

*Cryptocephalus socotrensis* sp. nov.,  
the first representative of the genus from Socotra Island  
(Coleoptera: Chrysomelidae: Cryptocephalinae)

Matthias SCHÖLLER

Humboldt-University of Berlin, Faculty of Life Sciences, Lentzeallee 55/57, 14195 Berlin, Germany;  
e-mail: Matthias.Schoeller@hu-berlin.de

**Abstract.** *Cryptocephalus* (*Cryptocephalus*) *socotrensis* sp. nov., the first known species of *Cryptocephalus* Geoffroy, 1762 from Socotra Island (Yemen), is described and illustrated. The new species is similar in colouration to the *C. undulatus*-species group, but differs from all species in this group in a deep incision in the basal margin of pronotum at posterior angles, and a non-spiral spermathecal ductus. Character states of the new species are compared with both Palaearctic and Afrotropical species of *Cryptocephalus*.

**Key words.** Coleoptera, Chrysomelidae, Cryptocephalinae, Cryptocephalini, *Cryptocephalus*, new species, Yemen, Socotra

### Introduction

The genus *Cryptocephalus* Geoffroy, 1762, has almost worldwide distribution. LOPATIN et al. (2010) listed 661 species from the Palaearctic Region, and SCHÖLLER (2002) mentioned 472 species from the Afrotropical Region. The species from the Arabian Peninsula were keyed by MEDVEDEV (1996); additional records were reported by MEDVEDEV (1997), SCHÖLLER (2006) and LOPATIN (2008).

Island of Socotra represents the largest island of the archipelago of the same name. It is situated in the western Arabian Sea, east of Gulf of Aden. Socotra is supposed to have been isolated from other landmasses for at least 16 million years, during which an unique flora and fauna have evolved (BATELKA 2012). Although only two representatives of the subfamily Cryptocephalinae are known to occur on Socotra Island, i.e. *Melixanthus melanocephalus* (Suffrian, 1857) (Cryptocephalini: Cryptocephalina) (SCHÖLLER et al. 2010), and the recently described *Tituboea purcharti* Bezděk, 2012 (Clytrini) (BEZDĚK 2012a), recent studies revealed

a rich fauna of other Chrysomelidae groups, e.g. Galerucinae (BEZDĚK 2012b), Alticinae (DÖBERL 2012) and Eumolpinae (ZOIA 2012). The recent field work of Czech biologists revealed the presence of an undescribed *Cryptocephalus* species in Socotra, whose description is the aim of the present publication.

## Materials and methods

All measurements were made using an ocular scale mounted on the stereomicroscope (at 20× magnification for the body length and 40× magnification for the remaining measurements). The photographs were taken with a Nikon D5100 mounted on the microscope, and the photos stacked with CombineZ software.

The holotype is deposited in Národní muzeum, Prague, Czech Republic (Jiří Hájek) (NMPC).

Exact label data are cited for the type specimen; a forward slash (/) separates different lines and a double slash (//) different labels of data. The data are printed if not otherwise mentioned, the author's remarks are presented in brackets: [w] = white label, [r] = red label.

## Taxonomy

### *Cryptocephalus (Cryptocephalus) socotrensis* sp. nov.

(Figs 1–7)

**Type locality.** Yemen, Socotra Island, Hagher Mountains, Scand Mountain env., 12°34.6'N, 54°01.5'E, 1450 m a.s.l.

**Type specimen.** HOLOTYPE: ♀: 'YEMEN, SOCOTRA Island / Hagher Mts., SCAND Mt. env. / montane evergreen woodland / 16.-18.vi.2012 / 12°34.6'N, 54°01.5'E, 1450 m [w] // SOCOTRA expedition 2012 / J. Bezděk, J. Hájek, V. Hula, / P. Kment, I. Malenovský, / J. Niedobová & L. Purchart leg. [w] // Collection / National Museum / Prague (NMPC) [w] // *Cryptocephalus socotrensis* sp. nov., / des. Matthias Schöller [r]'.

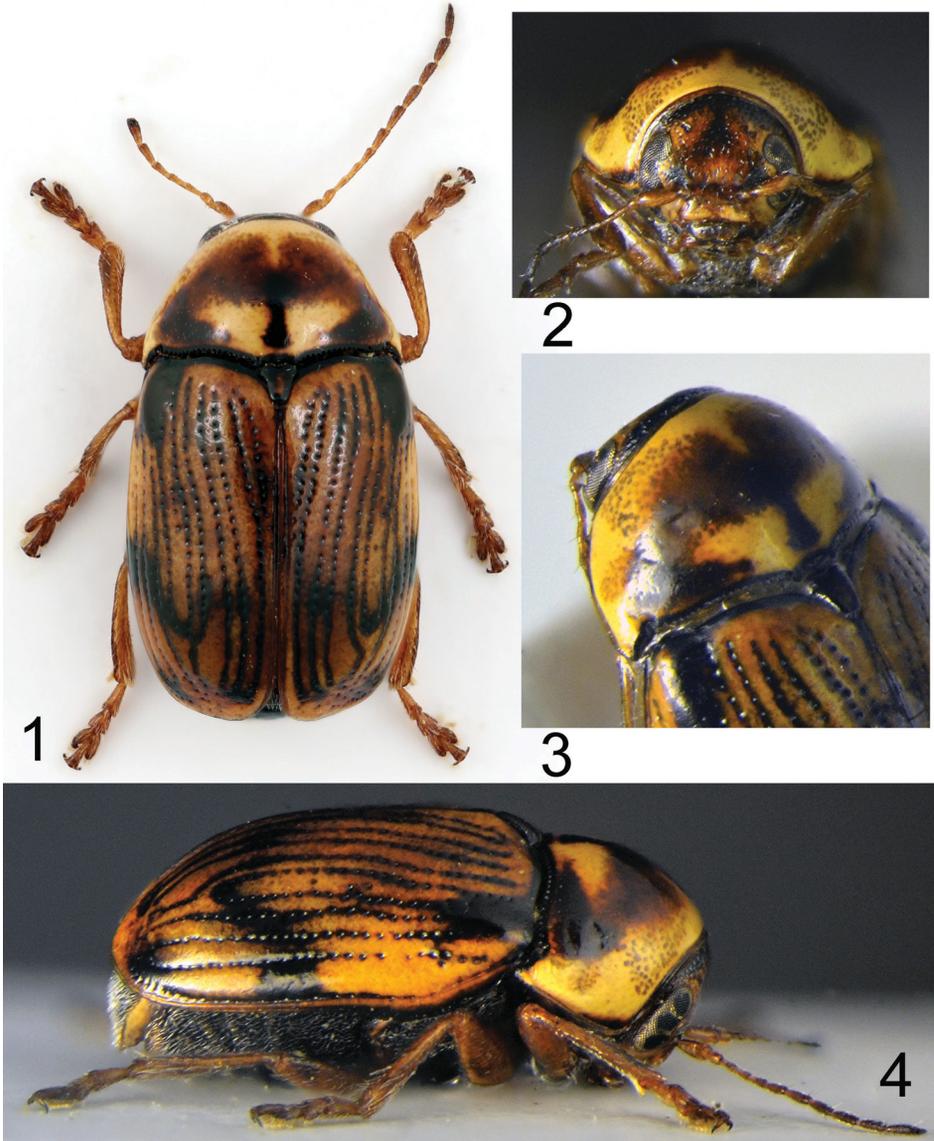
**Diagnosis.** A small species with yellow pronotum with blurred brown glasses-shaped marking, yellowish brown elytra with a black irregular transverse sinuose band at apical third, basal margin of pronotum at posterior angles with a deep incision followed by a toothless section, and simple claws.

**Description of holotype.** *Measurements.* Body length 3.65 mm, width of elytra at humeri 2.00 mm; length of elytra 2.65 mm; length of pronotum 1.10 mm and width 1.95 mm.

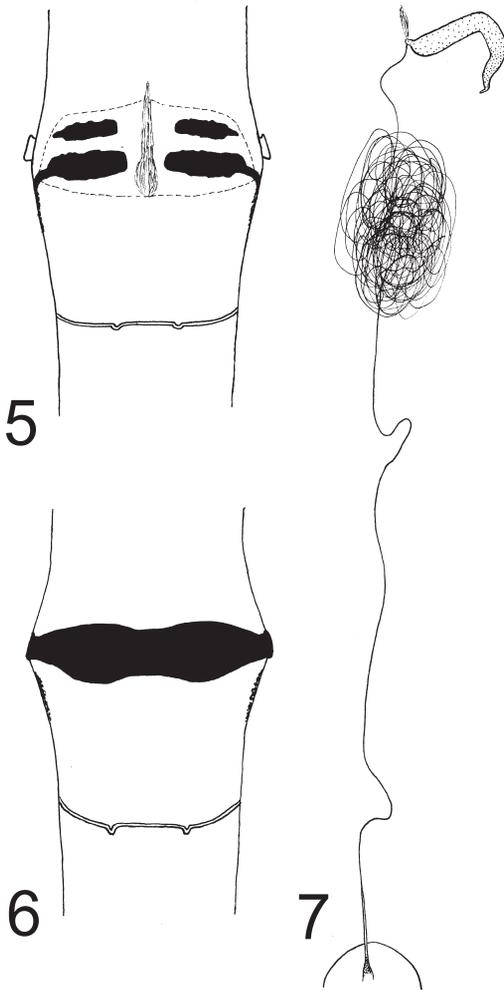
*Head.* Shiny, dark brown with yellow and medium brown markings as in Fig. 2. Surface of frons with broad round depression and with longitudinal furrow in middle; pair of small depressions above antennal sockets, sparsely punctured with distinct setigerous punctures, with short white setae. Clypeus with pair of triangular yellow spots apically. Labrum brown with yellowish brown margin; short, transverse, almost impunctate, anterior angles rounded, anterior margin shallowly convex, with row of short setae. Mandibles dark brown. Terminal palpomere of labial palpi acute. Eyes medium-sized, upper lobes distant, therefore distance between upper lobes 1.1 times eye length in lateral view; eyes evenly convex, canthus deep. Antennae inserted low on frons, 0.56× body length. Antennomeres medium brown, slightly darker from antennomere V onwards; scape club-shaped; pedicel cylindrical; antennomeres

III and IV elongate, narrow; antennomere V similar to IV, but more widened at apex; antennomeres VI to IX distinctly widened; antennomere XI with pointed tip.

*Thorax.* Pronotum yellow with blurred brown glasses-shaped marking reaching basal margin (Figs 1–4); shiny and practically impunctate (at 70× magnification very small and shallow puncturation detectable), but wrinkled at anterior angles. Pronotum transverse, 1.77



Figs 1–4. *Cryptocephalus socotrensis* sp. nov. 1 – habitus dorsal; 2 – head; 3 – pronotum; 4 – habitus, lateral view.



Figs 5–7. *Cryptocephalus socotrensis* sp. nov. 5 – ‘kotpresse’ dorsal; 6 – ‘kotpresse’ ventral; 7 – spermathecal ductus and spermatheca.

bands at apical third, upper one sinuose and posterior one reduced to a pair of spots (Fig. 1); with regular rows of punctures except for some extra-punctures between rows V and VI; rows of punctures not reaching basal margin, punctures in rows black at base, interstices partly black between punctures, i.e. forming longitudinal stripes, interstices shiny with few micropunctures, smooth, only laterally slightly convex. Epipleuron reaching  $4/5$  of length of elytra, impunctate.

*Legs* light brown with small blurred dark brown spot on each posterior femur; external edge of tibiae simple, fore tibiae as long as posterior tibiae, straight. Ratio of length of meta-

times as wide as long, widest at basal third, moderately convex (Figs 1, 3). Basal margin only feebly sinuose, 18 regular teeth present next to median lobe of pronotum, followed by deeply incised and toothless section toward posterior angles; posterior angles triangularly extended, bearing setigerous pore; median lobe of basal margin directly across from scutellum with three large and two small teeth, concave emarginate, not raised; lateral margins narrowly bordered (Fig. 3), not visible in dorsal view (Fig. 1); anterior margin convex in dorsal view, bordered (Fig. 2), anterior angles rectangular.

Thorax ventrally with white setae, black except for yellow apex of mesosternal process and lateral basal angles of prosternal process; brown spot next to procoxae. Intercostal prosternal process broad, 1.5 times as wide as coxal cavity, posterior margin with pair of short teeth, anterior margin regularly convex with narrow carina; hypomeron longitudinally strigose. Scutellum triangular, elongate, with truncate apex, apically in plane with elytra in lateral view, dark brown with yellowish brown centre, lustrous, impunctate. Elytra subcylindrical, widened in middle in dorsal view, 1.33 times as long as wide at humeral part; glabrous, lustrous, yellowish brown with black humeral spot and two black irregular transverse

tarsomeres as follows: 1.2 : 1 : 1.2 : 1.6; metatarsomere V broad, less than half its length projecting out of lobes of metatarsomere III, claws simple.

**Abdomen.** Ventrites dark brown, their margins and egg-hollow lighter brown, ventrites and pygidium with short white setae; puncturation of ventrites fine, coarser on pygidium; egg-hollow deep, its margin regular; pygidium black with lateral margins contrasting yellow (Fig. 4), swollen. 'Kotpresse' (i.e. rectal apparatus for forming the faecal pellets covering the eggs, see SCHÖLLER 2008) with dorsal sclerites doubled, anterior sclerites fused to sclerotisation of the lateral fold, and posterior sclerites situated near the edge of dorsal chitinous area (Fig. 5), ventral sclerite a single crosswise band; apodemes small, slightly wider than rectum, ventral sclerotisations of lateral fold present (Fig. 6). Spermatheca 0.35 × 0.30 mm, light brown, slightly darker at apex, narrow, hook-shaped; pump almost as long as reservoir; spermathecal duct emerging from cone-shaped extension of spermatheca, narrow and densely coiled up close to spermatheca, but not spiral, only getting wider at very base, light brown except for darker area at base (Fig. 7), ca. 3.6 mm long.

**Differential diagnosis.** The colouration of *Cryptocephalus (Cryptocephalus) socotrensis* sp. nov. is similar to that of *Cryptocephalus* in the 'undulatus' species group sensu WARCHAŁOWSKI (2010), characterised by a glasses- or M-shaped dark pattern on a yellowish brown pronotum, and elytral patterns forming one to three blurred or wavy (sometimes criss-cross) transverse bands. WARCHAŁOWSKI (2010) cumulated 15 species into 'undulatus' group within subgenus *Asionus* Lopatin, 1988, although part of species belongs to *Cryptocephalus* s.str. (compare with LOPATIN et al. 2010). However, *Cryptocephalus undulatus* Suffrian, 1854 has four large teeth of similar size, and consequently four large notches in the basal pronotal margin at posterior angles, the spermathecal ductus is spiral, the dorsal sclerites of the 'kotpresse' are simple, and the ventral sclerite is doubled (M. Schöller, unpubl. data). *Cryptocephalus fasciatointerruptus* Berti & Rapilly, 1979 has four notches in the basal pronotal margin at posterior angles, and a spiral spermathecal ductus, too. In *C. augustalisi* Pic, 1913 these pronotal teeth are regularly increasing in size. In *Cryptocephalus monilis* Weise, 1890, these pronotal teeth are of almost equal size, and the pronotum is strongly punctate. *Cryptocephalus curtissimus* Pic, 1907 has three notches in the basal pronotal margin and coarse puncturation on the pronotum. Finally, the geographically closest species of this group, *Cryptocephalus subdeserticola* Berti & Rapilly, 1979 from North Yemen differs in the coarse and dense puncturation of the head and pronotum.

The key by MEDVEDEV (1996) to *Cryptocephalus* species of Arabia keys out to *C. petraeus* Suffrian, 1854, but this species is larger (body length 4.3–5.0 mm), has four large teeth of similar size on the basal pronotal margin at posterior angles, and large micropunctures on the elytral interstices.

No Afrotropical species with a similar colour pattern is known.

**Etymology.** The species name is an adjective referring to the collecting site, Socotra Island.

**Collecting circumstances.** Swept from the vegetation in *Leucas haggierensis*-*Pittosporum viridiflorum* type of woodland (DE SANCTIS et al. 2013) with dominant plants being *Leucas haggierensis* Al-Gifri & Cortés-Burns (Lamiaceae), *Pittosporum viridiflorum* Sims (Pittosporaceae), *Hypericum scopulorum* Balf. f. (Hypericaceae), *Euryops arabicus* Steudel (Asteraceae), and *Coelocarpum haggierense* A. G. Miller (Verbenaceae).

**Distribution.** So far known only from the type locality, the Skand area, Socotra, Yemen, the highest part of the Hagher mountains which is reaching 1,500 m a.s.l.

## Discussion

Two characters of *C. socotrensis* sp. nov. are shared exclusively with Afrotropical species of *Cryptocephalus*: Doubled dorsal sclerites of the ‘kotpresse’ as in *C. socotrensis* sp. nov. were previously only described for the Afrotropical species *C. (C.) dregii* Suffrian, 1857, *C. (C.) nigricollis* Weise, 1902, *C. (C.) pauli* Weise, 1898 (SCHÖLLER 1995), and *C. (Anteriscus) reinecki* Weise, 1904 (SCHÖLLER 2008), with the pair of transverse sclerites posterior to the dorsal sclerites termed ‘dorsales Nebensklerit’ (= dorsal side sclerite) (SCHÖLLER 1995). The second character is the structure of the teeth on the basal pronotal margin. A single deep notch can also be found e.g. in *C. (C.) intermedius* Suffrian, 1957 and *C. (C.) denticulatus* Suffrian, 1957 from South Africa, however, in these species the following section to the posterior angles is bearing another two teeth, i.e. it is not toothless as in *C. socotrensis* sp. nov.

The colouration of *C. socotrensis* sp. nov. resembles members of the Palearctic *C. undulatus* species group, however, beside the colouration, the group is quite inhomogenous and presumably not monophyletic. The colouration might be rather an adaptation to similar environmental conditions. This topic was discussed by BERTI & RAPILLY (1979), who synonymised the subgenus *Asionus* with *Cryptocephalus* s.str. based on a study of this group. However, this synonymisation was not followed by subsequent authors (e.g. WARCHALOWSKI 2010, LOPATIN et al. 2010).

MEDVEDEV (1997) analysed the biogeographical structure of the 39 species of Arabian Cryptocephalinae known at that time. Combining here the data for Cryptocephalini and Clytrini from his work, he suggested 10 species (25.6 %) each to be Palearctic and Afrotropical species, respectively, and 19 species (48.8 %) to be Arabian endemics. Among the Arabian endemics, 13 (33.3 %) and 6 (15.5 %) are thought to be of Palearctic and Afrotropical origin, respectively. These percentages are presumably not fundamentally changed due to the new records and species of Arabian Cryptocephalinae. MEDVEDEV (1997) pointed out that especially the Cryptocephalinae had undergone intensive speciation in Arabia leading to a high percentage of endemism and suggested ecological factors for this phenomenon, i.e. the arid climate and deserts.

## Acknowledgements

I thank Jan Bezděk (Mendel University, Brno, Czech Republic) for making the specimen available for study for me, and for providing me with the dorsal habitus picture.

## References

- BATELKA J. 2012: Socotra Archipelago – a lifeboat in the sea of changes: advancement in Socotran insect biodiversity survey. Pp. 1–26. In: HÁJEK J. & BEZDĚK J. (eds.): Insect biodiversity of the Socotra Archipelago. *Acta Entomologica Musei Nationalis Pragae* **52 (Supplementum 2)**: i–vi + 1–557.
- BERTIN. & RAPILLY M. 1979: Contribution à la faune d’Iran 4 – Cryptocephalinae (Coléoptères, Chrysomelidae). *Nouvelle Revue d’Entomologie* **9**: 239–269.

- BEZDĚK J. 2012a: *Tituboea purcharti* sp. nov., the first representative of Clytrini from Socotra Island (Coleoptera: Chrysomelidae: Cryptocephalinae). Pp. 395–401. In: HÁJEK J. & BEZDĚK J. (eds.): Insect biodiversity of the Socotra Archipelago. *Acta Entomologica Musei Nationalis Pragae* **52 (Supplementum 2)**: i–vi + 1–557.
- BEZDĚK J. 2012b: Galerucinae (Coleoptera: Chrysomelidae) of Socotra Island, with a review of taxa recorded from Yemen. Pp. 403–428. In: HÁJEK J. & BEZDĚK J. (eds.): Insect biodiversity of the Socotra Archipelago. *Acta Entomologica Musei Nationalis Pragae* **52 (Supplementum 2)**: i–vi + 1–557.
- DE SANCTIS M., ADEEB A., FARCOMENI A., PATRIARCA C., SAEDA A. & ATTORE F. 2013: Classification and distribution patterns of plant communities on Socotra Island, Yemen. *Applied Vegetation Science* **16**: 148–165.
- DÖBERL M. 2012: Alticinae (Coleoptera: Chrysomelidae) of Socotra Island. Pp. 429–447. In: HÁJEK J. & BEZDĚK J. (eds.): Insect biodiversity of the Socotra Archipelago. *Acta Entomologica Musei Nationalis Pragae* **52 (Supplementum 2)**: i–vi + 1–557.
- LOPATIN I. K. 1988: *Asionus Lopatin*, nom. n. pro *Asiopus Lopatin*, 1965. *Vestnik Zoologii* **1988(2)**: 8.
- LOPATIN I. K. 2008: Order Coleoptera, family Chrysomelidae. Pp. 312–324. In: HARTEN A. VAN (ed.): *Arthropod fauna of the United Arab Emirates. Volume 1*. Multiply Marketing Consultancy Services, Abu Dhabi, 754 pp.
- LOPATIN I. K., SMETANA A. & SCHÖLLER M. 2010: Tribe Cryptocephalini Gyllenhal, 1813, genus *Cryptocephalus* Geoffroy, 1762. Pp. 580–606. In: LÖBL I. & SMETANA A. (eds.): *Catalogue of Palaearctic Coleoptera. Volume 6. Chrysomeloidea*. Apollo Books, Stenstrup, 924 pp.
- MEDVEDEV L. N. 1996: The Chrysomelidae of Arabia. *Fauna of Saudi Arabia* **15**: 211–263.
- MEDVEDEV L. N. 1997: New records and new species of Chrysomelidae from Arabia. *Fauna of Saudi Arabia* **16**: 319–326.
- PIC M. 1907: Sur divers *Cryptocephalus* et *Pachybrachis* peu connus ou présumés nouveaux. *L'Échange, Revue Linnéenne* **23**: 1–4.
- PIC M. 1913: Notes diverses, descriptions et diagnoses (Suite). *L'Échange, Revue Linnéenne* **29**: 169–171.
- SCHÖLLER M. 1995: Arten der Gattung *Cryptocephalus* Geoffroy aus der Fauna des südlichen und östlichen Afrika (Coleoptera: Chrysomelidae). *Mitteilungen aus dem Zoologischen Museum Berlin* **71**: 373–385.
- SCHÖLLER M. 2002: Taxonomy of *Cryptocephalus* Geoffroy: what do we know? (Coleoptera: Chrysomelidae: Cryptocephalinae). *Mitteilungen des Internationalen Entomologischen Vereins e. V.* (Frankfurt am Main) **27**: 59–76.
- SCHÖLLER M. 2006: Two new species of *Cryptocephalus* Geoffroy, 1762 from Yemen and re-examination of *C. oblitus* Suffrian and *C. saudiensis* Lopatin (Coleoptera: Chrysomelidae: Cryptocephalinae). *Mitteilungen des Internationalen Entomologischen Vereins e. V.* (Frankfurt am Main) **31**: 145–155.
- SCHÖLLER M. 2008: Comparative morphology of sclerites used by Camptosomatan leaf beetles for formation of the extrachorion (Chrysomelidae: Cryptocephalinae, Lamprosomatinae). Pp. 87–120. In: JOLIVET P., SANTIAGO-BLAY, J. & SCHMITT M. (eds.): *Research on Chrysomelidae. Volume 1*. E. J. Brill, Leiden, 432 pp.
- SCHÖLLER M., LÖBL I. & LOPATIN I. K. 2010: Cryptocephalinae: Cryptocephalini (excl. *Cryptocephalus*). Pp. 580–617. In: LÖBL I. & SMETANA A. (eds.): *Catalogue of Palaearctic Coleoptera. Volume 6. Chrysomeloidea*. Apollo Books, Stenstrup, 924 pp.
- SUFFRIAN C. W. L. E. 1854: Verzeichniss der bis jetzt bekannt gewordenen Asiatischen *Cryptocephalen*. *Linnaea Entomologica* **9**: 1–169.
- SUFFRIAN C. W. L. E. 1857: Zur Kenntniss der Afrikanischen *Cryptocephalen*. *Linnaea Entomologica* **11**: 57–260.
- WARCHAŁOWSKI A. 2010: *The Palaearctic Chrysomelidae. Identification keys. Volume 1*. Natura Optima Dux Foundation, Warszawa, 629 pp.
- WEISE J. 1890: Insecta, a Cl. G. N. Potanin in China et in Mongolia novissime lecta. XVI. Chrysomelidae et Coccinellidae (Appendix). *Horae Societatis Entomologicae Rossicae* **24**: 477–492.
- WEISE J. 1898: Über neue und bekannte Chrysomeliden. *Archiv für Naturgeschichte* **64(1)**: 177–224.
- WEISE J. 1902: Einige neue afrikanische Chrysomeliden. *Deutsche Entomologische Zeitschrift* **1901(2)**: 301–310.
- WEISE J. 1904: Über neue und bekannte Chrysomeliden. *Archiv für Naturgeschichte* **70(1)**: 157–178.
- ZOIA S. 2012: Eumolpinae (Coleoptera: Chrysomelidae) of Socotra Island. Pp. 449–501. In: HÁJEK J. & BEZDĚK J. (eds.): Insect biodiversity of the Socotra Archipelago. *Acta Entomologica Musei Nationalis Pragae* **52 (Supplementum 2)**: i–vi + 1–557.

