

The Bruchidae (Coleoptera) of Oman, with Descriptions of a New Genus and Two New Species

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Abstract: Eleven species of Bruchidae (Coleoptera) are recorded from Oman. Descriptions are given of *Borowiecius* n.gen. and of *Borowiecius fuscus* n.sp. and *Callosobruchus omanicus* n.sp.

الخنفس من العائلة Bruchidae (رتبة غمدية الأجنحة) في سلطنة عمان،
مع وصف لجنس جديد ونوعين جديدين

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خلاصة: تم تسجيل أحد عشر نوعاً من الخنافس التابعة للعائلة Bruchidae (رتبة غمدية الأجنحة) من سلطنة عمان. وتورد الدراسة وصفاً للجنس الجديد *Borowiecius* ووصفاً للنوعين الجديدين اللعالم هما: *Borowiecius fuscus* و *Callosobruchus omanicus*.

INTRODUCTION

The Bruchids of Oman have not previously been studied, and from the adjacent countries only the Bruchidae of Saudi Arabia have been worked out in detail (DECELLE 1979, ANTON 1994). DECELLE (1979) also mentioned two species from Yemen, and later (DECELLE 1990) recorded an American species introduced into the Arabian Peninsula. I have had the opportunity of studying specimens deposited in the collection of the Naturhistorisches Museum, Basel (NHMB), and these are the first known Bruchidae from Oman with precise localities. The 117 specimens belonged to 11 species, of which two are new to science: *Borowiecius fuscus* n.sp. and *Callosobruchus omanicus* n.sp.; the description of *Borowiecius* n.gen. is also given in this paper.

Abbreviations:

aut. coll.: author's collection
NHMB: Naturhistorisches Museum, Basel

SYSTEMATIC SECTION

Subfamily Pachymerinae

Genus *Caryedon* Schoenherr, 1823

Caryedon Schoenherr, 1823. – Isis Oken 2: 1134.

Caryedon palaesticus Southgate, 1976

Caryedon serratus ssp. *palaesticus* Southgate, 1976. – Isr. Journ. Zool. 25: 195.

Caryedon palaesticus. – Pfaffenberger 1984; Col. Bull. 38: 220.

Material: Oman: 1 ♀, Baushar, 23°23'N 58°25'E, 9.V.1985, M.D. Gallagher, aut. coll.; 2 ♂♂, 1 ♀, Muscat, Madinat Qaboos, 23°36'N 58°26'E, 50 m, 2.IV.1985, C. Holzschuh, NHMB, aut. coll.; 1 ♀, nr Muscat, XII.1984, C. Green, NHMB; 1 ♂, Ras Dhabdhub, 21°32'N 58°49'E, 180 m, 17.III.1986, W. Büttiker, NHMB; 2 ♂♂, N of Sama il Qaylah, 23°21'N 58°03'E, 400 m, C. Holzschuh, NHMB, aut. coll.

Remarks: This species has a more or less northern Saharo-sahelian distribution in Africa, from Algeria to the Arabian Peninsula; it is also known from Turkmenistan ("Transcaspian area"), Iran and Pakistan. Its host plants are *Prosopis farcta* and several species of *Acacia*. I suppose that *C. palaesticus* could possibly be a junior synonym of *C. angeri* (Semenov, 1896). I did not see true specimens of *C. angeri*, but I studied several specimens of this species collected by C. Anger in the Transcaspian area. They are deposited in the collections of the Museum für Naturkunde, Berlin (Germany) and of the Zoological Institute, St. Petersburg (Russia). These specimens are conspecific with *C. palaesticus*.

Caryedon sahelicus sensu DECELLE (1979)

Material: Oman: 4 ♂♂, 1 ♀, Baushar, 23°32'N 58°24'E, 20.X.1985, M.D. Gallagher, NHMB, aut. coll.

Remarks: No description of this species has yet been published. *C. sahelicus* has a Saharo-sahelian distribution like *C. palaesticus*, but it prefers more southern areas (from Senegal to the Arabian Peninsula). Several *Acacia* species are known as host plants.

Caryedon serratus (Olivier, 1790)

Bruchus serratus Olivier, 1790. – Encycl. Méth. 5: 199.

Bruchus (Caryoborus) serratus. – Schoenherr 1833; Gen. Curc. I: 94.

Caryedon serratus. – Schoenherr 1823; Isis Oken 2: 1134.

Bruchus gonagra Fabricius, 1798. – Entomol. Syst. Suppl.: 159.

Bruchus (Caryoborus) gonagra. – Schoenherr 1833; Gen. Curc. I: 96.

Pachymerus gonagra. – Pic 1913; in Junk, Col. Cat. 55: 7.

Caryedon gonagra. – Southgate & Pope 1957; Ann. Mag. nat. Hist. 10: 670.

Pachymerus sicutensis Pic, 1924. – Mélanges 42: 25.

Caryedon sicutensis. – Decelle 1960; Expl. Parc Nat. Garamba 18: 73.

Material: Oman: 1 ♂, Al Khaburah, Batinah, 23°59'N 57°07'E, 10 m, 4.VII.1985, M.D. Gallagher, NHMB; 3 ♂♂, 2 ♀♀, Fanjah, Wadi Fanjah, 23°32'N 58°06'E, 150 m, 5.IV.1985, C. Holzschuh, NHMB, aut. coll.; 1 ♂, 1 ♀, Fanjah, Wadi Fanjah, 23°27'N 58°08'E, 9.V.1985, C. Holzschuh, NHMB, aut. coll.; 1 ♀, Jabal Shams, Jabal Akhdar, 23°15'N 57°15'E, 16.VII.1981, M.D. Gallagher, NHMB; 1 ♀, Qarhat, Mu'ammarr, 21°38'N 59°18'E, 130 m, 1986, W. Büttiker, NHMB; 4 ♂♂, 1 ♀, N of Sama il Qaylah, 23°21'N 58°03'E, 400 m, C. Holzschuh, NHMB, aut. coll.

Remarks: Widely distributed in Africa, this species has been introduced into several tropical regions (e.g. India, Curaçao) where it is now well established. The usual host plants are *Tamarindus indica*, *Bauhinia rufescens*, several species of *Cassia* and *Piliostigma*; *Arachis hypogaea* is accepted by allotrophism (DECELLE 1981).

***Caryedon yemenensis* Decelle, 1979**

Caryedon yemenensis Decelle, 1979. – Fauna of Saudi Arabia 1: 328–329.

Material: Oman: 1 ♂, 2 ♀♀, Mintirib, 22°25' N 58°49' E, 269 m, 11.II.1986 and 2.III.1986, W. Büttiker, NHMB, aut. coll.; 2 ♂♂, Mintirib, 22°25' N 58°48' E, 269 m, 13–20.I.1986, M.D. Gallagher, NHMB, aut. coll.; 1 ♂, Qarhat Mu'ammarr (dunes), 21°40' N 59°19' E, 135 m, 8.II.1986, W. Büttiker, NHMB; 3 ♂♂, 1 ♀, Wadi Andam, 20 km N of Samad, 22°58' N 58°05' E, 650 m, 6–8.II.1986, M.D. Gallagher, NHMB, aut. coll.

Remarks: This species is also known from Saudi Arabia, Yemen, and Pakistan (SW-Balochistan). It was reared from seeds of *Cassia italica*.

Subfamily **Bruchinae**Genus ***Algarobius*** Bridwell, 1946

Algarobius Bridwell, 1946. – Journ. Wash. Acad. Sci. 36: 54.

Algarobius prosopis (LeConte, 1858)

Bruchus prosopis LeConte, 1858. – Proc. Nat. Sci. Acad. Philad. 10: 77.

Acanthoscelides prosopis. – Blackwelder 1946; Bull. U.S. Nat. Mus. 185: 760.

Algarobius prosopis. – Bridwell 1946; Journ. Wash. Acad. Sci. 36: 54.

Material: Oman: 2 ♂♂, 1 ♀, N of Sama il Qaylah, 23°21' N 58°03' E, 400 m, 22.IV.1985, C. Holzschuh, NHMB, aut. coll.

Remarks: Distributed in southwestern USA and Mexico, this species was imported into Saudi Arabia, Yemen and Dubai, probably with its Nearctic host plant *Prosopis (Algarobia) glandulosa*. It may be able to utilise African species of Mimosaceae for its development.

Genus ***Callosobruchus*** Pic, 1902

Callosobruchus Pic, 1902. – Rev. Entomol. 21: 6.

Callosobruchus omanicus n. sp.

Holotype: ♂, Oman: Dhofar, Ayun-Nabi Ayoub, 21.II.1989, W. Wittmer, NHMB, genitalia slide no. 240492 I. – Paratype: Oman: 1 ♂, Dhofar, Ain Rzat (Salalah), 17.II.1989, W. Wittmer, aut. coll., genitalia slide no. 240492 II.

Description: Length: 2.8–3.2 mm. Black; antennal segments 1–3 (4) and legs (except the more or less darkened femoral bases) pale brown; sternites and pygidium in part and elytral interspaces 2–8 below the whitish hairs red-brown; antennal segments (4) 5–11 and tarsal segment 4 dark brown. Vestiture dense; head yellowish-white pubescent; pronotum with mixed yellowish-white and brown hairs, prescutellar area with very dense white hairs, in darker specimens with an aggregation of whitish hairs on lateral sides and along middle of disc. Elytra yellowish-white pubescent, areas with dark brown hairs on lateral mid part and at apex, paler specimens with an X-shaped area formed by two crossing oblique transverse bands of whitish hairs; pygidium yellowish pubescent, with white hairs in middle of apex forming an elongate to longitudinal band.

Male: Head moderately elongate, with deep and dense punctures; frons as wide as an eye, with a distinct thin keel; eyes relatively small, bulging, incised to 0.6 of length; tempora 0.3 as long as an eye-length. Antenna moderately long, reaching to basal third of elytral length; antennal segments 1–3 cylindrical, segment 2 half as long as segment 1, segment 3 somewhat longer than segment 1, segment 4 subserrate, as long as segment 1, segments 5–10 serrate, becoming steadily wider, about 1.3–1.1 times as long as wide, segment 11 about 1.7 times as long as wide.

Pronotum relatively square, about 1.5 times as wide as long, sides converging, straight; disc convex with very dense double puncturation; prescutellar area somewhat gibbous. Scutellum 1.2 times as long as wide.

Elytra about 1.1 times as long as their combined width, with sides almost parallel, without a tubercle at base; striae narrow, punctured; impressions of striae distinct; striae 3 and 6 approaching posterad, striae 4-5 shortened apically at 0.85 of elytral length; interspaces flat, with moderately dense micro-puncturation and irregular coarse punctures; humeral callus well developed. Hind femur moderately swollen, bicarinate ventrally; preapical spine on inner carina very small and sharp, on outer carina large and acute. Hind tibia moderately broadened, with a complete set of carinae; mucro about 0.7 as long as apical width of tibia. Pygidium as long as wide, vertical, convex, with dense double puncturation. Abdomen not modified, sternite 5 emarginate to half length.

Genitalia: Median lobe moderately short and broad; ventral valve triangular, with apex elongate; internal sac with several groups of sclerites and spines: at base with paired groups of six more or less elongate sclerites, with an agglomeration of very small spines between, a pair of weakly toothed plates below the paired lateral row of 14 elongate sclerites reaching to apical fourth of internal sac, between toothed plates and basal third of sclerite rows with an agglomeration of very small spines, the larger spines in median part and smaller spines in apical part of internal sac (Fig. 1). Lateral lobes moderately broad, depressed, divided to 0.9 of length, basal strut without keel (Fig. 2).

Female: Not known.

Host plant: Not known.

Affinities: This new species differs from all the African *Callosobruchus* species in particular by the male genitalia. In external characters *C. omanicus* n. sp. resembles *C. stoutus* Singal & Pajni, 1990, from India and *C. bicalcaratus* Decelle, 1975, from Sri Lanka (a description of the hitherto unknown male of *C. bicalcaratus* will follow in another paper), but it has different aggregations of larger, elongate sclerites in the male genitalia than do these two Oriental species.

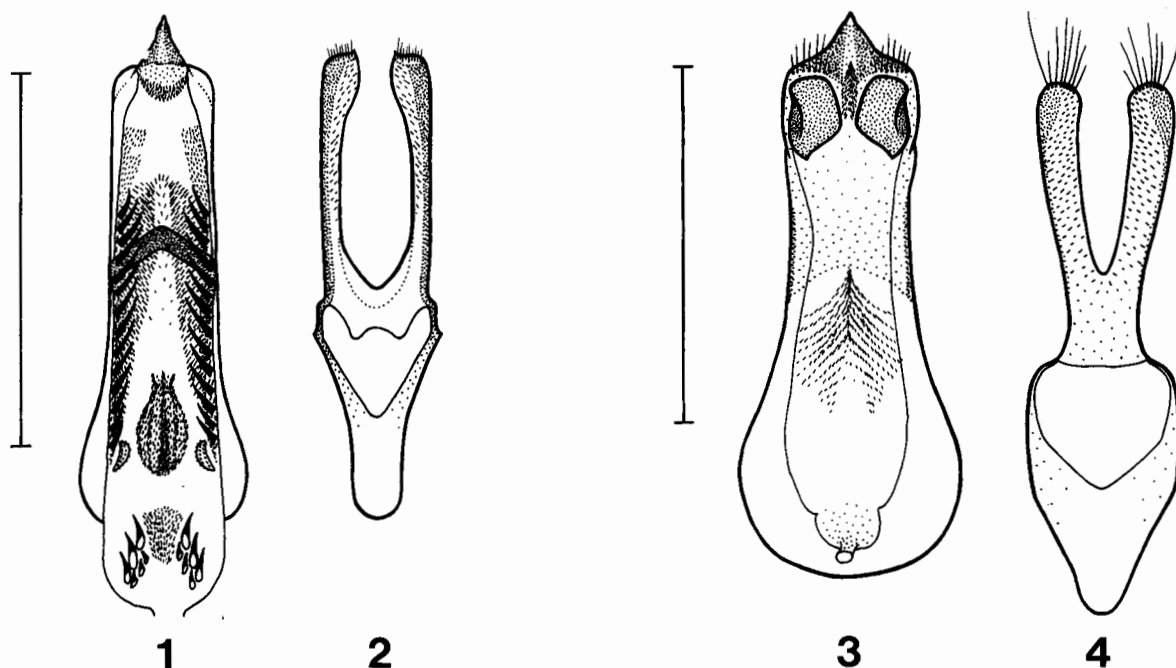
Genus *Borowiecius* n. gen.

Type species: *Bruchus ademptus* Sharp, 1886. - Ann. Mag. nat. Hist. 17: 36.

The genus-group taxa of the World Bruchidae have been the subject of an excellent study by BOROWIEC (1987). The description of this new genus *Borowiecius* follows his model of generic criteria:

Description: Antenna short, not sexually dimorphic; frons with a median carina; pronotum campaniform, without lateral carina, without prescutellar gibbosity; elytral interspaces 4-5 abbreviated basally by a hump; hind femur strongly swollen, bicarinate ventrally, outer ventral carina with a blunt preapical denticle and inner ventral carina with a long and acute preapical spine; hind tibia strongly broadened, with 3 carinae, slightly arcuate basally, strong mucro longer than lateral coronal denticle; pygidium vertical in male, subvertical in female; male genitalia with median lobe moderately long, broad, ventral valve acute with setae at base, internal sac with an apical pair of hinged sclerites and several groups of minute spines, lateral lobes depressed and unmodified apically, divided to 0.75 of length, basal strut without a keel.

Etymology: This new genus is dedicated to Prof. L. Borowiec (Wroclaw, Poland), one of the best specialists on the Bruchidae.



Figs 1-4: 1-2, *Callosobruchus omanicus* n. sp.: male genitalia (ventral view): 1, median lobe; 2, lateral lobes. Scale bar = 1 mm. 3-4, *Borowiecius fuscus* n. sp.: male genitalia (ventral view): 3, median lobe; 4, lateral lobes. Scale bar = 0.5 mm.

Affinities: Externally, this new genus is similar to *Callosobruchus*, but *Callosobruchus* species have different combinations of external characters: when the preapical denticle on the outer ventral carina of the hind femur is blunt, then the elytra never have a hump at base, and, moreover, when the antenna is not sexually dimorphic, then the pronotum always has prescutellar gibbosity with silky-white hairs. The greatest difference between the two genera lies in the male genitalia: *Callosobruchus* has an internal sac with at least one pair of more or less toothed basal plates, while *Borowiecius* has a pair of hinged sclerites at the apical orifice of the median lobe. The structure of the male genitalia of *Borowiecius* resembles that of the *Sulcobruchus*-group, which is formed in my opinion by *Sulcobruchus* Chujo sensu BOROWIEC (1987), *Megabruchidius* Borowiec and *Horridobruchus* Borowiec, but differs by the presence of long setae at base of ventral valve. In the genus *Sulcobruchus* sensu Borowiec, at least some African and Oriental species have an apical pair of hinged sclerites. All the genera of the *Sulcobruchus*-group mentioned above agree in their general genitalia structure, with the median lobe short to moderately long and broad, lateral lobes depressed and broad, and basal strut without a keel. The combination of external characters in *Borowiecius*, such as antenna without sexual dimorphism, elytra with a basal hump, hind femur bicarinate ventrally, hind tibia with 3 carinae, confirms its position in the *Sulcobruchus*-group.

Remarks: There are five species which belong to this genus: *B. alternans* (Fahraeus, 1871) and *B. varicolor* (Boheman, 1833), both distributed in the Afrotropical region, *B. ademptus* (Sharp, 1886), which is distributed from the Oriental region to the southeastern Palaearctic region, whilst an undescribed species occurs in Thailand. The fifth species was found in Oman; its description follows here.

Borowiecius fuscus n. sp.

Holotype: ♂, Oman: Dhofar, Ain Rzat (Salalah), 17. II. 1989, W. Wittmer, NHMB, genitalia slide no. 040492 II.
 - Paratype: Oman: 1 ♂, same data as holotype, aut. coll., genitalia slide no. 040492 III.

Description: Length: 2.5–2.7 mm. Reddish-brown; antennal base or entire antenna, fore and mid legs paler; head, pronotum, various elytral spots and underside of body darker. Vestiture moderately dense; yellow and yellowish-white hairs forming a more or less distinct pattern on elytra, darker elytral spots always with brown hairs; rest of body uniformly yellow pubescent.

Male: Head of moderate length; frons as wide as an eye, with shining and distinct carina; eyes bulging, incised to 0.6 of length; tempora 0.25 as long as an eye-length. Antenna short, reaching to base of elytra; antennal segments 1–4 cylindrical, segment 1 about twice as long as segment 2, segment 3 as long as segment 1, segment 4 somewhat shorter than segment 3, segment 5 subserrate and about 1.2 times as long as wide, segments 6–10 serrate, becoming steadily broader and shorter, about 1.0–1.3 times as wide as long, segment 11 about 1.4 times as long as wide, with pointed tip.

Pronotum campaniform, about 1.4 times as wide as long; sides linear, disc slightly convex and with double punctures. Scutellum as long as wide, somewhat bifid.

Elytra almost as long as their combined width, sides and disc convex; interspaces 4–5 abbreviated basally by a hump; interspaces flat, with indistinct micro-puncturation and an irregular row of coarse punctures; striae narrow, punctured; impression of striae sharp; striae 2–3 converging or enclosed basally; humeral callus moderately developed. Hind femur strongly swollen, bicarinate ventrally; outer carina with a very blunt preapical denticle, inner carina with a long and acute preapical spine. Hind tibia strongly broadened; lateral, ventral and anterior carinae well developed; mucro strong, more than twice as long as coronal denticle at extension of lateral carina. Pygidium 1.1 times as wide as long, vertical, convex, densely punctured. Abdomen not modified, sternite 5 emarginate to half of its length.

Genitalia: Median lobe moderately long, broad; ventral valve acute apically, with seven setae at base; a pair of very large hinged sclerites at base of orifice; minute spines between hinged sclerites and in median part of internal sac (Fig. 3). Lateral lobes broad, depressed, rounded apex with eight long setae, divided to 0.75 of length, basal strut without a keel (Fig. 4).

Female: Not known.

Host plant: Not known.

Affinities: This new species agrees with the type-species *Borowiecius ademptus* (Sharp) in body-shape and pattern of elytral vestiture. However, *B. ademptus* differs mainly by having body colour black (except abdomen), hind legs black (except tarsi), and male genitalia with distinctly smaller hinged sclerites. It is widely distributed in the Oriental Region (from India to China, Korea and Japan) but does not reach the Arabian Peninsula.

Genus *Tuberculobruchus* Decelle, 1951

Tuberculobruchus Decelle, 1951. – Rev. Zool. Bot. Afr. 45: 179.

Tuberculobruchus sinaitus (K. Daniel, 1907)

Laria (*Bruchidius*) *sinaitus* K. Daniel, 1907. – Abeille 31: 40.

Tuberculobruchus sinaitus. – Decelle 1979; Fauna of Saudi Arabia 1: 319.

Material: Oman: 1 ♀, Dhofar, Ayun-Nabi Ayoub, 21. II. 1989, W. Wittmer, aut. coll.; 1 ♂, 7 km SE of Dibab, 23° 02' N 59° 05' E, 60 m, 17–18. IV. 1985, M. D. Gallagher & K. Smythe, NHMB.

Remarks: This species has a wide Saharo-sahelian distribution, from Algeria and Senegal to the Arabian Peninsula. Known host plants are *Acacia raddiana* and *A. sieberiana*.

Genus *Bruchidius* Schilsky, 1905

Bruchidius Schilsky, 1905. - in Küster & Kraatz, Käfer Europas 41: e-f.

Bruchidius buettikeri Decelle, 1979

Bruchidius buettikeri Decelle, 1979. - Fauna of Saudi Arabia 1: 321-323.

Material: Oman: 1 ♀, W of Al Sib, 23°41'N 58°10'E, 10 m, 14.IV.1985, C. Holzschuh, NHMB; 1 ♀, Baushar, 23°23'N 58°25'E, 9.V.1985, M.D. Gallagher, NHMB; 6 ♂♂, 6 ♀♀, Fanjah, Wadi Fanjah, 23°27'N 58°08'E, 9.IV.1985, C. Holzschuh, NHMB, aut. coll.; 1 ♂, 1 ♀, Wadi Fanjah, 23°32'N 58°06'E, 150 m, 5.IV.1985, C. Holzschuh, NHMB; 2 ♂♂, 1 ♀, Mudhaybi, 22°12'N 58°06'E, 530 m, 12.III.1986, W. Büttiker, NHMB, aut. coll.; 11 ♂♂, 8 ♀♀, Muscat, Madinat Qaboos, 23°36'N 58°26'E, 50 m, 2.IV.1985, C. Holzschuh, NHMB, aut. coll.; 2 ♂♂, SE of Muscat, Wadi Mayh, 23°27'N 58°35'E, 200 m, 11-12.IV.1985, C. Holzschuh, NHMB; 3 ♂♂, 1 ♀, N of Sama il Qaylah, 23°21'N 58°03'E, 400 m, 21.IV.1985, C. Holzschuh, NHMB, aut. coll.

Remarks: This species also has a Saharo-sahelian distribution, but is only known from the eastern part of this region (Somalia, Saudi Arabia and Yemen). Its host plant is still unknown.

Bruchidius sahelicus sensu DECELLE (1979)

Material: Oman: 1 ♂, Baushar, 23°32'N 58°24'E, 20.X.1985, M.D. Gallagher, NHMB; 1 ♂, 4 ♀♀, Fanjah, Wadi Fanjah, 23°27'N 58°08'E, 9.IV.1985, C. Holzschuh, NHMB; 1 ♂, Mudhaybi, 22°12'N 58°06'E, 280 m, 12.III.1986, W. Büttiker, NHMB; 1 ♂, Muscat, Madinat Qaboos, 23°36'N 58°26'E, 50 m, 2.IV.1985, C. Holzschuh, aut. coll.; 1 ♂, Qurm, Nature Res., 23°37'N 58°29'E, 26.IV.1984, C. Holzschuh, aut. coll.; 4 ♂♂, 5 ♀♀, N of Sama il Qaylah, 23°21'N 58°03'E, 21.IV.1985, W. Büttiker, NHMB, aut. coll.; 1 ♀, Tawi Sarin, 21°40'N 58°39'E, 137 m, 11.II.1986, W. Büttiker, NHMB.

Remarks: No description of this species has yet been published. Widely distributed in the Saharo-sahelian region, it is found in Algeria and Senegal as well as in Saudi Arabia. Larvae develop in several species of *Acacia*.

Subfamily Amblycerinae

Genus *Spermophagus* Schoenherr, 1833

Spermophagus Schoenherr, 1833. - Gen. Curc. I: 102.

Spermophagus humilis Decelle, 1970

Spermophagus humilis Decelle, 1970. - South Afr. Animal Life 14: 265-266.

Material: Oman: 1 ♂, 6 ♀♀, Dhofar, Ain Rzat (Salalah), 17.II.1989, W. Wittmer, NHMB, aut. coll.

Remarks: This species is widely distributed in the Afrotropical region, from Senegal to Zimbabwe and Somalia; it was recently found in Pakistan (SW-Balochistan). Its host plant is still unknown (BOROWIEC 1991). This is the first record of *S. humilis* for the Arabian Peninsula.

DISCUSSION

The bruchid fauna of Oman resembles that of Saudi Arabia. Seven species are African elements, of which *Caryedon palaesticus*, *C. sahelicus*, *Tuberculobruchus sinaitus*, *Bruchidius buettikeri* and *B. sahelicus* have a Saharo-sahelian distribution, whilst *Caryedon serratus* and *Spermophagus humilis* are Afrotropical species. Five of them develop in species of *Acacia*; the host plants of *S. humilis* and *B. buettikeri* are not known. *Caryedon yemenensis*, which is distributed throughout the Arabian Peninsula and Pakistan, develops in *Cassia italica*. So far as is known,

Callosobruchus omanicus n. sp. and *Borowiecius fuscus* n. sp. are endemic species and are restricted to Oman; no host plants are known for both species. The closest relatives of *C. omanicus* are among Indian *Callosobruchus* species, whilst the position of *B. fuscus* n. sp. within *Borowiecius* n. gen. requires further studies. One Nearctic species has been introduced: *Algarobius prosopis*; it seems to be autochthon throughout the Arabian Peninsula.

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REFERENCES

- ANTON, K.-W. 1994. The Bruchidae (Coleoptera) of Saudi Arabia, with descriptions of two new species. *Fauna of Saudi Arabia* 14: 97-104.
- BOROWIEC, L. 1987. The genera of seed beetles (Coleoptera, Bruchidae). *Polskie Pismo Entomologiczne* 57: 207 pp.
- BOROWIEC, L. 1991. Revision of the genus *Spermophagus* Schoenherr (Coleoptera: Bruchidae: Amblycerinae). *Biologica Silesiae, Suppl.*: 198 pp.
- DECELLE, J.E. 1977. Coleoptera: Bruchidae de Ceylan. *Entomologica Scandinavica, Supplementum* 4: 179-194.
- DECELLE, J.E. 1979. Insects of Saudi Arabia. Coleoptera: Fam. Bruchidae. *Fauna of Saudi Arabia* 1: 318-330.
- DECELLE, J.E. 1981. Bruchidae related to grain legumes in the Afrotropical area. *Series Entomologica* 19: 193-197.
- DECELLE, J.E. 1990. *Algarobius prosopis* (Coleoptera: Bruchidae) dans la péninsule arabe. *Bulletin et annales de la Société Royale Belge d'Entomologie* 126: 20-22.
- SEMENOV, A. 1896. Insectorum quorundam novorum faunae transcaspiae diagnoses. *Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de St.-Petersburg* 1: 378-386.
- SINGAL, S.K. & PAJANI, H.R. 1990. Six new species of *Callosobruchus* Pic from India (Coleoptera, Bruchidae). *Polskie Pismo Entomologiczne* 59: 761-782.

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