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Agonoscelis puberula (Hemiptera: Heteroptera: Pentatomidae) in Cuba – the oldest record of an alien species in the New World

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Abstract: The African cluster bug *Agonoscelis puberula* Stål, 1854 (Hemiptera: Heteroptera: Pentatomidae: Pentatominae: Agonoscelidini), an Afrotropical stink bug previously introduced to the New World, is recorded from Cuba for the first time. The specimen was collected in 1978 and represents the oldest record in America, suggesting the possibility of its introduction during the engagement of Cuban troops in conflicts in tropical Africa during the Cold War, most probably from Angola. Complete bibliography of the papers citing *A. puberula*, its distribution, host plants and status of name-bearing types are reviewed. Additional records of *A. puberula* from Botswana, Namibia, South Africa and Zambia (new record) are provided.

Keywords: Heteroptera, Pentatomidae, new record, alien species, Caribbean

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Introduction

Agonoscelis Spinola, 1837 is an Old World genus of the family Pentatomidae, classified in the subfamily Pentatominae as the only genus of the tribe Agonoscelidini. Currently, there are 26 species group taxa (i.e. 22 species and four subspecies) but a comprehensive revision of the genus is lacking and the validity of some of the taxa remains in question (Rider 2017). The genus is native in the tropical and subtropical regions of the Old World. Most of the species are distributed in Africa and Madagascar [*A. bicolor* Distant, 1879, *A. cognata* Horváth, 1904, *A. erosa erosa* (Westwood, 1837), *A. e. atropurpurea* Schumacher, 1913, *A. haraldi* Bergroth, 1908, *A. longirostris* Harold, 1879, *A. marshalli* Schouteden, 1912, *A. neavei* Distant, 1910, *A. odendaali* Distant, 1910, *A. okuana* Linnavuori, 1982, *A. puberula* Stål, 1854, *A. sansibarica* Harold, 1879, *A. vanderysti* Schouteden, 1916, *A. venosa* (Thunberg, 1783), *A. versicolorata*

versicolorata (Turton, 1802), *A. v. fallaciosa* Linnavuori, 1975, *A. v. gambiensis* Horváth, 1904, *A. v. tibialis* Horváth, 1904]; two others (*A. arabica* Linnavuori, 1975, *A. puberula*) occur in the Arabian Peninsula; six species are confined to the Oriental and East Palaearcic Region [*A. antennata* Distant, 1911, *A. campbelii* Distant, 1918, *A. femoralis* Walker, 1868, *A. karachiensis* Ahmad, Siddiqui & Kamaluddin, 2001, *A. nubilis* (Fabricius, 1775), *A. tamilnadensis* Mathew, 1977]; and only a single species, *A. rutila* (Fabricius, 1775), is distributed in Indonesia, New Guinea and Australia (Ahmad et al. 2001; Cassis & Gross 2002; Rider 2006, 2017; Robertson 2009). Partial revisions and/or keys to species may be found in the following papers: Stål (1876), Harold (1879), Horváth (1904), Jensen-Haarup (1920), Mathew (1977) (India), Linnavuori (1982) (West and Central Africa) and Ahmad et al. (2001) (Indo-Pakistan subregion). Only recently one of the Afrotropical species, *A. puberula* or African cluster bug, has been discovered in Mexico, the southern USA, and the West Indies, with the oldest record dating back to 1985 (Thomas et al. 2003). In this paper, we present the first record of this species from Cuba, being moreover the oldest known record from the New World. The possible ways of introduction of *A. puberula* in America are discussed.

Material and methods

The specimens mentioned are deposited in the following collections:

DARC	David A. Rider collection, Fargo, North Dakota, USA;
NHRS	Swedish Museum of Natural History, Stockholm, Sweden;
NMPC	National Museum, Prague, Czech Republic;
ZMHB	Museum für Naturkunde, Berlin, Germany;
ZMUC	Zoological Museum, University of Copenhagen, Copenhagen, Denmark.

Results

***Agonoscelis puberula* Stål, 1854**

Agonoscelis puberula Stål, 1854: 216. Lectotype (designated by Linnavuori 1975: 91, as type): ♂, South Africa: 'T'kons font., Wahlberg' (NHRS).

Agonoscelis puberula: Dohrn (1859): 12 (catalogue); Stål (1865): 179–180 (redescription, distribution); Walker (1867): (catalogue, record); Stål (1876): 85 (key, catalogue); Harold (1879): 40 (key), 43–44 (redescription, records); Lethierry (1883): 743 (records); Distant (1892): 246 (record); Lethierry & Severin (1893): 150 (catalogue); Distant (1898): 297, 306 (records); Horváth (1904): 262 (key); Schouteden (1905): 9 (record); Kirkaldy (1909): 98 (catalogue, distribution); Distant (1910): 96 (record); Schouteden (1910): 82 (records); Jeannel (1913): 87 (records); Schumacher (1913): 55 (records); Anderson (1919): 3 (agricultural entomology); Jensen-Haarup (1920): 217 (key); Carpenter (1921): 73 (palatability experiments, record); Lehmann (1922): 132 (records); Hesse (1925): 31 (records); Haines (1935): 182, 188 (biology, agricultural entomology); Hesse (1935): 588 (records); Mancini (1939): 200 (record); Leston (1952): 518 (record); Leston (1953): 54 (record); Leston (1954): 679 (record); Schouteden (1957): 284 (record); Le Pelley (1959): 54, 126, 171 (host plant, records); Linnavuori (1975): 91, Figs. 68c–e (new synonymy, lectotype designations, figures of male genital capsule and paramere, record); Le Pelley (1979): 256 (parasitoid); Couilloud (1989): 205 (cotton pest); Linnavuori (1989): 11 (record); Linnavuori & van Harten (1997): 232 (record); Thomas et al. (2003): 151–153 (habitus photo of adult, host plant, records, distribution); Kondratieff et al. (2005): 7, 93–94 (record); Perez-Gelabert & Thomas (2005): 327–328 (record, distribution); Ortega-León et al. (2006): 245–249, Figs. 1–6 (habitus drawing of adult, description and habitus drawings of larval instars I–V, host plant, record); Rider (2006): 253 (catalogue, distribution); Robertson (2009): 213 (catalogue, distribution); Bundy (2012): 199 (records); Aukema et al. (2013): 447 (catalogue); Santos & Bastardo (2013): 4, 7 (distribution); Krüger & Deckert (2016): 47 (checklist).

Figs 1–2. Habitus of *Agonoscelis puberula* **Stål, 1854. 1 – ♀ from Cuba, Baracoa (9.4 mm), 2 – ♂ from Namibia, Caprivi strip) (9.8 mm). Photo: P. Kment.**

Agonoscelis brevicornis Jensen-Haarup, 1920: 216 (original description), 217 (key). Syntypes: 5 ♀♀, Eritrea (ZMUC). Synonymized by Linnavuori (1975).

Agonoscelis brevicornis: Mancini (1956): 93 (record).

Material examined

CUBA: Cuba, Baracoa, 20.v.1978 , 1 ♀, J. Křeček lgt., P. Kment det. (NMPC: ex coll. Ludvík Škapec) (Fig. 1). **AFRICA: BOTSWANA:** Botswana, 15.viii.1974, 1 ♀, R. Mc Bee lgt., D.A. Rider det. (DARC); Chobe Park, Savuti Camp, 18°33'S, 24°03'E, 11.iii.1993, 2 ♂♂ 6 ♀♀, U. Göllner & J. Deckert lgt., D.A. Rider det. (ZMHB); Gabarone, 8.–14.x.1988, 1 ♀, 15.–21.x.1988, 1 ♀, 28.–30.xi.1988, 1 ♂, 8.–14.ii.1989, 1 ♂, R.D. Ward lgt., D.A. Rider det. (DARC); Kalahari, Severelela-Kakir, x.–xi.1904, 1 ♂ 6 ♀♀, L. Schulze lgt., D.A. Rider det. (ZMHB); Tiokweng, 8.–14.v.1988, 1 ♀, R.D. Ward lgt., D.A. Rider det. (DARC). **NAMIBIA:** Bushmanland, Rooidaghekpos veterinary station, ca. 140 km E of Grootfontein, 19°17'S, 19°12'E, 19.ii.1992, 8 ♂♂ 3 ♀♀, U. Göllner lgt., D.A. Rider det. (ZMHB); Caprivi Strip, 69 km W Katima Mulio, 9.i.2015, 1 ♂ (Fig. 2) 1 ♀, S. Prepsl lgt., P. Kment det. (NMPC); Daan Viljoen, 22°26'S, 16°53'E, 7.iii.1994, 2 ♂♂ 1 ♀, U. Göllner lgt., D.A. Rider det. (ZMHB); Etosha N.P., Namutoni, Fischer's Pan, 18°48'S, 16°56'E, 935 m a.s.l., 14.–16.xii.1993, 1 ♂ 1 ♀, J. Deckert lgt., D.A. Rider det. (ZMHB); Etosha Pan N.P., Okaukuejo, 19°10'S, 15°55'E, 1168 m a.s.l., 17.–18.xii.1993, 5 ♂♂, J. Deckert lgt., D.A. Rider det. (ZMHB); Gobabis env., Boxhagen farm, 1.–3.x.1991, 8 ♂♂ 5 ♀♀, U. Göllner lgt., D.A. Rider det. (ZMHB); Gobabis env., Ohlsenhagen farm, 16.–17.ii.1998, 8 ♂♂ 6 ♀♀, U. Göllner lgt., D.A. Rider det. (ZMHB); Grootfontein Distr., Klein Nosib farm, 19°28'S, 14°50'E, iv.1989, 2 ♀♀, J. Irish lgt., D.A. Rider det. (ZMHB); Grootfontein, Otavi Fontein, 4 km E of Otavi, 19°38'S, 17°23'E, 17.ii.1992, 1 ♀, J. Deckert lgt., D.A. Rider det. (ZMHB); Grootfontein env., Hurisib farm, on *Cyperus papyrus*, 8.–9.x.1991, 1 ♂, U. Göllner lgt., D.A. Rider det. (ZMHB); Katima Mulilo Distr., Mudumu N. P., Nakatwa, 18°10'S, 23°26'E, 15.iii.1997, 1 ♂ 1 ♀, J. Deckert lgt., D.A. Rider det. (ZMHB); Kavango, Popa Falls, 18°07'S, 21°35'E, 26.ii.–3.iii.1992, 1 ♂, U.

Göllner lgt., D.A. Rider det. (ZMHB); Kunene, Epupa Falls, 17°00'S, 13°15'E, 20.–22.ii.1994, 1 ♂, U. Göllner lgt., D.A. Rider det. (ZMHB); Omaruru env., Otjua farm, 5.–7.x.1991, 1 ♂ 1 ♀ (♂ collected on false cotton [= *Cochlospermum*]), U. Göllner lgt., D.A. Rider det. (ZMHB); Omaruru env., 30 km NEN Omaruru, Otjua farm, 21°07'S, 16°04'E, 17.iii.1992, 1 ♂ 1 ♀, U. Göllner lgt., D.A. Rider det. (ZMHB); Osona near Okahandja, iii.–iv.1989, 17 ♂♂ 22 ♀♀, J. Irish lgt., D.A. Rider det. (ZMHB); Otawi env., Dakota farm, 1.–3.iii.1998, 1 ♂ 1 ♀, U. Göllner lgt., D.A. Rider det. (ZMHB); Waterberg Plateau Park, Camp Bemade de la Bat, 20°30'S, 17°14'E, 1250 m a.s.l., 19.xii.1993, 1 ♂, J. Deckert lgt., D.A. Rider det. (ZMHB); D.S.W. Afrika, Windhoek, 1 ♀, V. Kolle lgt., D.A. Rider det. (DARC); D.S.W. Afrika, Windhoek, 1 ♂, S.G. Techow lgt., D.A. Rider det. (DARC); S. W. Afr., Windhuck [= Windhoek], P. Kment det. (NMPC); Windhoek, 1 ♂, D.A. Rider det. (ZMHB). **SOUTH AFRICA:** 18 km SW Offantshook, 10.i.1991, 1 ♀, C. Bayer lgt., D.A. Rider det. (ZMHB); C.P. [Western Cape], Prince Albert, Tierberg, 33.12°S 22.16°E, ix.1991, 1 ♀, S.J. Dean lgt., D.A. Rider det. (DARC); [Limpopo], Roodeplaat, 'found on host plant *Sesamum triphyllum*', 4.v.1966, 1 ♀, P. Paliatseas lgt., D.A. Rider det. (DARC); Tvl [= Transvaal, currently Gauteng], Magaliesburg, Castle Gorge, 25.48°S 27.34°E, 16.ii.1993, 1 ♂, I. Millar lgt., D.A. Rider det. (DARC); Tvl [= Transvaal, currently Limpopo], D'Nyala Nat. Res., Ellisras [= Lephalale] District, 23.45°S 27.49°E, 10.–14.xi.1986, 1 ♂, K. de Wet lgt., D.A. Rider det. (DARC); TVL [= Transvaal, currently Gauteng], Soutpan [= Tswaing crater], Pretoria Distr., 25.24S 28.06E, 5.iii.1987, 1 ♂, I.M. Millar lgt., D.A. Rider det. (DARC). **ZAMBIA:** 29 km NW Chipata, 13°30'S, 32°29'E, ca. 825 m a.s.l., 20.iii.1993, 1 ♀, U. Göllner lgt., D.A. Rider det. (ZMHB).

Plant associations

Bixaceae: *Cochlospermum* (one adult, Namibia – this paper). **Cyperaceae:** *Cyperus papyrus* (one adult, Namibia – this paper). **Lamiaceae:** *Leonotis nepetifolia* (L.) R.Br. (all instars collected on inflorescences, Mexico – Ortega et al. 2006); *Marrubium vulgare* L. (adults and larvae, Arizona – Thomas et al. 2003). **Linaceae:** *Linum usitatissimum* L. (Kenya, no details – Le Pelley 1959). **Malvaceae:** *Gossypium* sp. (listed as pest of cotton – Couilloud 1989). **Pedaliaceae:** *Sesamum triphyllum* (one adult, South Africa – this paper). **Poaceae:** 'common on cereals' (Kenya – Anderson 1919). **Rubiaceae:** *Coffea arabica* L. (Kenya – Anderson 1919, Le Pelley 1959).

Distribution

Africa: Botswana (Schumacher 1913, Hesse 1935, Krüger & Deckert 2016), **Eritrea** (Schouteden 1905; Jensen-Haarup 1920, as *A. brevicornis*), **Ethiopia** (Lethierry 1883; Mancini 1939, 1956), **Kenya** (Jeannel 1913, Anderson 1919, Le Pelley 1959), **Namibia** (Stål 1865, Harald 1879, Schumacher 1913, Lehmann 1922, Hesse 1925), **Rwanda** (Schouteden 1957), **South Africa** (Stål 1854, 1865, 1876; Walker 1867; Harald 1879; Distant 1892, 1898; Leston 1952, 1953), **Sudan** (Linnavuori 1975), **Tanzania** (Schouteden 1910, Carpenter 1921), **Zambia** (new record), **Zimbabwe** (Distant 1898, Leston 1954). **Southwest Asia: Yemen** (Linnavuori 1989, Linnavuori & van Harten 1997). **North America: United States**: Arizona (Thomas et al. 2003), California (Ortega-León et al. 2006, no exact record), Colorado (Ortega-León et al. 2006, no exact record), New Mexico (Thomas et al. 2003, Bundy 2012), Oklahoma (Kondratieff et al. 2005), Texas (Thomas et al. 2003), Utah (Ortega-León et al. 2006, no exact record). **Central America: Mexico**: Distrito Federal (Thomas et al. 2003, Ortega et al. 2006), Guanajuato (Thomas et al. 2003), Guerrero (Thomas et al. 2003), Hidalgo (Thomas et al. 2003), Mexico (Thomas et al. 2003), Michoacán (Thomas et al. 2003), Nuevo León (Thomas et al. 2003), Oaxaca (Thomas et al. 2003), Queretaro (Thomas et al. 2003), Yucatán (Thomas et al. 2003). **West Indies: Cuba** (new record), **Dominican Republic** (Thomas et al. 2003, Perez-Gelabert & Thomas 2005, Santos & Bastardo 2013), **Jamaica** (Thomas et al. 2003).

Note on type status

Stål's (1854) original description of *A. puberula* was based upon an unknown number and sex of specimens originating from Natal ('Habitat in terra Natalensi'); he provided only

single measurement for each body length (8.5 mm) and width (5 mm), possibly indicating that he only had a single specimen, but we cannot assume this. Linnavuori (1975) cited the studied types as: 'Type, 1 ♂ and a paratype of *puberula* St., S. Africa T'kons font., Wahlberg. Mus. Stockholm. 2 paratypes of *puberula* St. Caffraria, Mus. Stockholm.' Because it is clear, that Linnavuori (1975) selected the only male of the four specimens to be the type, his action satisfied the requirements of the Article 74.5 (ICZN 1999) for lectotype designation by indicating explicitly that he was selecting from the type series that particular specimen to serve as name-bearing type.

Jensen-Haarup (1920) described *A. brevicornis* based on 5 ♀♀ (i.e., syntypes) from 'Colonia Eritrea'. Linnavuori (1975) cited the studied type as: 'type of *brevicornis* J.-H., Eritrea, Mus. Copenhagen'. Because it not certain which of the five syntypes Linnavuori actually examined, in this case the requirements of the Article 74.5 (ICZN 1999) for lectotype designation were not fulfilled.

Discussion

The host plants of *Agonoscelis puberula* in the New World are two introduced weeds, horehound (*Marrubium vulgare*) and klip dagga (*Leonotis nepetifolia*) on which also the larvae were collected (Thomas et al. 2003, Ortega-León et al. 2006). In South Africa, it has been reported as a nuisance in fruit orchards (Haines 1935). Anderson (1919) listed the species from cereals and coffee (*Coffea arabica*), Le Pelley (1959) from flax (*Linum usitatissimum*) and coffee, and Couilloud (1989) on cotton (*Gossypium* sp.) but without any details, so there is no proof of its development on these hosts. The same is true for the two host plant records provided here based on label data of two adult specimens found on *Cyperus papyrus* an *Cochlospermum* sp. in Namibia and *Sesamum triphyllum* in South Africa.

In Africa, the species is widely distributed in southern and eastern Africa (from Namibia and South Africa to Ethiopia and Eritrea) and extends also to Yemen in the south-west of Arabian Peninsula (see above). However, there are major gaps in the knowledge of its distribution and we may expect records from other countries of the region as well.

In America, the species was first found in Jamaica in 1985, followed by first records in Mexico (Guanajuato) in 1988 and the USA (Arizona) in 1990 (Thomas et al. 2003). Here we present the oldest known record from the New World, dating back to 1978. This specimen originates from the private collection of Ludvík Škapec, Czech specialist in Heteroptera, donated recently to the National Museum in Prague. His collection contained a few hundred true bugs from Cuba collected by various Czech entomologists in the 1970s, but there are no specimens from tropical Africa in that collection which supports the authenticity of the examined specimen. Concerning its origin on the continent, Thomas et al. (2003) wrote: 'Our colleague Thomas J. Henry (USDA-ARS) informs us that he has frequently identified *Agonoscelis versicolor* (F.), intercepted on cut flowers shipped to the United States from South Africa via the Netherlands. This suggests a plausible route for the entry of *A. puberula* which may have established because of the ready availability of an acceptable host plant.' Perez-Gelabert & Thomas (2005) further indicated that specimens from Jamaica had been intercepted at U.S. ports on shipments of thyme (*Thymus vulgaris*). However, considering the socialistic planned economy of Cuba in the 1970s, the arrival of this species into the country by cut flower shipment is not very probable.

Though the route of introduction into Cuba is unknown, we expect this introduction is probably connected with Cuban engagement in various conflicts in tropical Africa during the Cold War, the most important of which was the Angola civil war from 1975 to 1991 (Anonymus 2017a). Since gaining Angola's independence in November 1975, Cuba launched a large-scale military intervention in support of the regime of the communist People's Movement for the Liberation of Angola (MPLA) against the interventions of South Africa and Zaire (now Democratic Republic of the Congo) in support of two right-wing liberation movements com-

peting for power in the country, the National Liberation Front of Angola (FNLA) and the National Union for the Total Independence of Angola (UNITA). In 1976, the Cuban military in Angola reached 36,000 troops and some of them stayed in the country even after the (temporary) withdrawal of South Africa forces (March 1976) due to the continuing civil war with UNITA. In 1988, Cuban troops (increased to about 55,000) intervened again to support the Soviet-led People's Armed Forces for the Liberation of Angola (FAPLA) in the struggle with South African intervention and UNITA (The so-called South African Border War). Cuban military engagement in Angola started to decrease after a tripartite peace settlement was signed on 10 September, 1988, and finally ended in 1991 (Klíma 2008, Anonymus 2017b). Besides the military support, Cuba also provided massive humanitarian help (especially after 1980) involving tens of thousands of volunteers working in Angola, including technical, medical and educational staff, reconstructing damaged infrastructure, reviving coffee and sugar cane production, as well as creating foundations for Angola's social, health and education services (Anonymus 2017b). Cuban troops (16,000) also intervened in Ethiopia during the Ogaden war in 1977–1978 (Anonymus 2017c).

Long time massive exchange of people and goods during these interventions probably offered the possibility for *A. puberula* to be transported into Cuba. Although there is no record of *A. puberula* from Angola, this is a very poorly sampled African country due to the long civil war and persisting mine fields; its occurrence there is probable at least in the southern part of the country because it is well documented to occur in adjacent areas of northern Namibia (areas of Okawango and Owamboland) (Lehmann 1922, Hesse 1925). From Ethiopia *A. puberula* has been recorded by Lethierry (1883) and Mancini (1939, 1956).

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References

Ahmad I., Siddiqui A.S. & Kamaluddin S., 2001: A revision of the lucern stink bug genus Agonoscelis Spinola (Heteroptera: Pentatomidae: Pentatominae) from Indo-Pakistan subcontinent with description of a new species from Sindh, Pakistan and their cladistic relationships. – Proceedings of the Pakistan Congress of Zoology 21: 227–240.

Anderson T.J., 1919: Catalogue of the exhibit of entomology at the Nairobi Agricultural Show 1919. – British East Africa Department of Agriculture, Nairobi Division of Entomology, Bulletin 2: 1–28.

Anonymus, 2017a: Cuban intervention in Angola. https://en.wikipedia.org/wiki/Cuban_intervention_in_Angola (Last access: 28 July 2017)

Anonymus, 2017b: Military history of Cuba. https://en.wikipedia.org/wiki/Military_history_of_Cuba#Congo_Crisis (Last access: 28 July 2017)

Anonymus, 2017c: Ogaden War. https://en.wikipedia.org/wiki/Ogaden_War (Last access: 28 July 2017)

Aukema, B., Rieger, Ch. & Rabitsch, W., 2013: Catalogue of the Heteroptera of the Palaearctic Region. VI. Supplement. – Amsterdam: The Netherlands Entomological Society, xxiii + 629 pp.

Bundy C.S., 2012: An annotated checklist of the stink bugs (Heteroptera: Pentatomidae) of New Mexico. – Great Lakes Entomologist 45: 196–209.

Carpenter G.D.H., 1921: Experiments on the relative edibility of insects, with special reference to their coloration. – Transactions of the Entomological Society of London 1921: 1–105.

Cassis G. & Gross G.F., 2002: Hemiptera: Heteroptera (Pentatomomorpha). – In: Houston W. W. K. & Wells A. (eds.), Zoological Catalogue of Australia. Vol. 27.3B. Melbourne: CSIRO Publishing, xiv + 737 pp.
Couilloud R., 1989: Hététoptères déprédateurs du cotonnier en Afrique et à Madagascar (Pyrrhocoridae, Pentatomidae, Coreidae, Alydidae, Rhopalidae, Lygaeidae). – Coton et Fibres Tropicales 44(3): 185–227.
Distant W.L., 1892: A naturalist in the Transvaal. – London: R. H. Porter, xvi + 277 pp + pls. I–V.
Distant W.L., 1898: Rhynchota from the Transvaal, Mashonaland, and British Nyasaland. – Annals and Magazine of the Natural History, Series 7, 2: 294–316.
Distant W.L., 1910: Rhynchotal notes.–LI. – Annals and Magazine of Natural History, Series 8 6: 77–99, 212–221.
Dohrn A., 1859: Catalogus Hemipterorum. – Stettin: Herrcke & Lebeling, 112 pp.
Haines G.C., 1935: Cluster bugs. – Farming in South Africa 10(109): 182, 188.
Harold E.v., 1879: Ueber einige Agonoscelis-Arten (Hemiptera Heteroptera). – Mittheilungen des Münchener Entomologischen Vereins 3: 39–45.
Hesse A.J. 1925: Contributions to a knowledge of the fauna of South-West Africa. IV. A List of the Heteropterous and Homopterous Hemiptera of South-West Africa. – Annals of the South African Museum 23: 1–190.
Hesse A.J., 1935: Scientific results of the Vernay-Lang Kalahari Expedition, March to September, 1930. Hemiptera-Heteroptera. – Annals of the Transvaal Museum 16: 581–603.
Horváth G., 1904: Pentatomidae novae africanae. – Annales Musei Nationalis Hungarici 2: 253–271.
International Comission on Zoological Nomenclature [ICZN], 1999: International Code of Zoological Nomenclature. Fourth edition. – London: International Trust for Zoological Nomenclature, 306 pp.
Jeannel R., 1913: Voyage de Ch. Alluaud et R. Jeannel en Afrique Orientale (1911–1912). Résultats scientifiques. Insectes Hémiptères. I. Pentatomidae. – Paris: Albert Schulz, 114 pp + pls. i–iv.
Jensen-Haarup A.C., 1920: Hemipterological notes and descriptions I. – Entomologiske Meddelelser 13: 209–224.
Kirkaldy G.W., 1909: Catalogue of the Hemiptera (Heteroptera) with biological and anatomical references, lists of foodplants and parasites, etc. Prefaced by a discussion on Nomenclature and an analytical table of families. Vol. I. Cimicidae. – Berlin: Felix L. Dames, xl + 392 pp.
Kondratieff B.C., Schmidt J.P., Opler P.A. & Garhart M.C., 2005. Chapter 2. Survey of selected arthropod taxa of Fort Sill, Comanche County, Oklahoma. III. Arachnida: Ixodidae, Scorpiones, Hexapoda: Ephemeroptera, Hemiptera, Homoptera, Coleoptera, Neuroptera, Trichoptera, Lepidoptera, and Diptera. Pp. 70–265. – In: Opler P. (ed.): Insects of Western North America. 4. Survey of selected arthropod taxa of Fort Sill, Comanche County, Oklahoma. III. Contributions of the C. P. Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, CO, 265 pp.
Klíma J., 2008. Dějiny Angoly. [History of Angola.] – Praha: Nakladatelství Lidové noviny, 402 pp. [In Czech.]
Krüger A. & Deckert J., 2016: True bugs (Hemiptera-Heteroptera) of Botswana—Bibliographical inventory and new records. – Zootaxa 4114(1): 33–63. https://doi.org/10.11646/zootaxa.4114.1.2
Lehmann H., 1922: Erster Beitrag zur Verbreitung afrikanischer Pentatomiden (Heteroptera). (VII. Heteropteren-Aufsatz). – Konowia 1: 129–133.
LePelley R.H., 1959: Agricultural Insects of East Africa. – Nairobi: East Africa High Commission, 307 pp.
LePelley R.H., 1979: Some scelionid egg-parasites reared from coffee bugs (Antestiopsis spp.) and from some unusual pentatomid hosts. – Entomophaga 24:255–258.

Leston D., 1952: Notes on the Ethiopian Pentatomoidea (Hemiptera). V. On the specimens collected by Mr. A. L. Capener, mainly in Natal. – Annals and Magazine of Natural History, Series 12 5: 512–520.
Leston D., 1953: Notes on the Ethiopian Pentatomoidea. X. Some specimens from southern Africa in the South African Museum, with a note on the remarkable pygophore of Elvisura irrorata Spinola and description of a new species of Piezodorus Fieber. – Annals of the South African Museum 41(2): 48–60.
Leston D., 1954: Notes on the Ethiopian Pentatomoidea (Hemiptera). – XII. On some specimens from Southern Rhodesia, with an investigation of certain features in the morphology of Afrius figuratus (Germar) and remarks upon the male genitalia in Amyotinae. – Occasional Papers of the National Museum of Southern Rhodesia 19 [1953]: 678–686.
Lethierry L., 1881: Spedizione Italiana nell'Africa equatoriale. Resultati zoologici: Emitteri. – Annali del Museo Civico di Storia Naturale di Genova 16: 277–298.
Lethierry L. & Severin G., 1893: Catalogue général des Hémiptères. Vol. 1. Pentatomidae. – Bruxelles, x + 286 pp.
Linnavuori R.E., 1975: Hemiptera Heteroptera of the Sudan, with remarks on some species of the adjacent countries 5. Pentatomidae. Boletim da Sociedade Portuguesa de Ciências Naturais, Serie 2 15: 5–128.
Linnavuori R.E., 1982: Pentatomidae and Acanthosomatidae (Heteroptera) of Nigeria and the Ivory Coast, with remarks on species of the adjacent countries in West and Central Africa. – Acta Zoologica Fennica 163: 1–176.
Linnavuori R.E., 1989: Heteroptera of Yemen and South Yemen. – Acta Entomologica Fennica 54: 1–40.
Linnavuori R.E. & van Harten A., 1997: Notes on Heteroptera (Insecta: Hemiptera) of Yemen. – Fauna of Saudi Arabia 16: 169–236.
Mancini C., 1939: Hemiptera. Pp. 195–224. – In: Missione Biologica nel Paese dei Borana. Volume terzo. Raccolte Zoologiche. Parte Seconda. Reale Accademia d'Italia, Roma.
Mancini C., 1956: Emitteri dell'Abissinia raccolti del M.se Saverio Patrizi e da altri. Nota I. – Fragmenta Entomologica 2: 65–96.
Mathew K., 1977: Studies on Agonoscelis from Southern India (Hemiptera: Pentatomidae). – Oriental Insects 11: 521–530.
Ortega-León G., Thomas D.B. & Soriano E.G., 2006: A description of the nymphal stages of the African Cluster Bug Agonoscelis puberula Stål. – Southwestern Entomologist 31: 245–249.
Perez-Gelabert D.E. & Thomas D.B., 2005: Stink bugs (Heteroptera: Pentatomidae) of the island of Hispaniola, with seven new species from the Dominican Republic. – Boletín de la Sociedad Entomológica Aragonesa 37: 319–352.
Rider D.A., 2006: Family Pentatomidae. Pp. 233–402. – In: Aukema B. & Rieger Ch. (eds.): Catalogue of the Heteroptera of the Palaearctic Region. Vol. 5. Amsterdam: The Netherlands Entomological Society, xiii + 550 m a.s.l.
Rider D.A., 2017: Pentatomoidea homepage. https://www.ndsu.edu/pubweb/~rider/Pentatomoidea/ (Last access: 28 July 2017)
Robertson I.A.D., 2009: The Pentatomoidea (Hemiptera: Heteroptera) of Sub-Saharan Africa. A database. – PDF-file prepared at African Studies Centre, Leiden, the Netherlands, vii + 451 pp. [available from: http://www.ascleiden.nl]
Santos G. de los & Bastardo R. 2013: La familia Pentatomidae (Hemiptera: Heteroptera) en las colecciones de referencia de la República Dominicana. – Novitates Caribaea 6: 1–15.
Schouteden H., 1905: Escursione del Dott. Achille Tellini nell'Eritrea. – Annales de la Société Entomologique de Belgique 49: 6–10.
Schouteden H., 1910: Hemiptera. Pentatomidae. Pp. 73–96. – In: Wissenschaftliche Ergebnisse der Schwedischen Zoologischen Expedition nach dem Kilimandjaro, dem Meru und den umgebenden Massaisteppen Deutsch-Ostafrikas 1905–1906 unter Leitung von Prof. Dr.

Yngve Sjöstedt. Band 2. Stockholm: Schwedischen Akademie der Wissenschaften, 844 pp. + 19 pls.
Schouteden H., 1957: Contributions à l'étude de la faune entomologique du Ruanda-Urundi (Mission P. Basilewsky 1953). CXXVI. Heteroptera, Plataspidae, Acanthosomidae [sic!], Pentatomidae et Coreidae. – Annales du Musée Royal du Congo Belge, Sciences Zoologiques 58: 269–310.
Schumacher F., 1913: Ein Beitrag zur Kenntnis der Rhynchoten-Fauna Südafrikas, insbesondere von Deutsch-Südwestafrika, Klein-Namaland und dem Kalaharigebiet, auf Grund der Expeditionsergebnisse von Herrn Professor L. Schultze und dem Material des Königl. Zoologischen Museums zu Berlin. – In: Schultze L. (ed.): Zoologische und anthropologische Ergebnisse eine Forschungsreise in Südafrika. Bd. V. Denkschriften der Medizinisch-Naturwissenschaftlichen Gesellschaft zu Jena 17: 49–88.
Stål C., 1854: Nya Hemiptera från Cafferlandet. [New hemiptera from Caffraria]. – Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar 10(9) [1853]: 209–227. [In Swedish and Latin.]
Stål C., 1865: Hemiptera Africana. Vol. 1. – Stockholm: Officina Norstedtiana, iv + 256 pp.
Stål C., 1876: Enumeratio Hemipterorum. Bidrag till en förteckning öfver alla hittills kända Hemiptera, jemte systematiska meddelanden. [List of Hemiptera. Contribution to a list of all previously known Hemiptera, systematically arranged]. – Kongliga Svenska Vetenskaps-Akademiens Handlingar 14(4): 1–162. [In Swedish and Latin.]
Thomas D.B., Eger J.E., Jones W. & Ortega-Leon G., 2003: The African Cluster Bug, Agonoscelis puberula (Heteroptera: Pentatomidae), established in the New World. – Florida Entomologist 86: 151–153.
Walker F., 1867: Catalogue of the specimens of Heteropterous-Hemiptera in the collection of the British Museum. Part I. Scutata. – London: Trustees of the British Museum, pp. 1–240.