Supplement Table 1. Suhonen Jukka, Ilvonen Jaakko J., Nyman Tommi, and Sorvari Jouni. Brood parasitism in eusocial insects (Hymenoptera): role of host geographic range size and phylogeny. Philosophical Transactions B

Bumblebee species, their geographical range size (GRS, number of 611 000 km2 grids), whether they are parasitized by a social parasite or not (Parasitized), whether a breeding queen of a cuckoo bumblebee species has been observed (Breeding queen), the number of different social cuckoo bumblebee parasite species observed on a species (# Parasites), and the probability of social parasitism for each species (%) estimated based on logistic regression without taking phylogeny into account.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **GRS** | **Parasitized** | **Breeding queen** | | **# Parasites** | | **%** | |
| *B. abnormis* | 1 | No | No | 0 | | 0.7 | |
| *B. affinis* | 11 | Yes | Yes | 1 | | 6.9 | |
| *B. alpinus* | 9 | No | No | 1 | | 4.7 | |
| *B. amurensis* | 7 | No | No | 0 | | 3.0 | |
| *B. anachoreta* | 6 | No | No | 0 | | 2.4 | |
| *B. angustus* | 1 | No | No | 0 | | 0.7 | |
| *B. appositus* | 11 | Yes | Yes | 2 | | 6.9 | |
| *B. ardens* | 8 | No | No | 0 | | 3.8 | |
| *B. argillaceus* | 18 | Yes | No | 1 | | 20.9 | |
| *B. armeniacus* | 25 | No | No | 0 | | 41.0 | |
| *B. asiaticus* | 17 | No | No | 0 | | 18.3 | |
| *B. atratus* | 28 | No | No | 0 | | 48.9 | |
| *B. atripes* | 8 | No | No | 0 | | 3.8 | |
| *B. auricomus* | 14 | No | No | 0 | | 11.7 | |
| *B. avanus* | 3 | No | No | 0 | | 1.2 | |
| *B. avinoviellus* | 3 | No | No | 0 | | 1.2 | |
| *B. baeri* | 6 | No | No | 0 | | 2.4 | |
| *B. balteatus* | 66 | No | No | 1 | | 30.7 | |
| *B. beaticola* | 2 | No | No | 0 | | 0.9 | |
| *B. bellicosus* | 8 | No | No | 0 | | 3.8 | |
| *B. bicoloratus* | 8 | No | No | 0 | | 3.8 | |
| *B. bifarius* | 18 | Yes | No | 1 | | 20.9 | |
| *B. bimaculatus* | 14 | Yes | No | 1 | | 11.7 | |
| *B. biroi* | 9 | No | No | 0 | | 4.7 | |
| *B. borealis* | 18 | No | No | 0 | | 20.9 | |
| *B. braccatus* | 2 | No | No | 0 | | 0.9 | |
| *B. brachycephalus* | 7 | No | No | 0 | | 3.0 | |
| *B. brasiliensis* | 8 | No | No | 0 | | 3.8 | |
| *B. breviceps* | 13 | No | No | 0 | | 9.9 | |
| *B. brevivillus* | 15 | No | No | 0 | | 13.7 | |
| *B. brodmannicus* | 5 | No | No | 0 | | 1.9 | |
| *B. caliginosus* | 4 | No | No | 0 | | 1.5 | |
| *B. centralis* | 19 | No | No | 0 | | 23.6 | |
| *B. cingulatus* | 25 | No | No | 0 | | 40.9 | |
| *B. coccineus* | 6 | No | No | 0 | | 2.4 | |
| *B. confusus* | 17 | No | No | 0 | | 18.3 | |
| *B. consobrinus* | 52 | No | No | 0 | | 62.5 | |
| *B. convexus* | 5 | No | No | 0 | | 1.9 | |
| *B. crotchii* | 6 | No | No | 0 | | 2.4 | |
| *B. cryptarum* | 52 | No | No | 0 | | 62.5 | |
| *B. cullumanus* | 31 | No | No | 0 | | 55.5 | |
| *B. czerskii* | 8 | No | No | 0 | | 3.8 | |
| *B. dahlbomii* | 7 | No | No | 0 | | 3.0 | |
| *B. defector* | 5 | No | No | 0 | | 1.9 | |
| *B. deuteronymus* | 28 | No | No | 0 | | 48.9 | |
| *B. difficillimus* | 11 | No | No | 0 | | 6.9 | |
| *B. digressus* | 3 | No | No | 0 | | 1.2 | |
| *B. diligens* | 4 | No | No | 0 | | 1.5 | |
| *B. distinguendus* | 51 | No | No | 0 | | 63.7 | |
| *B. diversus* | 8 | No | No | 0 | | 3.8 | |
| *B. ecuadorius* | 5 | No | No | 0 | | 1.9 | |
| *B. ephippiatus* | 10 | No | No | 0 | | 5.7 | |
| *B. excellens* | 9 | No | No | 0 | | 4.7 | |
| *B. exil* | 8 | No | No | 0 | | 3.8 | |
| *B. eximius* | 14 | No | No | 0 | | 11.7 | |
| *B. fedtschenkoi* | 1 | No | No | 0 | | 0.7 | |
| *B. fervidus* | 27 | Yes | Yes | 1 | | 46.4 | |
| *B. festivus* | 7 | No | No | 0 | | 3.0 | |
| *B. filchnerae* | 11 | No | No | 0 | | 6.9 | |
| *B. flavescens* | 19 | No | No | 0 | | 23.6 | |
| *B. flavifrons* | 24 | Yes | Yes | 1 | | 38.1 | |
| *B. formosellus* | 1 | No | No | 0 | | 0.7 | |
| *B. fragrans* | 21 | No | No | 0 | | 29.3 | |
| *B. franklini* | 1 | No | No | 0 | | 0.7 | |
| *B. fraternus* | 13 | No | No | 0 | | 9.9 | |
| *B. frigidus* | 29 | No | No | 0 | | 51.3 | |
| *B. friseanus* | 6 | No | No | 0 | | 2.4 | |
| *B. funebris* | 10 | No | No | 0 | | 5.7 | |
| *B. funerarius* | 5 | No | No | 0 | | 1.9 | |
| *B. genalis* | 3 | No | No | 0 | | 1.2 | |
| *B. gerstaeckeri* | 6 | No | No | 0 | | 2.4 | |
| *B. glacialis* | 1 | No | No | 1 | | 0.7 | |
| *B. grahami* | 6 | No | No | 0 | | 2.4 | |
| *B. griseocollis* | 21 | No | No | 0 | | 29.3 | |
| *B. haematurus* | 8 | No | No | 0 | | 3.8 | |
| *B. haemorrhoidalis* | 8 | No | No | 0 | | 3.8 | |
| *B. handlirschi* | 5 | No | No | 0 | | 1.9 | |
| *B. handlirschianus* | 5 | No | No | 0 | | 1.9 | |
| *B. haueri* | 4 | No | No | 0 | | 1.5 | |
| *B. hedini* | 7 | No | No | 0 | | 3.0 | |
| *B. himalayanus* | 1 | No | No | 0 | | 0.7 | |
| *B. honshuensis* | 4 | No | No | 0 | | 1.5 | |
| *B. hortorum* | 54 | Yes | Yes | 2 | | 59.8 | |
| *B. hortulanus* | 5 | No | No | 0 | | 1.9 | |
| *B. humilis* | 46 | Yes | Yes | 1 | | 67.0 | |
| *B. huntii* | 17 | Yes | No | 1 | | 18.3 | |
| *B. hyperboreus* | 58 | No | No | 0 | | 52.3 | |
| *B. hypnorum* | 63 | Yes | Yes | 3 | | 39.4 | |
| *B. hypocrita* | 5 | No | No | 0 | | 1.9 | |
| *B. ignitus* | 14 | No | No | 0 | | 11.7 | |
| *B. imitator* | 6 | No | No | 0 | | 2.4 | |
| *B. impatiens* | 17 | Yes | Yes | 2 | | 18.3 | |
| *B. impetuosus* | 6 | No | No | 0 | | 2.4 | |
| *B. incertus* | 7 | No | No | 0 | | 3.0 | |
| *B. inexspectatus* | 4 | No | No | 0 | | 1.5 | |
| *B. infirmus* | 3 | No | No | 0 | | 1.2 | |
| *B. infrequens* | 7 | No | No | 0 | | 3.0 | |
| *B. irisanensis* | 1 | No | No | 0 | | 0.7 | |
| *B. jacobsoni* | 1 | No | No | 0 | | 0.7 | |
| *B. jonellus* | 66 | Yes | Yes | 4 | | 30.7 | |
| *B. kashmirensis* | 9 | No | No | 0 | | 4.7 | |
| *B. keriensis* | 22 | No | No | 0 | | 32.3 | |
| *B. koreanus* | 9 | No | No | 0 | | 4.7 | |
| *B. kotzschi* | 2 | No | No | 0 | | 0.9 | |
| *B. ladakhensis* | 10 | No | No | 0 | | 5.7 | |
| *B. laesus* | 48 | No | No | 0 | | 66.1 | |
| *B. lantschouensis* | 9 | No | No | 0 | | 4.7 | |
| *B. lapidarius* | 28 | Yes | Yes | 1 | | 48.9 | |
| *B. lapponicus* | 36 | Yes | Yes | 1 | | 63.2 | |
| *B. lemniscatus* | 8 | No | No | 0 | | 3.8 | |
| *B. lepidus* | 10 | No | No | 0 | | 5.7 | |
| *B. longipennis* | 6 | No | No | 0 | | 2.4 | |
| *B. longipes* | 6 | No | No | 0 | | 2.4 | |
| *B. lucorum* | 39 | Yes | Yes | 1 | | 65.8 | |
| *B. luteipes* | 2 | No | No | 0 | | 0.9 | |
| *B. macgregori* | 3 | No | No | 0 | | 1.2 | |
| *B. magnus* | 11 | No | No | 0 | | 6.9 | |
| *B. malaisei* | 4 | No | No | 0 | | 1.5 | |
| *B. margreiteri* | 8 | No | No | 0 | | 3.8 | |
| *B. marussinus* | 3 | No | No | 0 | | 1.2 | |
| *B. medius* | 5 | No | No | 0 | | 1.9 | |
| *B. melaleucus* | 5 | No | No | 0 | | 1.9 | |
| *B. melanopoda* | 1 | No | No | 0 | | 0.7 | |
| *B. melanopygus* | 28 | No | No | 0 | | 48.9 | |
| *B. melanurus* | 22 | No | No | 0 | | 32.3 | |
| *B. mendax* | 4 | No | No | 0 | | 1.5 | |
| *B. mesomelas* | 10 | No | No | 0 | | 5.7 | |
| *B. mexicanus* | 7 | No | No | 0 | | 3.0 | |
| *B. miniatus* | 3 | No | No | 0 | | 1.2 | |
| *B. minshanensis* | 2 | No | No | 0 | | 0.9 | |
| *B. mixtus* | 29 | No | No | 0 | | 51.3 | |
| *B. mlokosievitzii* | 4 | No | No | 0 | | 1.5 | |
| *B. modestus* | 21 | No | No | 0 | | 29.3 | |
| *B. mongolensis* | 3 | No | No | 0 | | 1.2 | |
| *B. monticola* | 15 | Yes | No | 1 | | 13.7 | |
| *B. montivagus* | 6 | No | No | 0 | | 2.4 | |
| *B. morawitzi* | 5 | No | No | 0 | | 1.9 | |
| *B. morio* | 23 | No | No | 0 | | 35.2 | |
| *B. morrisoni* | 9 | No | No | 0 | | 4.7 | |
| *B. mucidus* | 7 | No | No | 0 | | 3.0 | |
| *B. muscorum* | 59 | Yes | No | 1 | | 50.0 | |
| *B. neoboreus* | 11 | No | No | 0 | | 6.9 | |
| *B. nevadensis* | 17 | Yes | Yes | 1 | | 18.3 | |
| *B. niveatus* | 12 | No | No | 0 | | 8.3 | |
| *B. nobilis* | 6 | No | No | 0 | | 2.4 | |
| *B. oberti* | 7 | No | No | 0 | | 3.0 | |
| *B. obtusus* | 1 | No | No | 0 | | 0.7 | |
| *B. occidentalis* | 21 | Yes | Yes | 2 | | 29.3 | |
| *B. oceanicus* | 2 | No | No | 0 | | 0.9 | |
| *B. opifex* | 14 | No | No | 0 | | 11.7 | |
| *B. opulentus* | 10 | No | No | 0 | | 5.7 | |
| *B. parthenius* | 2 | No | No | 0 | | 0.9 | |
| *B. pascuorum* | 62 | Yes | Yes | 2 | | 42.3 | |
| *B. patagiatus* | 30 | No | No | 0 | | 53.5 | |
| *B. pensylvanicus* | 29 | Yes | Yes | 1 | | 51.3 | |
| *B. perplexus* | 22 | No | No | 0 | | 32.3 | |
| *B. persicus* | 6 | No | No | 0 | | 2.4 | |
| *B. personatus* | 9 | No | No | 0 | | 4.7 | |
| *B. picipes* | 8 | No | No | 0 | | 3.8 | |
| *B. polaris* | 66 | No | No | 2 | | 30.7 | |
| *B. pomorum* | 19 | Yes | Yes | 1 | | 23.6 | |
| *B. portchinsky* | 4 | No | No | 0 | | 1.5 | |
| *B. pratorum* | 38 | Yes | Yes | 4 | | 65.1 | |
| *B. pressus* | 2 | No | No | 0 | | 0.9 | |
| *B. pseudobaicalensis* | 16 | No | No | 0 | | 15.9 | |
| *B. pullatus* | 10 | No | No | 0 | | 5.7 | |
| *B. pyrenaeus* | 7 | No | No | 0 | | 3.0 | |
| *B. religiosus* | 3 | No | No | 0 | | 1.2 | |
| *B. remotus* | 6 | No | No | 0 | | 2.4 | |
| *B. richardsiellus* | 2 | No | No | 0 | | 0.9 | |
| *B. robustus* | 5 | No | No | 0 | | 1.9 | |
| *B. rohweri* | 4 | No | No | 0 | | 1.5 | |
| *B. rotundiceps* | 7 | No | No | 0 | | 3.0 | |
| *B. rubicundus* | 7 | No | No | 0 | | 3.0 | |
| *B. rubriventris* | 1 | No | No | 0 | | 0.7 | |
| *B. ruderarius* | 30 | Yes | No | 1 | | 53.5 | |
| *B. ruderatus* | 19 | Yes | Yes | 2 | | 23.6 | |
| *B. rufipes* | 5 | No | No | 0 | | 1.9 | |
| *B. rufocinctus* | 26 | Yes | No | 2 | | 43.8 | |
| *B. rufofasciatus* | 9 | No | No | 0 | | 4.7 | |
| *B. rufoflavus* | 1 | No | No | 0 | | 0.7 | |
| *B. sandersoni* | 18 | No | No | 0 | | 20.9 | |
| *B. schrencki* | 40 | No | No | 0 | | 66.4 | |
| *B. securus* | 4 | No | No | 0 | | 1.5 | |
| *B. semenovianus* | 2 | No | No | 0 | | 0.9 | |
| *B. semenoviellus* | 21 | No | No | 0 | | 29.3 | |
| *B. senex* | 4 | No | No | 0 | | 1.5 | |
| *B. sibiricus* | 17 | No | No | 0 | | 18.3 | |
| *B. sichelii* | 44 | Yes | No | 1 | | 67.4 | |
| *B. sichuanensis* | 6 | No | No | 0 | | 2.4 | |
| *B. simillimus* | 1 | No | No | 0 | | 0.7 | |
| *B. sitkensis* | 14 | No | No | 0 | | 11.7 | |
| *B. sonani* | 1 | No | No | 0 | | 0.7 | |
| *B. soroeensis* | 40 | Yes | Yes | 1 | | 66.4 | |
| *B. sporadicus* | 38 | No | No | 0 | | 65.1 | |
| *B. steindachneri* | 4 | No | No | 0 | | 1.5 | |
| *B. subterraneus* | 38 | No | No | 0 | | 65.1 | |
| *B. subtypicus* | 6 | No | No | 0 | | 2.4 | |
| *B. sulfureus* | 5 | No | No | 0 | | 1.9 | |
| *B. superbus* | 1 | No | No | 0 | | 0.7 | |
| *B. supremus* | 7 | No | No | 0 | | 0.03.0 | |
| *B. sushkini* | 20 | No | No | 0 | | 26.4 | |
| *B. sylvarum* | 27 | Yes | No | 1 | | 46.4 | |
| *B. sylvicola* | 36 | No | No | 0 | | 63.2 | |
| *B. tanguticus* | 2 | No | No | 0 | | 0.9 | |
| *B. ternarius* | 19 | Yes | Yes | 1 | | 23.6 | |
| *B. terrestris* | 43 | Yes | Yes | 1 | | 67.3 | |
| *B. terricola* | 28 | Yes | Yes | 1 | | 48.9 | |
| *B. transversalis* | 19 | No | No | 0 | | 23.6 | |
| *B. tricornis* | 7 | No | No | 0 | | 3.0 | |
| *B. trifasciatus* | 9 | No | No | 0 | | 4.7 | |
| *B. trinominatus* | 2 | No | No | 0 | | 0.9 | |
| *B. tucumanus* | 4 | No | No | 0 | | 1.5 | |
| *B. tunicatus* | 3 | No | No | 0 | | 1.2 | |
| *B. turkestanicus* | 7 | No | No | 0 | | 3.0 | |
| *B. unicus* | 7 | No | No | 0 | | 3.0 | |
| *B. ussurensis* | 9 | No | No | 0 | | 4.7 | |
| *B. vagans* | 24 | Yes | Yes | 1 | | 38.1 | |
| *B. validus* | 1 | No | No | 0 | | 0.7 | |
| *B. vandykei* | 6 | No | No | 0 | | 2.4 | |
| *B. velox* | 1 | No | No | 0 | | 0.7 | |
| *B. veteranus* | 28 | No | No | 0 | | 48.9 | |
| *B. vogti* | 8 | No | No | 0 | | 3.8 | |
| *B. vosnesenskii* | 7 | No | No | 0 | | 3.0 | |
| *B. waltoni* | 8 | No | No | 0 | | 3.8 | |
| *B. wangae* | 2 | No | No | 0 | | 0.9 | |
| *B. weisi* | 8 | No | No | 0 | | 3.8 | |
| *B. wilmattae* | 2 | No | No | 0 | | 0.9 | |
| *B. wurflenii* | 16 | No | No | 0 | | 15.9 | |
| *B. zonatus* | 10 | No | No | 0 | | 5.7 | |