

# Journal of Melittology

Bee Biology, Ecology, Evolution, & Systematics

*The latest buzz in bee biology*

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## BOOK REVIEW

### Identifying bumble bees across India

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**Book review.** Saini, M.S., R.H. Raina, & H.S. Ghatgoria. 2015. *Indian Bumblebees*. M/s Bishen Singh Mahendra Pal Singh; Dehra Dun, India; [v]+248 pp. ISBN 978-81-211-0827-0 [hardback].

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Bumble bees (genus *Bombus* Latreille) are some of the most charismatic and familiar species among insects. Given the documented impacts on their populations during our current era of climate change, it is understandable that there has been growing interest in these native pollinators. Recently, numerous texts have appeared that attempt to provide a ready means for identifying bumble bees in various faunal regions. Quite importantly, these have often been designed to make them readily accessible by the citizen scientist and avid naturalist, as well as seasoned entomologists and bumble bee researchers. Indeed, many of these works are lovely as bumble bees are certainly photogenic, and this certainly helps to engage the public. The fauna of Europe has received the greatest attention over the last several years (*e.g.*, Benton, 2006; Edwards & Jenner, 2009; Bollingmo, 2012; Söderström, 2013; Gammans & Allen, 2014; Rasmont *et al.*, 2015), as well as a stunningly produced coverage of those species in North America (Williams *et al.*, 2014). To this body of literature we can now welcome the present volume that covers the bumble bees occurring in India.

As one would expect, the work is opened by a general introduction to bees and bumble bees specifically. The overview is brief and therefore does not provide great depth to the many topics in bee biology, and while the authors do cite works to direct the reader to further information, these are often older works and many more current studies are overlooked. While this leaves the introduction rather poor, the book focused on the description of those species recorded from the Indian fauna. Thus, if one is seeking a review of bumble bee biology, then this is not the reference for such a reader and neither do I believe that it was the intent of the authors to create such as

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compilation. Instead, their goal is to provide a mechanism for the identification of the species of *Bombus* occurring in India, and particularly the rich fauna of the Himalayan region. Indeed, the work is a bit mistitled as it really is a consideration of the north-western Indian Himalayan fauna of *Bombus*, with those species from elsewhere across the sub-continent appended. The original collecting done by the junior authors was concentrated within that region and it is that subset of species that are treated with the greatest depth.

Two keys are presented the species, one for females (workers) and the other for males, and while clear these are unfortunately not accompanied by associated images. There are, in fact, numerous photographs collected into a series of plates at the end of the book, but these are not referenced in the keys and while one can locate some of the character states among those images, it is a difficult process to do so as they are not arranged in such a way as to make it easy for the reader to find a given figure, or even if a drawing or photograph of a particular part of a couplet is to be found at all. While for some couplets, such as simple color features, this does not pose any real challenges. However, some features mentioned are rather ambiguous and an image could go a long way toward clarifying these alternative states. For example, in one place the opposing couplets deal with the degree to which large punctures may be found on the clypeus. In one it is stated that the disc of the clypeus is with "very sparse micropunctures" versus "sparse micropunctures", and it is true that the authors then refer to the separation of these relative to twice their breadth, but even here we are faced with "mostly separated" and "many separated", all of which implies extensive overlap. Many examples of ambiguously worded couplets can be found, and these are likely subtly distinct such that it is challenging to convey the differences in qualitative terms. Accordingly, suitable images embedded throughout the keys would enhance the work greatly.

Each species, arranged alphabetically, is provided with a summary of type material and synonyms, a diagnosis, a list of material examined (from within the geographic area of focus, which is effectively northwestern India), and a checklist of countries and states within India from which it has been recorded. There is also a record of the elevational range and color variation for each species, and a brief section of remarks. These individual species treatments are provided with illustrations of pertinent characters such as the shape of the antennae, labra, hind legs, and male hidden sterna and genitalia. Photographs of the species do supplement the text, but these are divorced from each species' section and instead clustered at the end of the book. While this arrangement is less than ideal, it is understandable as placing all of the color together certainly can cut down on production costs. Much of the information in the species treatments can be found in other sources, sometimes with greater detail, but the diagnoses are nonetheless of use and certainly when placed into the context of the associated figures.

There are any number of grammatical errors and inconsistencies throughout the work and it would have benefitted from considerable editing before publication. Although the language may be stilted in places, in no instance that I found was the meaning indecipherable. Nonetheless, the writing leaves something to be desired and although it is clear that the authors love their subject, far greater care should have been given to the composition of the text. For example, the vernacular 'bumblebee' (one word) is used in most places [despite the fact that the common practice for insect common names is to write the words separate whenever the insect is what the name indicates; *i.e.*, in this case these are certainly bees so the name would be 'bumble bee', versus something like 'dragonfly' where the insect involved is not a fly (nor a dragon

either, for that matter)], but in other instances it appears as two words, 'bumble bee'. I reiterate that their intended meaning is not lost, but consistency would be preferred in such a work and this is the least egregious of such mistakes.

While many of the photographs are useful, particularly those of associated flowers and collecting localities, there is rather significant variations in quality. Several photographs are out of focus, rendering them of no value to the work. For example, their photograph of a male of *Bombus (Mendacibombus) himalayanus* (Skorikov) is greatly out of focus and effectively useless, and those of *B. (Pyrobombus) pressus* (Frison) are similarly unclear. Meanwhile, the selected specimens of species such as *B. (P.) rotundiceps* Friese are poorly arranged and various individuals are so matted or twisted as to render them uninformative. The diagrams of color patterns provide the information that the photographs fail to convey, and one is left wondering if the inclusion of the habitus photographs was done only to satisfy the notion that such an image was included rather than for what information it might provide.

Overall, I believe that the book does serve the purpose of adding to our knowledge of bumble bee diversity and providing a means by which species in the Indian Himalayan region may be identified. The inclusion of illustrations and photographs of the male genitalia and hidden sterna for these species is laudatory, and I am sure the book will aid those in the region wishing to study *Bombus*. Given the varied quality of the photographs and the comprehensiveness of the information included, the price seems to be disproportionately high. Thus, I would recommend melittologists to encourage their institutional libraries pick up a copy for occasional reference, while personal copies might only be of great use to those within the region.

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A Journal of Bee Biology, Ecology, Evolution, & Systematics

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The *Journal of Melittology* is an international, open access journal that seeks to rapidly disseminate the results of research conducted on bees (Apoidea: Anthophila) in their broadest sense. Our mission is to promote the understanding and conservation of wild and managed bees and to facilitate communication and collaboration among researchers and the public worldwide. The *Journal* covers all aspects of bee research including but not limited to: anatomy, behavioral ecology, biodiversity, biogeography, chemical ecology, comparative morphology, conservation, cultural aspects, cytogenetics, ecology, ethnobiology, history, identification (keys), invasion ecology, management, melittopalynology, molecular ecology, neurobiology, occurrence data, paleontology, parasitism, phenology, phylogeny, physiology, pollination biology, sociobiology, systematics, and taxonomy.

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