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SHORT NOTE

A Rare Case of the Presence of Ocelli in a Worker of *Aenictus pachycerus* (F. Smith, 1858) (Hymenoptera, Formicidae)

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Abstract
The worker caste in species of the genus *Aenictus* Shuckard, 1840 is entirely blind, devoid of compound eyes and ocelli. In contrast, males of the same species possess large compound eyes and three prominent ocelli, which facilitate orientation and navigation during nuptial flights. In a rare observation, the presence of ocelli was documented in a worker individual of *Aenictus pachycerus* (F. Smith, 1858), a deviation from the typical worker morphology observed within the genus.

Aenictus Shuckard, 1840 is the most species-rich genus of the subfamily Dorylinae in the Old World, comprising 206 valid species and 25 valid subspecies (Borowiec, 2016; Bolton, 2026). The workers of *Aenictus* can be distinguished by the presence of 8-10 segmented antennae, an elevated position of the propodeal spiracle, and a binodal waist (Borowiec, 2016). Another trait of the genus is the absence of eyes and ocelli in workers, while queens are blind and bear either one or no ocelli. In contrast, males exhibit well-developed compound eyes and three prominent ocelli (Borowiec, 2016). These ocelli are specialized light-detecting organs, enabling the males to perceive and navigate using light cues.

In flying insects, ocelli play a critical role in various visual and navigational functions, including altitude control, horizon detection, flight initiation timing, optomotor regulation, and phototactic responses (Cornwell, 1955; Lindauer & Schricker, 1963; Schricker, 1965; Barry & Jander, 1968; Wellington, 1974; Wilson, 1978; Stange, 1981; Taylor, 1981; Eaton et al., 1983; Mizunami, 1995; Stange et al., 2002; Berry et al., 2007; Honkanen et al., 2018; Penmetcha et al., 2021). These simple eyes are generally absent in non-flying, walking insects. However, among ants, ocelli are known to be present in the workers of certain genera such as *Cataglyphis* Foerster,1850; *Melophorus* Lubbock, 1883; and *Myrmecia* Fabricius, 1804 (Narendra et al., 2010; Schwarz et al., 2011; Narendra & Ribi, 2017; Penmetcha et al., 2019). The presence of ocelli has also been reported in the ergatogyne of *Leptogenys transitionis* Bharti and Wachkoo, 2013, and in the ergatoid male of *Platythyrea sagei* Forel, 1900 (Bharti & Wachkoo, 2013; Boudinot et al., 2016). Within the subfamily Dorylinae, the presence of ocelli in workers is uncommon, yet observed in species of the genera *Chrysapace* Crawley, 1924; *Simopone* Forel, 1891; *Tanipone* Bolton & Fisher, 2012, and in some species of *Cylindromyrmex* Mayr, 1870 and *Lioponera* Mayr, 1879 (Borowiec, 2016). In this note, we report for the first time an unusual presence of ocelli in a worker of the *Aenictus pachycerus*.

Field sampling was conducted between 11:00 and 16:00. The search methods included active, opportunistic methods such as moving loose rocks and fallen logs, and scanning through leaf litter. The worker individuals were found beneath a large rock, collected using a plastic aspirator, and stored in 70% ethanol at the collection site. The GPS coordinates of the collection site were recorded using a Garmin™ Etrex 30x (Datum WGS 84). Subsequent card mounting and morphological observations were carried out at the National Institute of Science Education and Research (NISER), Khurda, Odisha, using a ZEISS Stemi 508 stereo microscope equipped with an Axiocam 208 colour camera. Photographic documentation was conducted using a Keyence VHX-6000 digital microscope at the Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru. The specimens are deposited in the ATREE Insect Museum, Bengaluru (AIMB), India.

Material examined: *Aenictus pachycerus* worker (AIMB/Hy/Fr 250022). INDIA, Odisha, Angul, Tikarpada Wildlife Sanctuary, 84.8165°N 20.6033°E, 120 m, 11.viii.2021, aspirator, Bikash Sahoo leg., colony code-OD89 (n = 12 individuals of the same colony).

During microscopic observation, we found a single worker individual with three prominent ocelli (Fig 1 A-D). All the collected individuals of the same colony were checked under the microscope, but the ocelli were found to be present only in one individual, while no other members of the same colony exhibited this feature. Despite its genetic divergence from the rest of the *A. pachycerus* specimens in our phylogenetic study (Sahoo et al., in prep.), the individual shared all key morphological traits with the species, supporting its identification as *A. pachycerus*. This rare occurrence may be attributed to a mutation in the gene responsible for the development of ocelli and might lead to the expression of certain male characteristics, such as the presence of ocelli, in a worker. Bharti (2003) reported the queen of *A. pachycerus* does not bear any ocelli.

Fig 1. Worker of *Aenictus pachycerus* with ocelli. A. Head in full-face view. B. Close-up of the head with ocelli marked with a yellow circle. C. Body in dorsal view. D. Body in profile view.

We could not determine the functionality of the ocelli in this individual, as no physiological or behavioral analyses were performed because the specimen was already dead at the time of examination. Due to the limited number of specimens obtained from the colony, it is not possible to determine whether the presence of ocelli is a rare aberration or if any other members of the same colony also possessed ocelli. To date, there are no other reports of ocelli occurring in workers of any *Aenictus* species, making this observation highly unusual. This anomaly may indicate a disruption in the genetic regulation of caste-specific morphological traits. Further genetic and developmental studies are needed to understand the underlying causes and implications of this rare trait expression.

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