

Bibliography

Bibliography of *Apis cerana* Fabricius (1793)*

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Abstract – This bibliography of the published literature on *Apis cerana* was compiled from 2687 references written by 2002 authors and were published in 449 periodicals, conference proceedings, theses, reports and books covering the period 1793–2004. The literature shows greater strength in the applied aspects of beekeeping than basic honeybee biology. Growth of this literature has doubled each decade for the last half century.

Apis cerana: bibliography

COMMENTARY:

Of an estimated 100 000 publications on *Apis*, only 3% of these titles concern Asian species of honeybees. Of these, *A. cerana* is ubiquitous and commercially important throughout Asia, so that it is not surprising that nearly 70% of the Asian honeybee literature concerns this species. Since its description (Fabricius, 1793) until the end of the World War II, only 90-odd publications on *A. cerana* appeared in the literature. In the last half century, the rate of publication doubled, on average, every decade and now stands at about 2698 publications. Crane (1993) estimated that the total literature on Asian honeybee species was between 1500–2000 references. However, obtaining translations of Asian language works, new publications over the last decade, information gleaned from visits to apicultural libraries in Asia, and after discussions with colleagues in Asia, we estimate that there are probably another perhaps 500 or so publications in the original Asian languages (Chinese, Japanese, Korean and Vietnamese and others) for which there are

not yet any European language translations. Indeed, about a third of the entries here are in the apicultural literature of the Asian languages, most of which have not previously appeared in English translation. This would bring the probable total of publications on *A. cerana* to perhaps 3500 references.

Accessing this literature is by no means an easy task and it cannot be found at computer driven websites. The published literature is also “classical” in that it is in print and most of it will have passed through a peer-review process, which, admittedly does not ensure quality. Against this, a recent check on the computer website search engine “Google” revealed over 36 100 *A. cerana* entries, which with the rare exceptions, do not constitute peer-reviewed sources of information; moreover extremely few of these sites derive from Asia where *A. cerana* naturally occurs. It is deemed essential to gather and preserve the classical literature before it is swamped in plethora of highly suspect websites. However, following the recent introduction of the “Google Scholar” computer search engine, which provides citations to papers cited in scientific literature, over 550 items on *A. cerana* (some dating back to the 1950’s) have appeared at this writing. (In the case of *A. mellifera*, a citation for 1900 appears). Because this search engine is based on citations, it is iterative

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* References are available online at
<http://www.edpsciences.org/apido>.

into the past to the extent that contemporary authors cite older literature.

The directions in research on *A. cerana* to date demonstrate predominance in beekeeping matters such as foraging, honey, disease, pests, and general beekeeping. The literature on basic biology reflects the same trends seen in the western literature. Early years were concerned with description, behaviour, reproduction, classification and basic biology while more recent years have seen large strides in studies of pheromones, biochemistry, mitochondrial DNA and population biology. The country sources of published research of *A. cerana* form three tiers of relative productivity. The lion's share of publications derives from India, China and Japan; then, a middle tier consists of Nepal, Indonesia, Korea, Thailand, Sri Lanka, Pakistan, Philippines and Malaysia, while the remaining countries where *A. cerana* naturally occurs have hardly been touched upon.

A. cerana has an extensive natural distribution of some 30 M km² and, like *A. florea*, seems particularly capable of thriving in disturbed secondary habitats, urban and agricultural settings. It has been purposefully introduced into several islands of north-eastern Indonesia as well as Papua-New Guinea and in the latter has colonized this immense island in three decades. It reached islands in the Torres Straight and has been collected at several points in Australia where it very probably will soon gain a permanent foothold. Moreover, a Genetic Algorithm for Rule-Set Prediction (GARP) suggests that at least 2 M km² offers suitable vegetational and climatic conditions for its success in Australia (Diniz-Filho, pers. comm.).

This bibliography is presented to: (1) provide knowledge of the existence of the classical and recent published literature on *A. cerana*; (2) to indicate gaps in our information base; (3) encourage *cerana* scientists in Asia to at least translate the titles of Asian language papers into European ones; and finally (4) to assist bee scientists in countries where *A. cerana* has already proven invasive and to others where it is highly likely to soon also occur.

The bibliography was prepared by obtaining all references to Asian honeybees published in Apicultural Abstracts (1950–2004), Zoological Record (1864–2003) as well as *cerana*-specific

bibliographies such as Crane (1967–1991), Honeybee Science (2001), Indian Bee Journal (1989), Joshi (1995, 1996), Mishra (1987), Yang (1982), Yoshida (1999), and Zhang (1982). Copies of the originals were used to trace cited references in continuous iterations into the past until no new references were found. References were keyworded and entered in a computer database. A wide approach to keywords was taken so that a particular pest or predator can be searched under the broader category "natural enemies". To obtain better coverage of the Asian languages literature, colleagues kindly translated many titles from Chinese and Russian into English. Finally, several references are incomplete for bibliographic detail and are noted with an asterisk.

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Résumé – Bibliographie d'*Apis cerana* Fabricius (1793). Cette bibliographie sur *Apis cerana* comporte 2687 références de travaux publiés par 2002 auteurs dans 449 périodiques, comptes-rendus de conférences, thèses, rapports et ouvrages sur la période 1793–2004. La littérature est plus importante dans les aspects appliqués de l'apiculture que dans la biologie de base de l'abeille. Durant les 50 dernières années la littérature a doublé tous les 10 ans.

Zusammenfassung – Bibliographie über *Apis cerana* Fabricius (1793). Diese Bibliographie der Veröffentlichungen über *Apis cerana* stellt 2687 Artikel von 2002 Autoren zusammen, die in der Zeit von 1793–2004 in 449 Zeitschriften, Konferenzberichten, Doktorarbeiten und Büchern publiziert wurden. Der überwiegende Teil der Veröffentlichungen bezieht sich stärker auf die angewandten Aspekten der Bienenhaltung als auf die Grundlagen der Biologie dieser Honigbiene. Die Zuwachs dieser Literatur hat sich im letzten halben Jahrhundert alle 10 Jahre verdoppelt.