotum and elytron yellow or light brown without metallic luster, elytral suture usually darker than elytron 3
- 2'. Pronotum and elytron metallic blue, green, or black with or without metallic luster 7
3. Body more than 3.0 mm long. Frontal ridge wide. Median lobe of aedeagus moderately straight in lateral view, apex usually flat with impression in middle. Vaginal palpus usually robust. Apical abdominal tergite always without basal appendages ***cyparissiae* species-group**
- 3'. Body less than 2.5 mm long. Frontal ridge narrow. Median lobe of aedeagus moderately convex in lateral view, apex usually triangular, acute. Vaginal palpus usually slender. Apical abdominal tergite sometimes with basal appendages 4
4. Elytral punctures forming nearly regular striae ***bombayensis* species-group**
- 4'. Elytral punctures confused, not forming nearly regular striae 5
5. Median lobe of aedeagus with high longitudinal ridge in middle and knob at apex. Pronotum with lateral side usually nearly straight, lateral margins mostly narrowly explanate. Frontal ridge moderately wide (compared to frontal ridge of species of *hammarstroemi* species-group, but narrower than in *cyparissiae* species-group). Anterofrontal ridge usually high in middle and comparatively high laterally ***kanaraensis* species-group**
- 5'. Median lobe of aedeagus without longitudinal ridge in middle and knob at apex. Pronotum with lateral side usually convex, lateral margins mostly widely explanate. Frontal ridge moderately narrow. Anterofrontal ridge usually moderately high in middle and low laterally 6
6. Median lobe of aedeagus apically with 2 denticles bent ventrally. Vaginal palpus robust, anterior and posterior sclerotization long, each longer than middle membranous part of palpus. Tignum with solid plate posteriorly. Antennomere 2 longer than 3 ***pallida* species-group**
- 6'. Median lobe of aedeagus apically without 2 denticles. Vaginal palpus slender, anterior and posterior sclerotization usually short, each not longer than middle membranous part of palpus. Tignum with 2 branches posteriorly. Antennomere 2 usually shorter than 3 ***placida* species-group**
7. Ventral side of median lobe of aedeagus with 2 impressions situated laterally to middle ridge, without membranous window. Middle ridge narrow, in most species present only apically. Posterior part of tignum with 2 branches. Dorsal part of body in most species metallic blue or green, or with strong coppery or brassy luster. Pronotum with much coarser punctation basally than apically 8
- 7'. Ventral part of median lobe of aedeagus without 2 impressions and middle ridge, usually with membranous window. Middle ridge present in some species, but only basally or in middle of median lobe. Posterior part of tignum in most species with single branch. Dorsal part of body usually black, sometimes black with light metallic luster. Pronotum with punctation basally nearly as coarse as apically 9
8. Median lobe of aedeagus thick basally and narrow apically, sometimes sinuous in lateral

view. Tignum moderately short, with posterior branches wide apically

.....*crypta* species-group

8'. Median lobe of aedeagus almost as thick basally as apically, either curved or nearly straight but not sinuous in lateral view. Tignum moderately long, with posterior branches narrow to moderately narrow apically

.....*hammarstroemi* species-group

9. Median lobe of aedeagus spoon-like, with narrow basal and broad apical parts. Tignum with narrow anterior part. Vaginal palpus with long and curved apical sclerotization

.....*gracilis* species-group

9'. Median lobe of aedeagus not spoon-like, with apical and basal parts of subequal width. Tignum with wide anterior part. Vaginal palpus with short and straight apical sclerotization.....

.....*depressa* species-group

***Aphthona bombayensis* Scherer, 1969**

(Figs. 1–6)

Aphthona bombayensis Scherer 1969: 70 (Type locality: India, Bombay. Holotype in Hungarian Museum of Natural History, Budapest, Hungary). Medvedev 1992: 24 (distribution, Nepal). Medvedev and Sprecher-Uebersax 1999: 322 (catalog, Nepal). Konstantinov and Lingafelter 2002: 34, 56–58 (redescription, genitalia illustration, key, new record for Sri Lanka).

Aphthonotarsa brunnea Medvedev 1984: 56 (Type locality: Nepal, Kathmandu. Holotype in Sencken-

berg Museum, Frankfurt, Germany). Konstantinov and Lingafelter 2002: 56 (synonymized).

Distribution. India (Delhi, Karnataka, Kerala, Maharashtra), Nepal, Sri Lanka.

Host plants. *Phyllanthus airy-shawii* Brunel and Roux (Fig. 8), *Phyllanthus amarus* Schum. and Thonn. (Fig. 7), and *Phyllanthus urinaria* L. (Euphorbiaceae).

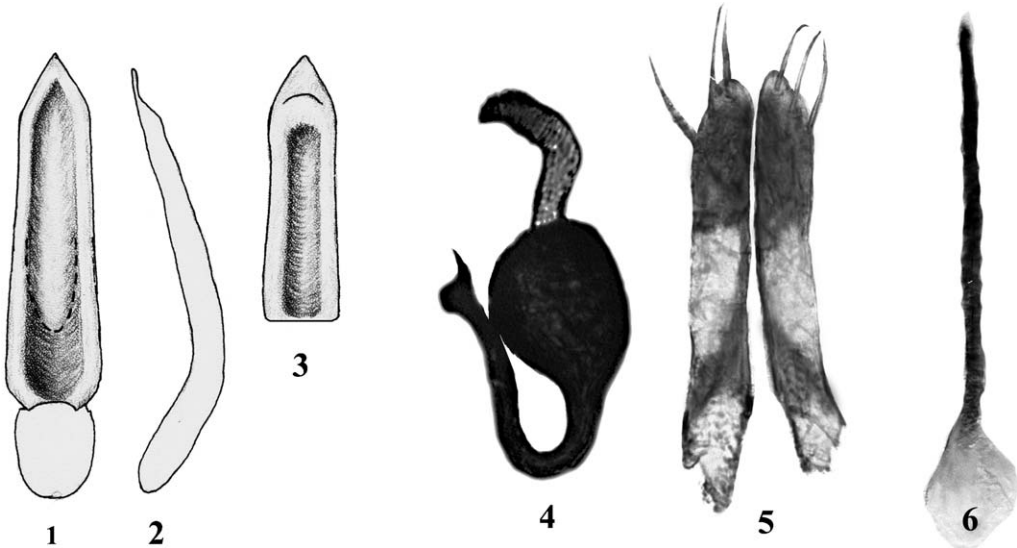
Remarks. This is the first report of *A. bombayensis* from southern India as defined by Prathapan and Konstantinov (2003). Adults feed on the leaves of *Phyllanthus* spp. by scraping green tissue from their surface (Fig. 9). An affinity to Euphorbiaceae by *A. bombayensis* supports our conclusion that this species belongs to *Aphthona* as many of its congeners are associated with Euphorbiaceae. Herbaceous species of *Phyllanthus*, especially *P. amarus* and *P. urinaria*, are widely used in the traditional Indian medicine in treatment of jaundice.

Material Examined. INDIA: Karnataka: 1 ♀, Bangalore, 19.vi.1998, Prathapan coll.; Kerala: 1 ♀, Vellayani, 26.x.2002; 1 ♀, same data except dating 8.vi.2009; 1 ♂ 7 ♀, same data except dating 8.x.2010; 1 ♂ 2 ♀, same data except dating 14.i.2011; 1 ♀, Ponnudi, 14.vi.2009, Prathapan coll.; 3 ♂ 2 ♀, Pandanad, 25.xii.2010, Prathapan coll. (PKDC).

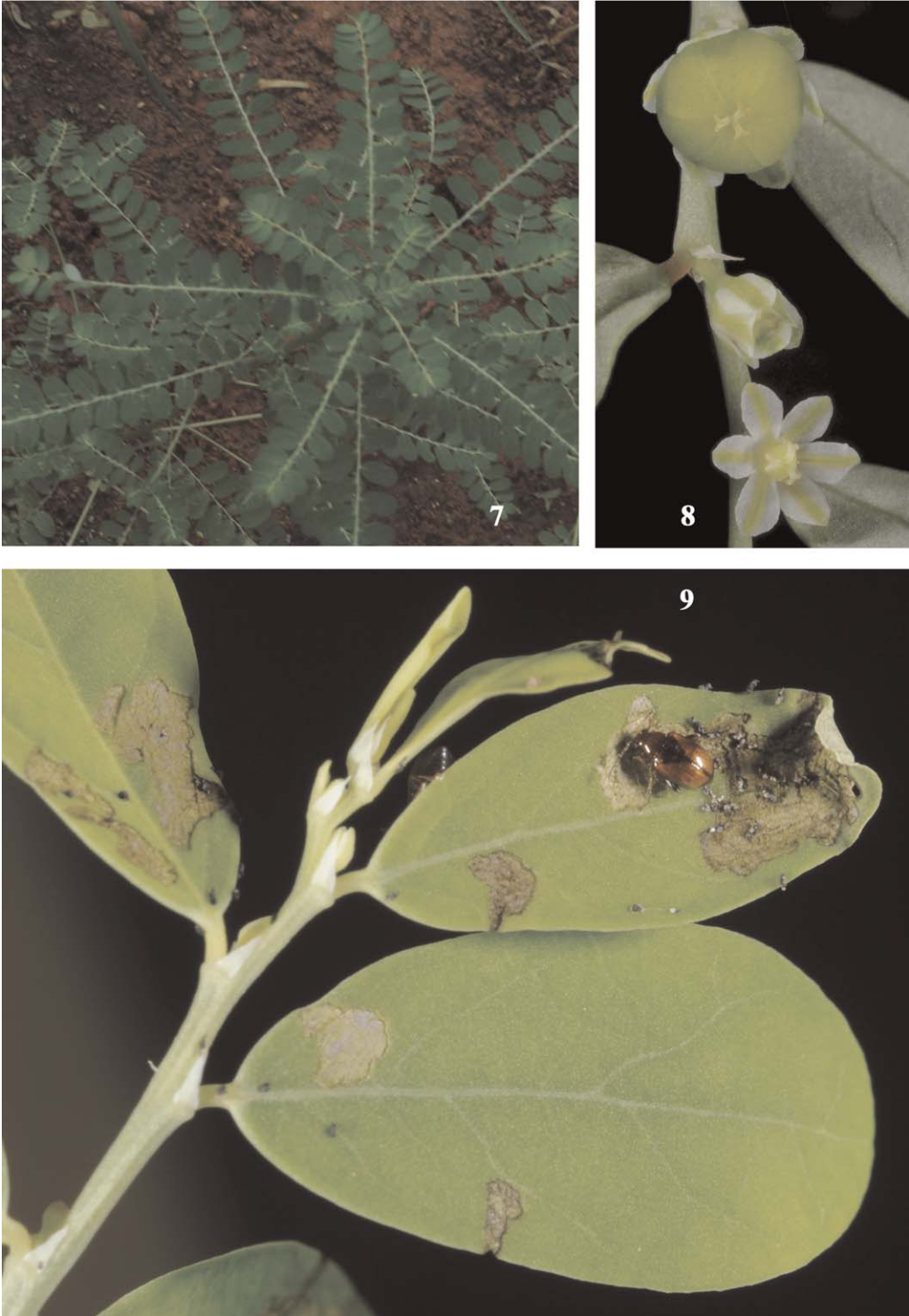
***Aphthona yercaudensis* Prathapan and Konstantinov, new species**

(Figs. 10–15)

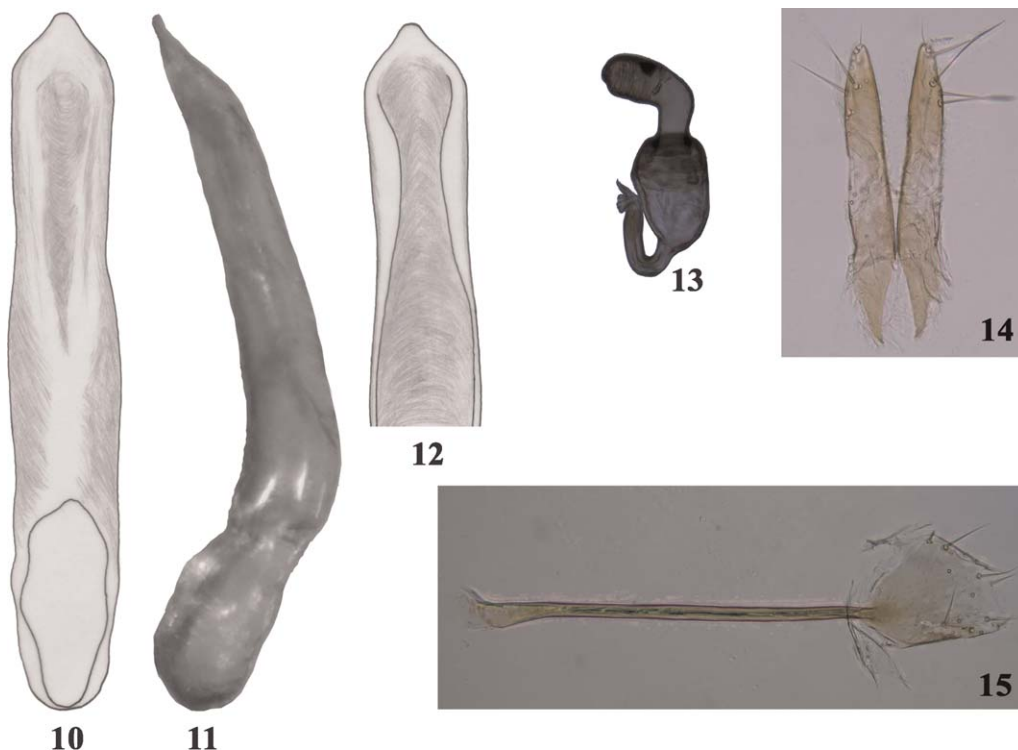
Description. Length 1.22–1.44 mm; width 0.67–0.84 mm. Color yellow brown, distal 2 or



Figs. 1–6. *Aphthona bombayensis*. 1) Median lobe of aedeagus, ventral view; 2) Median lobe of aedeagus, lateral view; 3) Median lobe of aedeagus, dorsal view; 4) Spermatheca; 5) Vaginal palpi; 6) Tignum.



Figs. 7–9. Host plants of *Aphthona bombayensis*. **7)** *Phyllanthus amarus*; **8)** *Phyllanthus airy-shawii*; **9)** Adult feeding scars on leaf.



Figs. 10–15. *Aphthona yercaudensis*. **10)** Median lobe of aedeagus, ventral view; **11)** Median lobe of aedeagus, lateral view; **12)** Median lobe of aedeagus, dorsal view; **13)** Spermatheca; **14)** Vaginal palpi; **15)** Tignum.

3 antennomeres and metathoracic sternite darker in some specimens. Head moderately flat in lateral view. Vertex smooth and shiny with extremely minute punctures and shallow transverse impression behind antennal calli. Frontal ridge narrow, narrower than socket, sharply narrowing towards anterofrontal ridge, lower towards anterofrontal ridge; sides convex. Antennal calli flat, indistinctly raised. Supraantennal sulcus well-developed; mid-frontal, suprafrontal sulci evident; postcallinal sulcus poorly developed. Supraorbital sulcus well-developed; orbital sulcus evident but short. Anterofrontal ridge narrow, further narrowing laterally, slightly curved, medially much lower than frontal ridge, frontoclypeal suture with irregular row of sparse long and short setae. Clypeus long. Labrum with 3 pairs of setiferous pores.

Pronotum shiny, moderately convex in lateral view. Posteriorly slightly wider than anteriorly. Lateral margin moderately narrowly explanate, anteriorly wider than posteriorly. Anterolateral callosity moderately long with obtuse denticle, straight. Posterolateral setiferous pore well-developed. Punctuation extremely fine, apparently stronger posteriorly than anteriorly. Prosternum short. Prosternal inter-

coxal process narrow between coxal cavities, wider apically with flat apex.

Scutellum about as wide as long with narrow apex. Elytron with well-developed humeral callus. Lateral side of elytron convex at basal three-fourths. Maximum width almost at middle. Apical margin convex, apex narrowly rounded. Punctures forming regular striae on disc, more or less half as large as interspaces at middle of elytron. Interstices flat, shiny, extremely minutely punctured. Metasternum mostly convex behind middle in lateral view, slightly short. Metatibia short, straight, widening apically, flat dorsally in apical two-fifths. Apex of first metatarsomere slightly wider than its base from dorsal view, narrower than third male metatarsomere.

Median lobe of aedeagus moderately long, nearly straight in lateral view (Fig. 11), ventrally with furrow on distal half, slightly narrowed behind distal one-third, with narrowly rounded apex (Fig. 10); dorsal side deeply concave (Fig. 12). Tegmen with stem slightly shorter than or subequal to arm.

Spermatheca (Fig. 13) with receptacle nearly as long as pump. External side of receptacle convex, internal side convex with slight concavity near middle. Receptacle nearly ovoid, longer than wide

with maximum width between middle and pump. Pump rounded at apex, with horizontal part longer and wider than vertical part. Duct making loop away from receptacle. Vaginal palpus (Fig. 14) with membranous part in middle shorter than sclerotized parts anteriorly and posteriorly; lateral margin not parallel to medial, not forming well-developed angle to apex. Tignum (Fig. 15) anteriorly curved, wide, unsclerotized; posterior sclerotization wide, without well-developed arms.

Distribution. India (Tamil Nadu).

Host plants. Unknown.

Remarks. *Aphthona yercaudensis* can be separated easily from *A. bombayensis* by: its light yellow-brown color (general color of *A. bombayensis* is dark brown); a sharp frontal ridge (the frontal ridge is comparatively broader in *A. bombayensis*); three pairs of well-developed labral setae (only two pairs of labral setae are well-developed in *A. bombayensis*); the median lobe of aedeagus widest near middle in ventral view (median lobe of aedeagus widest proximal to middle in ventral view in *A. bombayensis*; Fig. 1); and the shape of the spermatheca. Adults were collected while flying and landing on broad leaves of a shrub, performing a characteristic display in bright daylight.

Etymology. Named after the locality from which the types were collected.

Types. Holotype ♂. Labels: 1) South India Eastern Ghats Tamil Nadu env. Yerkaud (=Yercaud) 2.XII.2003, 1250m. forest N 11°47'38" E 78°12'06" leg. Konstantinov, Prathapan, Saluk 2) HOLOTYPE *Aphthona yercaudensis* n. sp. des. Prathapan and Konstantinov (USNM). Paratypes. Same data as holotype. 16♂, 18♀, 12 unsexed card mounted specimens (22 NPC, 10 UASB, 6 BMNH, 6 USNM, 2 PKDC).

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and the National Museum of Natural History, Washington, DC. We thank Adelita Linzmeier (Depto. Zoologia, Universidade Federal do Paraná, Curitiba, Brazil), Allen Norrbom, Jens Prena, and Norman Woodley (Systematic Entomology Laboratory, USDA, ARS, Washington, DC), and two anonymous reviewers for valuable comments and suggestions on an earlier version of this manuscript. USDA is an equal opportunity provider and employer.

REFERENCES CITED

- Konstantinov, A. S. 1998a.** Revision of the Palearctic Species of *Aphthona* Chevrolat and Cladistic Classification of the Aphthonini (Coleoptera: Chrysomelidae: Alticinae). *Memoirs on Entomology, International*. Associated Publishers, Gainesville, FL.
- Konstantinov, A. S. 1998b.** Revision of the *Aphthona crypta* group of species and a key to the species groups in *Aphthona* Chevrolat (Coleoptera: Chrysomelidae: Alticinae). *The Coleopterists Bulletin* 52: 134–146.
- Konstantinov, A. S., and S. W. Lingafelter. 2002.** Revision of the Oriental species of *Aphthona* Chevrolat (Coleoptera: Chrysomelidae). *Miscellaneous Publications of the Entomological Society of Washington, Washington, DC*.
- Medvedev, L. N. 1984.** Chrysomelidae from the Nepal Himalayas. 1. Alticinae (Insecta: Coleoptera). *Senckenbergiana Biologica* 65: 47–63.
- Medvedev, L. N. 1992.** Chrysomelidae from the Nepal Himalayas, III (Insecta: Coleoptera). *Stuttgarter Beiträge zur Naturkunde Serie A (Biologie)* 485: 1–36.
- Medvedev, L. N., and E. Sprecher-Uebersax. 1999.** Katalog der Chrysomelidae von Nepal. *Entomologica Basiliensia* 21: 261–354.
- Prathapan, K. D., and A. S. Konstantinov. 2003.** The flea beetle genus *Aphthona* Chevrolat (Coleoptera: Chrysomelidae) of southern India, with descriptions of seven new species. *Proceedings of the Entomological Society of Washington* 105: 154–179.
- Scherer, G. 1969.** Die Alticinae des indischen Subkontinentes (Coleoptera - Chrysomelidae). *Pacific Insects Monograph* 22: 1–251.

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