

- Dinter, A. and Poehling, H.M., 1995. *Ent. Exp. Appl.*, **74**: 151–163.
- Dondale, C.D., 1970. *Proc. Ent. Soc. Ontario*, **101**: 62–69.
- Easterbrook, M.A., 1997. *A field assessment of the effects of insecticides on the beneficial fauna of strawberry*. Horticulture Research International, East Malling, West Malling, Kent ME19 6BJ, UK. [http://dx.doi.org/10.1016/S0261-2194\(96\)00080-4](http://dx.doi.org/10.1016/S0261-2194(96)00080-4), How to Cite or Link Using DOI.
- Holland, J.M., Winder, L. AND Perry, J.N., 2000. *Ann. Appl. Biol.*, **136**: 93–105.
- Linde, C.D., 1994. Physico-Chemical Properties and Environmental Fate of Pesticides. Environmental Hazards Assessment Program. Department of Pesticide Regulation. <http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh9403.pdf>
- Maloney, D., Drummond, F.A. and Alford, R., 2003. *Maine Agric. Forest. Exp. Stat. Tech. Bull.*, **190**: 32.
- Marc, P., Canard, A. and Ysnel, F., 1999. *Agric. Ecosyst. Environ.*, **74**: 229–273.
- Nyffeler, M. and Benz, G., 1987. *J. appl. Ent.*, **103**: 321–329.
- Peterson, H., 2002. *Eur. J. Soil Biol.*, **38**: 177–180.
- Rezac, M., Pekar, S. and Stara, J., 2010. *Biocontrol*, **55**: 503–510.
- Tahir, H.M., Butt, A., Khan, S.Y., Ahmad, K.R., Arshad, M. and Nawaz, S., 2011. *Afr. J. Biotech.*, **10**: 6265–6268.
- Tanaka, K., Endo, S. and Kazano, H., 2000. *Appl. Ent. Zool.*, **35**: 177–187.
- Turnbull, A.L., 1973. *Ann. Rev. Ent.*, **18**: 305–348.
- Yardim, E.N. and Edwards, A.C., 1998. *The Agric. Ecosyst. Environ.*, **70**: 31–48.
- Wiltz, B.A., 2010. Laboratory Evaluation of Effects of Soil Properties on Termiticide Performance against Formosan Subterranean Termites (Isoptera: Rhinotermitidae). *Sociobiol.*, **56**: 755–773.

(Received 13 July 2012, revised 24 April 2013)

*Pakistan J. Zool.*, vol. 45(3), pp. 868–871, 2013.

## Genus *Aulacophora* Chevrolat, 1836 (Coleoptera: Chrysomelidae) From Pothohar, Punjab, Pakistan

Waqar Ahmad, Muhammad Naeem and Imran Bodlah\*

Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan

**Abstract.**— Two species of genus *Aulacophora* Chevrolat, 1836 have been recorded from Pothohar tract of Punjab province of Pakistan. One species, *Aulacophora lewisii* Baly, 1886 is reported for the first time from different localities of Pothohar tract of Punjab Province of Pakistan. New locality records for *Aulacophora foveicollis* have also been added from Thal tract of Punjab. The main identification characters along distribution range supported by micrographs have been given for future field and research identification. A short review on the distribution of species of genus *Aulacophora* in Pakistan has also been given.

**Key words:** Coleoptera, Chrysomelidae, *Aulacophora*, Pothohar.

Leaf-beetle subfamily Galerucinae is well distributed with over 5000 species in 520 genera and 6300 species (Gillespie *et al.*, 2008; Scherz and Wagner, 2007). In the edispersed all over the world but mostly common in tropics (Aslan *et al.*, 2000). The Galerucinae species are mostly known as plant pests which attack a wide variety of Mono and Dicotyledonous families. Adults mostly feed on foliage (parenchyma of the lower leaf surface) producing irregular holes and some species feed on pollen. Many species are severe pests of economic value which cause damage by feeding and transmit viruses (Aslan *et al.*, 2000).

Among the genera of Galerucinae, the genus *Aulacophora* Chevrolat, 1836 is mainly characterized by highest numbers of species (34) having triple modification of antennae (Mohamedsaid and Furth, 2011). This genus can be

\* Corresponding author: imranbodlah@gmail.com

easily distinguished on the basis of the characters: eyes strongly convex, except the two basal antennal segments the remaining covered with delicate hairs, prothorax transverse, always narrower than the base of elytra and a median transversely impressed line; generally straight (Maulik, 1936).

This genus is represented by 17 species from Sulawesi (Indonesia), 14 from New Guinea (Papua Island), 48 from Sundaland (Indonesia) and 17 from Australia (Barroga and Mohamedsaid, 2002), 18 species from Thailand and Indochina (Kimoto, 1989), 4 species from New Caledonia (Beenen, 2008) and some 30 species from Indian subcontinent (Maulik, 1936; Anand and Cox, 1986).

The species of this genus are mostly linked with cucurbitaceous plants all over the world (Menon *et al.*, 1974). This genus is of great economic importance as a lot of work has been done on this genus all over the world: British India (Maulik, 1936), Sandaland (Barroga, 2001; Barroga and Mohamedsaid, 2002), Russia (Medvedev, 2001), Malaysia (Mohamedsaid, 1994), Indonesia (Laboissiere, 1934; Samoderzhnikov, 1992), India and Africa (Kim *et al.*, 2003), Taiwan (Jolivet *et al.*, 2009) but as far as Pakistan is concerned, no specific work on this genus has been done in Pothohar region of Punjab. So a systematic survey of various areas of Pothohar region (Punjab) was done during 2011 - 2012.

#### Materials and methods

Several field trips of various localities (Rawalpindi, Islamabad, Taxila and Attok) were done during 2011 to 2012. Beetles were collected by sweeping the weeds and bushes with aerial net. In the laboratory, specimens were pinned, dried, labeled and kept in collection boxes. Identification of the leaf beetles was done using the keys of Maulik (1936), Choate (1999) and Aston (2009). The micrographs were taken using LEICA MS-5 stereomicroscope attached with Samsung digital camera. The identified specimens have been deposited in Biosystematics Laboratory, Department of Entomology, PMAS- Arid Agriculture University (Pakistan).

#### Results and discussion

Two species of genus *Aulacophora* were

recorded from studied area. *A. lewisii* Baly, 1886 is a new species for Pothohar tract; Punjab Province (Pakistan). New locality records for *Aulacophora foveicollis* have also been added from Thal tract of Punjab.

#### *Aulacophora foveicollis* (Lucas, 1849)

*Aulacophora foveicollis* P.H. Lucas, 1849 (as *Galleruca*)

*Aulacophora africana* Weise, 1903

*Aulacophora nigriventris* Redtenbacher, 1850

#### Identification characters

Body elongate, orange with reddish touch. Eyes black. Antennal 1<sup>st</sup> segment is the enlarged and broadest, 2<sup>nd</sup> is the smallest while the 3<sup>rd</sup> is a bit larger than 4<sup>th</sup> one and the 5<sup>th</sup> -11<sup>th</sup> are almost equal in length. Scutellum is triangular; having no punctures and shares the same body colour. 1<sup>st</sup> tarsal segment is much longer than 2<sup>nd</sup> and 3<sup>rd</sup> combined. 3<sup>rd</sup> tarsal segment is slightly bilobed and bent beneath the 4<sup>th</sup>. Abdominal segments are 4-5 and black (except the last one). The last sternite is same like the body's general colour. In ♂ (male), it is divided into three lobes; middle and two lateral. The lateral lobes are shorter than the middle, gradually narrowed and rounded at the apex. While in the ♀ (female), the sternite is simple. The last visible sternite is lessened and totally emarginate at the apex and concave dorsally.

#### Distribution

France, Greece, Italy, Portugal, Spain. Egypt, Afghanistan, Cyprus, Oman, Pakistan, Saudi Arabia, Russia, Syria, Turkey, Yemen, Afrotropical region and Oriental region.

#### Material examined

Rawalpindi: 11 ♂, 17 ♀, 23.iv.2011, Waqar; Attock: 4 ♂, 1 ♀, 19.iv.2012, Waqar; Taxila: 12 ♂, 20 ♀, 11.ii.2011, Waqar.

#### Distribution in Thal tract

1 ♂, 7 ♀, 23.iv.2011; Layyah, Imran; 2 ♂, 9 ♀, 29.iv.2011, Imran; Bhakar; 14 ♂, 7 ♀, 19.iv.2011, Imran; 1 ♂, 7 ♀, 27.iv.2011, Khushab, Imran.

### Remarks

The specimens collected from Pakistan were compared with the published description of *Aulacophora foveicollis* by Maulik (1936), the species varies in length of antennomere as 3<sup>rd</sup> is larger than 4<sup>th</sup> one.

### *Aulacophora lewisii* Baly, 1886

*Aulacophora lewissii* Baly, 1886a

*Aulacophora cattigarensis* Weise, 1892 (Orthaulaca)

*Aulacophora intermedia* Jacoby, 1892

### Identification characters

Body oblong and elongate. Generally bicolour (head and thorax is reddish brown; elytra is black). Eyes golden. Antennal 1<sup>st</sup> segment is larger and wider than the 2<sup>nd</sup> one. 3<sup>rd</sup> to 9<sup>th</sup> is flattened. Scutellum is triangular in shape and reddish brown in colour. Abdomen is light brown in colour with 4-5 segments. In male, the last visible sternite is trilobed while in the female it is same like *A. foveicollis*. Pygidium is not exposed.

### Habitat

Specimens of this species were collected from wild vegetation *i.e.* *Spinacia oleracea*.

### Distribution

Afghanistan, Anhui, Arunnachal Pradesh, Bhutan, Fujian, Guandong, Guizhou, Guanxi, Hainan, Hongkong, Hubei, Hunan, Japan, Jiangxi, Liaoning, Nepal, Pakistan, Sichuan, Sikkim, Darjeeling, Shaanxi, Taiwan, Uttar Pradesh, Tibet, Peninsular Malaysia, Sabah, Sarawak, Kalimantan, Sri Lanka, Myanmar, Bhutan, Thailand, Cambodia, Laos, Vietnam, Zhejiang and Oriental region (Aston, 2009; Mohamedsaid, 2004)

### Material examined

Rawalpindi: 1 ♂, 23.iv.2011, Waqar; Taxila: 3 ♀, 19.iv.2011, Waqar; 2 ♂, 29.iv.2011, Rawalpindi, Imran; 4 ♂, 20.iv.2011, Islamabad, Imran.

### Remarks

This is recorded as a new species from this region. *A. lewisii* mainly differs from *A. foveicollis* due to the colour of its elytra and abdomen. The

specimens collected from Punjab were compared with the published description of *Aulacophora lewisii* given by Aston (2009), this species is quite different with respect to the colour of eyes as they are golden in colour.

### Distributional range of Genus *Aulacophora* in Pakistan

In Pakistan this genus has been recorded from South to Northward direction and also from Azad Kashmir (Rizvi *et al.*, 2012).

*Aulacophora bicolor* Weber: Northern area and Gilgit

*Aulacophora excavata* Baly: Murree, Azad Kashmir and Rawla Kot

*Aulacophora foveicollis* Lucas: Karachi

*Aulacophora intermedia* Jacoby: Murree

*Aulacophora viridis* Maulik: Azad Kashmir and Rawlakot

### References

- Anand, R. K. and Cox, M. L., 1986. *Ent. Abhandl.* (Dresden), **50**: 81-91.
- Aslan, I., Warchalowski, A. and Ozbek, H., 2000. *J. entomol. Res. Soc.*, **2**: 27-42.
- Aston, P., 2009. *Bull. Hong Kong entomol. Soc.*, **1**: 6-25.
- Barroga, G. F., 2001. *Serangga*, **6**: 37-50.
- Barroga, G.F. and Mohamedsaid, M. S., 2002. *Serangga*, **7**: 15-194.
- Beenen, R., 2008. *Genus*, **19**: 65-87.
- Choate, P. M., 1999. *Dichotomous keys to some families of florida Coleoptera. Introduction to the identification of beetles (Coleoptera)*. pp. 23-32. <http://tophqbooks.com/books/136341>
- Gillespie, J.J., Tallamy, D.W. Riley, E.G. and Cognato, A.I., 2008. *Zool. Scrip.*, **37**: 195-222.
- Jolivet, P., Jorge, A., Blay, S. and Schmitt, M., 2009. *Research on Chrysomelidae*. Vol.2. Ch.3. pp. 87-90.
- Kimoto, S., 1989. *Esakia*, **17**: 1-241.
- Kim, S.J., Kjer, K.M. and Duckett, C. N., 2003. *Insect. Syst. Evol.*, **34**: 53-64
- Laboissiere, 1934. *Bull. Mus. d'Hist. Nat. Belg.*, **10**: 1-4.
- Maulik, S., 1936. *The fauna of British India, including Ceylon and Burma. Chrysomelidae (Galerucinae)*, pp. 1-648. Taylor and Francis, Red Lion court, Fleet Street, London.
- Medvedev, L.N., 2001. *Russian Ent. J.*, **10**: 28-32.
- Menon, M.G.R., Katiyar, K.N. and Kapoor, V.C., 1972. *J. Nat. His.*, **6**: 17-20.
- Mohamedsaid, M. S., 1994. *Treubia*, **31**: 1-9.
- Mohamedsaid, M.S. and Furth, D.G., 2011. *ISRN. Zool.*, 1-60.
- Rizvi, S. G., Kamaluddin, S., Naz, S. and Shakira, 2012.

*Pakistan J. Ent. Karachi*, **27**: 67-73.

Scherz, X. and Wagner, T.H., 2007. *Ent. Z.*, 117: 161-183.

(Received 15 January 2013, revised 21 March 2013)

*Pakistan J. Zool.*, vol. 45(3), pp. 871-874, 2013.

## Identification of a Gram Negative *Rahnella aquatilis* Strain from *Rana temporaria chensinensis* David in China

Yuan Xue<sup>1</sup>, Duanling Zhang<sup>1</sup>, Jianfei Chen<sup>2</sup>, Yang Meng<sup>1</sup> and Yanlong Zhang<sup>1\*</sup>

<sup>1</sup>College of Wildlife Resource of Northeast Forest University, Harbin 150040, People's Republic of China

<sup>2</sup>Division of Swine Infectious Diseases, State Key Laboratory of Veterinary Biotechnology, Harbin Veterinary Research Institute, Chinese Academy of Agricultural Sciences, Harbin 150001, People's Republic of China

**Abstract.** - *Rahnella aquatilis* strain bf008 is a rare Gram negative bacterium isolated from one of the liver samples of *Rana temporaria chensinensis* David in China. Phenotypic characterizations of the isolate were done based on the colony morphology, microscopic observations and biochemical tests. The result of antimicrobial susceptibility test revealed that bf008 was resistant to fosfomycin and cefazolin, and intermediately susceptible to cefoperazone and cefoxitin. 16S rRNA of bf008 was sequenced and analyzed with those of *R. aquatilis* reference strains. The phylogenetic relationship based on 16S rRNA sequence showed bf008 has a close genetic relationship with 12 *R. aquatilis* reference strains. The present study will be helpful to further understand the significance of different microbial species of the *Rana temporaria chensinensis* David.

**Keywords:** *Rahnella aquatilis*, *Rana temporaria chensinensis* David, 16S rRNA, phylogenetic analysis.

*Rana temporaria chensinensis* David is a kind of frog with high commercial value (Yin *et al.*, 2006). This type of frog is distributed in the northeastern part of China. It has a long history of being used in traditional medicine and has been reported to improve health and immunity and prevent diseases such as antioxidant, antifatigue, inflammation (Wang, 2002).

*Rahnella aquatilis* is a rarely isolated Gram negative rod and a representative of the Enterobacteriaceae recognized in 1976–1979 (Gavini *et al.*, 1976; Izard *et al.*, 1979). Strains of *R. aquatilis* are isolated from open water reservoirs and soil (mostly from the rhizosphere of cereals, including wheat, corn, rice, etc.) as well as from clinical material. They are opportunistic pathogens causing a wide spectrum of diseases of the gastrointestinal and urinary tracts, respiratory organs, cardiovascular system, and others (Zdorovenko *et al.*, 2004). An important role in pathogenesis of diseases caused by Gram-negative bacteria belongs to the lipopolysaccharide (Zdorovenko *et al.*, 2008). As a result, some scientists believe that *R. aquatilis* is phytotrophic microorganisms, whilst others point to their ability to cause diseases in mammals. We report here a *R. aquatilis* strain isolated from *Rana temporaria chensinensis* David in China. The present study will be helpful to further understand the significance of different microbial species of *Rana temporaria chensinensis* David.

### Materials and methods

During 2011-2012, 40 *Rana temporaria chensinensis* David were collected from a Rana-raising farm. Samples of livers were collected under sterile condition and inoculated onto broth plates with 10% bovine serum (Gibico). The plates were incubated at 37°C for 18-24 h. Several off-white, smooth, neat edged and round colonies were obtained on the plate inoculated with samples.

Pure cultures of the bacteria were analyzed by the Vitek 2 Compact System (bioMérieux Vitek) (Fang *et al.*, 2012) for rapid biochemical identification in Department of Microbiology of the First Affiliated Hospital of Harbin Medical University.

\* Corresponding author: zhangyanlong2013@yeah.net