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A Checklist of Bees in Mt. Hiko, Kyushu, Japan

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Abstract. 125 species in 5 families of bees are listed from Mt. Hiko. The species diversity of bees in Mt. Hiko was quite high in the mainland of Kyushu. The number of species was highest (88 species) in the 1970's. However, in recent years, the number of species was about half in the 1970's.

Key words: Apoidea, Fukuoka, Hymenoptera, list.

Introduction

Mt. Hiko is located on the border of Fukuoka and Oita Prefectures, with the highest peak reaching approximately 1,200 m. At the foot of the mountain, the Hikosan Biological Laboratory belonging to Kyushu University was established in 1936 (Yasumatsu *et al*. 1970). Since the establishment of this laboratory, faunal surveys of various insect taxa have been conducted mainly by successive generations of laboratory members and students belonging to the Entomological Laboratory, Faculty of Agriculture, Kyushu University. Among the insect taxa occurring in Mt. Hiko, the checklist has been published for Lepidoptera, Coleoptera, and a part of Heteroptera and Hymenoptera (Chûjô *et al*. 1959; Kuroko 1957, 1959; Takeno 1998; Murao 2014, 2015; Hisasue 2020). For some insect taxa, faunal surveys at Mt. Hiko have been conducted in recent years (Yagi & Hirowatari 2019; Ito et al. 2021). In a recent study of moth assemblages by Yagi & Hirowatari (2019), environmental changes in Mt. Hiko based on several moth species were also discussed.

Approximately 20,000 bee species are known worldwide (Michener 2007), and 398 species have been recorded from Japan (Mitai 2020; Murao 2020, 2021; Tadauchi 2020). Many bee species forage pollen and nectar on flowers for larvae or sometimes their food. Therefore, bees play an important role as pollinators in the most terrestrial ecosystems and agricultural products. In recent years, bees have been reported to be declining in certain taxa (Williams & Osborne 2009; Arbetman *et al*. 2017), countries or regions (Biesmeijer *et al*. 2006; Bartomeus *et al*. 2013), and around the world (Zattara & Aizen 2021). As far as the author knows, there is no objective data to show that the number of bee species and individuals is declining nationwide in Japan. Bees are likely declining in Japan, but the basis for understanding such changes needs an inventory of what bee species inhabit an area.

Since many bee taxonomists have been studied at Kyushu University, they have published many taxonomic papers using specimens from Mt. Hiko (Yasumatsu & Hirashima 1950; Hirashima 1963; Tadauchi 1985; Tadauchi & Hirashima 1983; Ikudome 1989; Mitai & Tadauchi 2007; Murao 2021, etc.). In 398 species of Japanese bees, the type locality of 10 species is from Mt. Hiko. Although many taxonomic studies have used specimens from Mt. Hiko, no inventory of bees in Mt. Hiko has been made so far. In order to understand the environmental changes from the past to the present, and to establish a monitoring system in the future, it is important to make a checklist of bees in Mt. Hiko. In this paper, I have made a checklist of bees in Mt. Hiko, based on literature, identified and unidentified specimens, and the results of field surveys conducted by the author in recent years.

Material and method

The specimens used in the present study are housed in the collection of the Entomological Laboratory, Faculty of Agriculture, Kyushu

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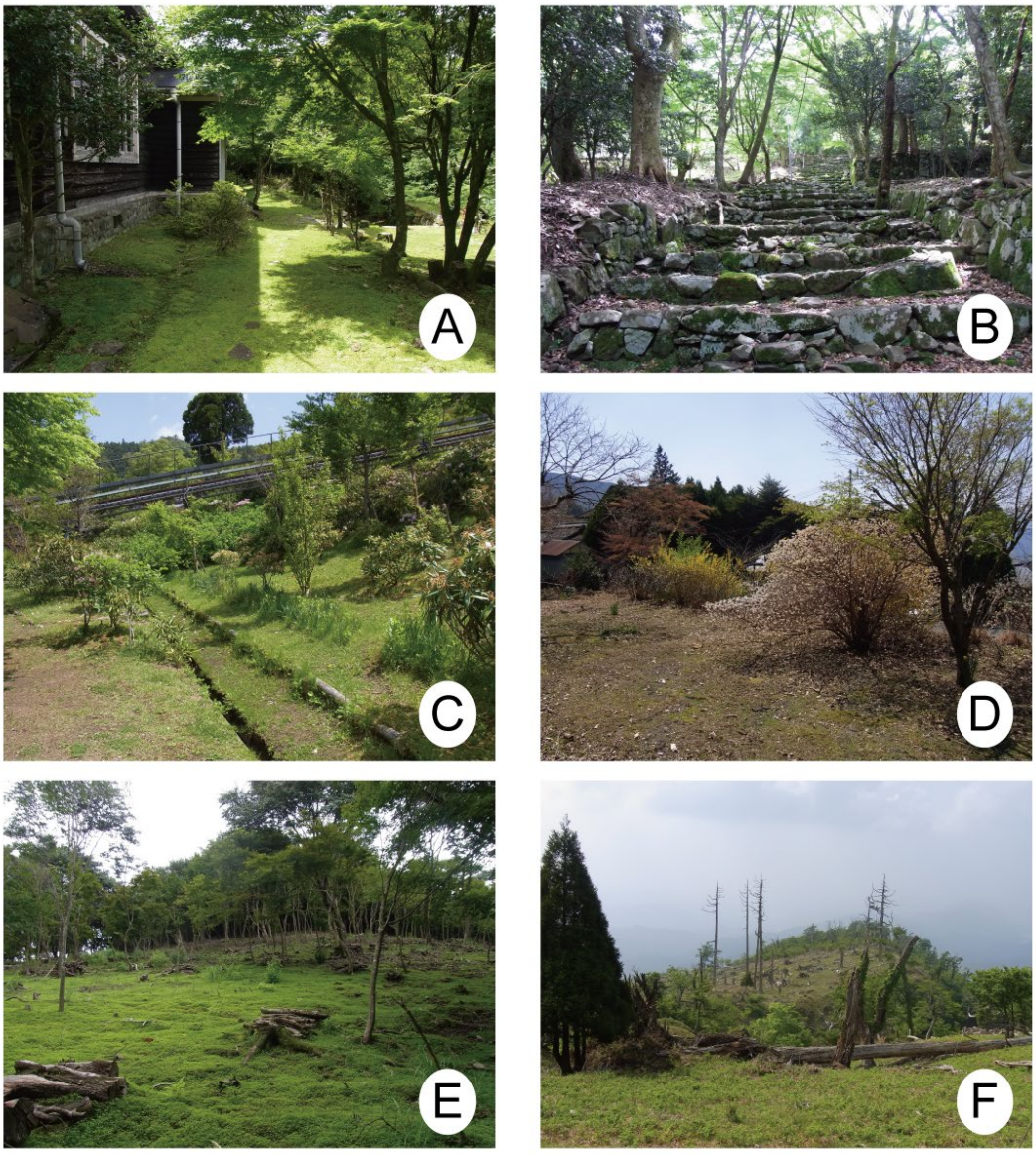

FIGURE 1. Collecting site in Mt. Hiko. A, B: Hikosan Biological Laboratory. C, D: Hikosan Flower Park and its surrounding areas. E: Hikosan Yaeijyo. F: near Mt. Kita-dake.

University, Fukuoka, Japan, the Hikosan Biological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan, and the private collection of the author (cMur). For information on the distribution of each bee species in Mt. Hiko, I referred to the following references: Yasumatsu & Hirashima (1950, 1953, 1969), Hirashima (1957, 1962a, 1962b, 1963, 1964a, 1964b, 1965a, 1965b, 1974), Hirashima & Tadauchi (1979), Tadauchi & Hirashima (1983, 1988), Tadauchi (1985, 1986), Tadauchi *et al*. (1987a, 1987b), Ikudome (1989), Mitai & Tadauchi (2003, 2007), Murao & Tadauchi (2008, 2011), Murao *et al*. (2006, 2015), Murao (2013, 2021).

To understand the recent bee fauna in Mt. Hiko, I also conducted field surveys from 2011 to 2021. The detailed locations and dates of the main field survey at Mt. Hiko are as follows.

Location A (Fig. 1A, B): Hikosan Biological Laboratory, Soeda-machi, Tagawa-gun, Fukuoka Pref., N33.482472, E130.908933; 18. v.

2011, 26. v. 2012, 13. iv. 2013, 13–14. vi. 2013, 24. vii. 2013, 18–19. ix. 2013, 23–24. v. 2014, 17–18. vii. 2014, 12. iv. 2015, 4. vi. 2015, 27. vii. 2015, 23–24. iii. 2016, 4. v. 2016.

Location B (Fig. 1C, D): Hikosan Flower Park and its surrounding areas, Soeda-machi, Tagawa-gun, Fukuoka Pref., N33.484039, E130.906185; 4. v. 2016, 8–9. v. 2021.

Location C (Fig. 1E): Hikosan Yaei-jyo, Soeda-machi, Tagawa-gun, Fukuoka Pref., N33.488928, E130.913476; 1. vii. 2013, 18. ix. 2013, 22–23. v. 2014, 17–18. vii. 2014, 21. viii. 2014, 27. vii. 2015, 8–9. v. 2021.

Location D (Fig. 1F): near Mt. Kita-dake, Soeda-machi, Tagawa-gun, Fukuoka Pref., N33.480590, E130.932100, 22. v. 2014.

The unidentified specimens in Kyushu University and collected specimens from field survey were identified by the author. All specimens are preserved in the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan. The classification and scientific names of bees are cited from the Catalogue of the Insects of Japan (Mitai 2020; Murao 2020; Tadauchi 2020).

List of collected or recorded bees in Mt. Hiko

Colletidae

1. *Colletes babai* Hirashima & Tadauchi, 1979
Published record. A specimen collected in 1938 was designated as a paratype by Hirashima & Tadauchi (1979).
Specimens examined. Mt. Hikosan: 1♀, 31. vii. 1998 (A. Dawut, cMur). Hikosan Yaei-jyo: 2♂, 21. viii. 2014 (R. Murao).

2. *Colletes collaris* Dours, 1872
Specimens examined. Mt. Hikosan, Buzen: 1♀15♂, 1. x. 1959 (Y. Hirashima). Mt. Hiko: 1♀4♂, 24. ix. 1970 (M.T. Chûjô); 1♂, 17. x. 1971 (M.T. Chûjô); 1♀, 1. xi. 1972 (M.T. Chûjô); 2♀, 14. xi. 1972 (M.T. Chûjô); 1♂, 16. x. 1973 (M.T. Chûjô); 5♀1♂, 30. x. 1973 (K. Takeno); 6♀, 17. x. 1974 (M.T. Chûjô); 2♀, 6. xi. 1974 (M.T. Chûjô).

3. *Colletes patellatus* Pérez, 1905
Published record. 2 specimens collected in 1959 were used by Ikudome (1989).
Specimens examined. Mt. Hiko: 1♂, 1. xi. 1972 (M.T. Chûjô); 1♂, 14. xi. 1972 (M.T. Chûjô); 4♂, 16. x. 1973 (M.T. Chûjô); 5♂, 30. x. 1973 (M.T. Chûjô); 2♀8♂, 17. x. 1974 (M.T. Chûjô); 4♂, 6. xi. 1974 (M.T. Chûjô).

4. *Colletes perforator* Smith, 1869
Specimens examined. Mt. Hiko: 3♀, 30. x. 1973 (M.T. Chûjô); 1♀, 17. x. 1974 (M.T. Chûjô).

5. *Hylaeus* (*Nesoprosopis*) *floralis* (Smith, 1873)
Specimens examined. Mt. Hikosan, Buzen: 1♀, 1. x. 1959 (Y. Hirashima). Hikosan: 1♂, 5. v. 1973 (O. Tadauchi). Mt. Hiko: 21♀4♂, 11. ix. 1973 (M.T. Chûjô); 2♀, 23. vi. 1975 (K. Takeno); 1♂, 3. viii. 1975 (K. Takeno). Hikosan Biological Laboratory: 1♀, 24. vii. 2013 (R. Murao); 1♀, 18. ix. 2013 (R. Murao).

6. *Hylaeus* (*Nesoprosopis*) *globulus* (Vachal, 1903)
Specimens examined. Hikosan (Buzen): 1♀, 2. viii. 1930 (K. Yasumatsu). Hikosan Biological Laboratory: 1♀, 1. vii. 2013 (R. Murao). Hikosan Yaei-jyo: 1♂, 18. ix. 2013 (R. Murao).

7. *Hylaeus* (*Nesoprosopis*) *matsumurai* Bridwell, 1919
Specimens examined. Hikosan (Buzen): 1♂, 22. v. 1950 (Y. Hirashima). Mt. Hiko: 1♀, 11. ix. 1973 (M.T. Chûjô).

8. *Hylaeus* (*Nesoprosopis*) *transversalis* Cockerell, 1924
Specimens examined. Mt. Hiko: 1♀, 20. ix. 1969 (K. Kanmiya); 1♂, 1. vi. 1972 (K. Takeno); 1♀2♂, 11. ix. 1973 (M.T. Chûjô); 1♂, 31. v. 1974 (K. Takeno); 1♀, 22. v. 1980 (K. Takeno). Hikosan Biological Laboratory: 1♀, 24. vii. 2013 (R. Murao). Hikosan Yaei-jyo: 1♀, 18. ix. 2013 (R. Murao).

9. *Hylaeus* (*Prosopis*) *submonticola* Ikudome, 1989
Published record. A specimen collected in 1951 was used by Ikudome (1989).

Andrenidae

10. *Andrena* (*Andrena*) *aburana* Hirashima, 1962
Published record. A specimen collected in 1976 was used by Tadauchi *et al*. (1987b).

11. *Andrena* (*Andrena*) *benefica* Hirashima,

1962

Published record. 4 specimens collected in 1951 were used by Hirashima (1962b).

Specimens examined. Mt. Hiko, Soeda-machi: 1♀, 15. iv. 2004 (T. Sugimoto, cMur).

12. *Andrena* (*Andrena*) *brevihirtiscopa* Hirashima, 1962

Published record. 48 specimens in total collected in 1937, 1951, 1973, 1975, and 1976 were used by Hirashima (1962b) and Tadauchi *et al*. (1987a).

Comments. The type locality of this species is Mt. Hiko (Hirashima 1962b).

13. *Andrena* (*Andrena*) *esakii* Hirashima, 1957

Published record. 22 specimens in total collected in 1937, 1951, 1962, 1972, 1975, and 1976 were used by Hirashima (1957, 1962b) and Tadauchi *et al*. (1987a).

Comments. The type locality of this species is Mt. Hiko (Hirashima 1957).

14. *Andrena* (*Andrena*) *longitibialis* Hirashima, 1962

Published record. 3 specimens collected in 1937, 1938, and 1955 were designated as paratypes by Hirashima (1962b).

15. *Andrena* (*Andrena*) *micado* Strand & Yasumatsu, 1938

Published record. 3 specimens collected in 1938 and 1951 were used by Hirashima (1962b).

Specimens examined. Mt. Hiko: 4♀, 5. iv. 1982 (K. Takeno); 1♀, 16. iv. 1985 (K. Takeno).

16. *Andrena* (*Andrena*) *nawai* Cockerell, 1913

Published record. 7 specimens in total collected in 1930, 1938, 1951, 1952, and 1975 were used by Hirashima (1962b, as *Andrena bombiformis*) and Tadauchi *et al*. (1987a).

17. *Andrena* (*Calomelissa*) *prostomias* Pérez, 1905

Published record. A specimen collected in 1927 was used by Hirashima (1963).

Specimens examined. Hikosan-Kakinoyama-Kottoidake-Yusubaru (Buzen): 1♀12♂, 31. v. 1938 (Esaki, Nomura, Yasumatsu). Mt. Hiko-san: 1♂, 14. vi. 2009 (O. Tadauchi). Hikosan Biological Laboratory: 1♀1♂, 14. vi. 2013 (R. Murao, cMur).

18. *Andrena* (*Calomelissa*) *tsukubana* Hirashima, 1957

Specimens examined. Hikosan Biological Laboratory: 1♀, 18. iv. 1972 (Malaise Trap); 1♂, 5. vi. 1972 (Malaise Trap); 2♀1♂, 14. vi. 2013 (R. Murao); 2♂, 4. vi. 2015 (R. Murao). Mt. Hiko-san: 1♀1♂, 14. vi. 2009 (O. Tadauchi).

Comments. A nest aggregation exists in the garden of the Hikosan Biological Laboratory.

19. *Andrena* (*Chlorandrena*) *knuthi* Alfken, 1900

Published record. A nest aggregation was discovered at Mt. Hiko in 1959, and biology have been reported by Hirashima (1962a).

Specimens examined. Hikosan (Buzen): 2♂, 20. v. 1939 (K. Yasumatsu). Mt. Hiko: 1♀, 13. v. 1966 (K. Takeno); 1♀, 26. vi. 1966 (A. Taketani); 2♂, 11. v. 1967 (S. Kimoto); 2♂, 16. v. 1967 (K. Takeno); 2♀11♂, 17. v. 1967 (K. Takeno); 1♀, 25. v. 1967 (S. Kimoto); 1♀, 12. vi. 1967 (K. Takeno); 1♂, 15. v. 1968; 1♀, 14. vi. 1969 (K. Kanmiya); 1♂, 12. v. 1970 (M.T. Chûjô); 1♀1♂, 11. v. 1971 (Y. Hirashima); 1♂, 20. v. 1971 (M.T. Chûjô); 1♀, 31. v. 1974 (K. Takeno); 1♂, 25. v. 1975 (K. Takeno); 1♀, 24. v. 1978 (K. Takeno); 1♀, 14. v. 1981 (K. Takeno); 1♀, 31. v. 1981 (K. Takeno). Kajiya, Mt. Hiko: 1♀, 4. vi. 1973 (K. Takeno); 5♂, 8. v. 1975 (K. Takeno). Hikosan Flower Park: 1♀1♂, 4. v. 2016 (R. Murao).

20. *Andrena* (*Euandrena*) *hebes* Pérez, 1905

Specimens examined. Hikosan, Yakushi-toge (Buzen), 900 m: 1♀, 26. iv. 1938 (K. Yasumatsu). Mt. Hiko: 1♀, 20. iv. 1965 (K. Takeno); 1♀, 20. iv. 1967 (K. Takeno); 1♀, 14. iv. 1971 (M.T. Chûjô); 1♀, 29. iv. 1978 (K. Takeno); 1♀, 27. iii. 1980 (K. Takeno); 1♀, 5. iv. 1982 (K. Takeno).

21. *Andrena* (*Euandrena*) *luridiloma* Strand, 1915

Specimens examined. Mt. Hiko: 1♀, 26. iv. 1971 (M.T. Chûjô); 1♀, 1. v. 1971 (H. Makihara); 1♀, 29. v. 1972 (K. Takeno); 1♀, 1. vi. 1972 (K. Takeno); 1♀, 21. v. 1975 (K. Takeno); 2♀, 2. v. 1978 (K. Takeno).

22. *Andrena* (*Holandrena*) *valeriana* Hirashima, 1957

Published record. 2 specimens collected in

1973 were used by Tadauchi (1986).
Specimens examined. Mt. Hiko: 1♂, 8. ix. 1968 (K. Kanmiya).

23. *Andrena* (*Hoplandrena*) *miyamotoi* Hirashima, 1964
Published record. 7 specimens collected in 1937, 1951, 1952, and 1955 were designated as type series by Hirashima (1964b).
Comments. The type locality of this species is Mt. Hiko (Hirashima, 1964b).

24. *Andrena* (*Leuchandrena*) *richardsi* Hirashima, 1957
Published record. A specimen collected in 1951 was designated as the holotype by Hirashima (1957).
Comments. The type locality of this species is Mt. Hiko (Hirashima, 1957).

25. *Andrena* (*Melandrena*) *parathoracica* Hirashima, 1957
Specimens examined. Mt. Hiko: 1♀, 29. v. 1981 (K. Takeno).

26. *Andrena* (*Melandrena*) *sasakii* Cockerell, 1913
Specimens examined. Kajiya, Mt. Hiko: 1♀, 18. iv. 1973 (K. Takeno). Mt. Hiko: 7♀, 21. v. 1975 (K. Takeno).

27. *Andrena* (*Melandrena*) *watasei* Cockerell, 1913
Specimens examined. Hikosan Biological Laboratory: 1♀, 7. vi. 1972 (Malaise Trap).

28. *Andrena* (*Micrandrena*) *hikosana* Hirashima, 1957
Published record. 11 specimens in total collected in 1938, 1951, and 1952 were used by Hirashima (1957, 1965a).
Specimens examined. Mt. Hiko: 1♀, 22. iv. 1969 (K. Kanmiya); 2♀, 31. v. 1974 (K. Takeno); 1♀, 28. iv. 1975 (K. Takeno); 1♀, 1. v. 1975 (Y. Yoneda); 1♀, 21. v. 1975 (K. Takeno); 2♀, 1. vi. 1978 (K. Takeno); 1♀, 22. v. 1980 (K. Takeno). Hikosan Biological Laboratory: 1♀, 9. vi. 1972 (by Malaise trap). Hikosan Flower Park: 1♀, 4. v. 2016 (R. Murao).
Comments. The type locality of this species is Mt. Hiko (Hirashima 1957).

29. *Andrena* (*Micrandrena*) *kaguya* Hirashima, 1965
Specimens examined. Hikosan (Buzen), 650 m: 2♀, 23. iv. 1930 (K. Yasumatsu). Hikosan (Buzen), 1,000 m: 1♀, 19. iv. 1938 (K. Yasumatsu). Hikosan (Buzen), 900 m: 3♀, 26. iv. 1938 (K. Yasumatsu). Mt. Hiko: 1♀, 12. iv. 1967 (K. Takeno); 1♀, 15. v. 1967 (K. Takeno); 1♀, 23. iv. 1969 (K. Kanmiya); 2♀, 21. v. 1975 (K. Takeno); 2♀, 22. v. 1980 (K. Takeno); 1♀, 23. iv. 1981 (K. Takeno); 4♀, 5. iv. 1982 (K. Takeno). Kajiya, Mt. Hiko: 1♀, 18. iv. 1973 (K. Takeno). Hikosan Biological Laboratory: 1♀, 4. vi. 2015 (R. Murao). Hikosan Flower Park: 1♀, 4. v. 2016 (R. Murao).

30. *Andrena* (*Micrandrena*) *minutula* (Kirby, 1802)
Published record. 18 specimens collected in 1973 were used by Tadauchi (1985).
Specimens examined. Hikosan (Buzen): 1♀, 20. v. 1939 (K. Yasumatsu). Mt. Hiko: 1♀, 1. v. 1975 (Y. Yoneda); 1♀, 21. iv. 1978; 1♀, 26. iv. 1978; 1♀, 23. iv. 1981; 3♀, 22. v. 1981 (K. Takeno); 3♀, 27. iv. 1983 (K. Takeno).

31. *Andrena* (*Micrandrena*) *semirugosa brassicae* Hirashima, 1957
Specimens examined. Kajiya, Mt. Hiko: 1♀, 14. vi. 1973 (K. Takeno). Hikosan Biological Laboratory: 1♀, 4. vi. 2015 (R. Murao). Hikosan Flower Park: 1♀, 4. v. 2016 (R. Murao).

32. *Andrena* (*Micrandrena*) *sublevigata* Hirashima, 1966
Specimens examined. Mt. Hikosan: 1♂, 10. v. 1951 (Y. Hirashima).

33. *Andrena* (*Ptilandrena*) *takachihoi* Hirashima, 1964
Published record. 2 specimens collected in 1959 were designated as type series by Hirashima (1964a).
Comments. The type locality of this species is Mt. Hiko (Hirashima 1964a).

34. *Andrena* (*Simandrena*) *kerriae* Hirashima, 1965
Published record. 3 specimens collected in 1973 were used by Tadauchi & Hirashima (1983).

35. *Andrena* (*Simandrena*) *opacifovea*

Hirashima, 1952

Specimens examined. Hikosan Biological Laboratory: 1♀, 7. vi. 1972 (Malaise Trap). Mt. Hiko: 1♀, 29. v. 1981 (K. Takeno). Hikosan Flower Park: 1♀, 4. v. 2016 (R. Murao).

36. *Andrena* (*Simandrena*) *yamato* Tadauchi & Hirashima, 1983

Specimens examined. Mt. Hiko: 1♀, 28. iv. 1969 (K. Kanmiya); 1♀, 31. v. 1969 (K. Takeno); 5♀, 5. v. 1973 (O. Tadauchi); 1♀, 1. v. 1978 (K. Takeno); 1♀, 1. vi. 1978 (K. Takeno); 1♀, 22. v. 1980 (K. Takeno); 4♀, 14. v. 1981 (K. Takeno); 3♀, 29. v. 1981 (K. Takeno); 1♀, 23. iv. 1981 (K. Takeno). Hikosan Flower Park: 1♀, 4. v. 2016 (R. Murao).

37. *Andrena* (*Stenomelissa*) *lonicerae* Tadauchi & Hirashima, 1988

Published record. 49 specimens collected in 1935, 1938, 1951, 1952, 1971, 1972, 1974, and 2013 were used by Hirashima (1965b, as *Andrena halictoides*), Tadauchi & Hirashima (1988), and Murao (2013).

38. *Andrena* (*Trachandrena*) *foveopunctata* Alfken, 1932

Specimens examined. Mt. Hiko: 1♀, 20. iv. 1969 (K. Kanmiya); 1♀, 26. iv. 1971 (K. Takeno); 1♀, 29. v. 1972 (K. Takeno); 2♀, 27. iv. 1973 (M.T. Chûjô); 1♀, 21. v. 1975 (K. Takeno).

39. *Andrena* (*Trachandrena*) *haemorrhoa japonibia* Hirashima, 1957

Published record. 2 specimens collected in 1938 and 1951 were designated as type series by Hirashima (1957).

Comments. The type locality of this species is Mt. Hiko (Hirashima 1957).

Halictidae

40. *Lipotriches* (*Austronomia*) *fruhstorferi* (Pérez, 1905)

Specimens examined. Mt. Hiko: 1♂, 8. ix. 1968 (K. Kanmiya); 1♂, 10. ix. 1968 (K. Kanmiya); 2♀, 29. viii. 1973 (K. Takeno).

41. *Halictus* (*Seladonia*) *aerarius* Smith, 1873

Specimens examined. Mt. Hikosan, Buzen: 1♀1♂, 1. x. 1959 (Y. Hirashima). Mt. Hiko: 2♂, 7. vii. 1968 (K. Kanmiya); 2♀, 24. v. 1978 (K. Takeno); 12♀, 8. vii. 2000 (O. Tadauchi).

42. *Lasioglossum* (*Lasioglossum*) *ebmerianum* Sakagami & Tadauchi, 1995

Specimens examined. Hikosan (Buzen): 1♀, 11. vi. 1937 (Esaki & Hori); 1♀, 18. v. 1950 (Y. Hirashima); 2♀, 12. v. 1952 (Y. Hirashima). Hikosan (Buzen), 1,000 m: 2♀, 19. iv. 1938 (K. Yasumatsu). Mt. Hikosan: 2♀, 9. v. 1951 (Y. Hirashima). Mt. Hiko: 1♀, 21. vi. 1966 (K. Takeno); 1♀, 7. iv. 1967 (K. Takeno); 1♀, 8. ix. 1968 (K. Kanmiya); 1♀, 26. iii. 1969 (K. Kanmiya); 1♀, 27. iii. 1969 (K. Kanmiya); 1♀, 11. iv. 1969 (K. Kanmiya); 1♀, 10. v. 1969 (K. Kanmiyma); 1♀, 23. iv. 1975 (K. Takeno); 1♀, 25. iv. 1978 (K. Takeno); 4♀, 19. v. 1980 (K. Takeno); 3♀, 14. v. 1981 (K. Takeno); 4♀, 22. v. 1981 (K. Takeno); 1♀, 30. v. 1981 (K. Takeno); 1♀, 25. iv. 1985 (K. Takeno). Hikosan Biological Laboratory: 1♀, 13. vi. 2013 (R. Murao). Hikosan Flower Park: 2♀, 4. v. 2016 (R. Murao).

43. *Lasioglossum* (*Lasioglossum*) *exiliceps* (Vachal, 1903)

Specimens examined. Hikosan (Buzen), 650 m: 3♀, 23. iv. 1930 (K. Yasumatsu). Hikosan (Buzen): 1♀, 3. v. 1937 (K. Yasumatsu); 1♀, 27. v. 1938 (Esaki, Nomura & Yasumatsu); 1♀, 17. v. 1939 (K. Yasumatsu); 1♀, 13. v. 1952 (Y. Hirashima). Mt. Hikosan: 6♀, 9. v. 1951 (Y. Hirashima); 4♀, 10. v. 1951 (Y. Hirashima); 1♀, 12. v. 1951 (Y. Hirashima); 1♀, 7. vi. 1959 (Y. Miyatake); 1♀, 1. x. 1959 (Y. Hirashima). Mt. Hiko: 1♀, 27. iv. 1965 (K. Takeno); 1♀, 28. iii. 1967 (K. Takeno); 1♀, 10. v. 1969 (K. Kanmiya); 1♂, 10. vii. 1969 (K. Kanmiya); 1♀, 6. x. 1977 (K. Takeno); 1♀, 5. iv. 1979 (K. Takeno); 1♀, 22. v. 1981 (K. Takeno). Hikosan: 5♀, 5. v. 1973 (O. Tadauchi). Hikosan Flower Park: 3♀, 4. v. 2016 (R. Murao).

44. *Lasioglossum* (*Lasioglossum*) *leviventre* (Pérez, 1905)

Specimens examined. Hikosan (Buzen): 1♀, 22. ix. 1938 (Hori & Fujino). Hikosan: 1♀, 6. x. 1972 (O. Tadauchi).

45. *Lasioglossum* (*Lasioglossum*) *proximatum* (Smith, 1879)

Specimens examined. Hikosan (Buzen), 1,000 m: 2♀, 19. iv. 1938 (K. Yasumatsu). Mt. Hiko: 1♀, 15. v. 1967 (S. Kimoto); 1♀, 4. vi. 1968 (K. Takeno); 1♀, 10. iv. 1969 (K.

Kanmiya); 1♀, 15. v. 1971 (M.T. Chûjô); 1♀, 27. iv. 1973 (M.T. Chûjô); 2♀, 1. vi. 1974 (K. Takeno); 1♀, 26. iv. 1975 (K. Takeno); 1♀, 2. v. 1978 (K. Takeno); 1♀, 14. v. 1981 (K. Takeno); 1♀, 22. v. 1981 (K. Takeno).

46. *Lasioglossum* (*Leuchalictus*) *mutilum* (Vachal, 1903)

Specimens examined. Mt. Hiko: 1♀, 3. viii. 1930 (K. Okabe); 1♀, 24. v. 1966 (A. Taketani); 1♀, 13. vi. 1966 (K. Takeno); 2♀, 21. vi. 1966 (K. Takeno); 2♀, 22. vi. 1966 (K. Takeno); 1♀, 23. vi. 1966 (K. Takeno); 1♀, 19. vii. 1966 (K. Takeno); 1♀, 6. vii. 1966 (K. Takeno); 2♀, 11. vii. 1969 (K. Kanmiya); 1♀, 10. v. 1973 (K. Takeno); 1♂, 7. xi. 1974 (K. Takeno); 2♀, 23. vi. 1975 (K. Takeno); 3♂, 1. x. 1975 (K. Takeno); 1♀, 8. xi. 1978 (K. Takeno). Hikosan (Buzen): 1♀, 9. vi. 1937 (Esaki & Hori); 1♀, 10. x. 1937 (K. Yasumatsu); 1♀, 13. viii. 1938 (K. Yasumatsu); 1♀, 25. ix. 1938 (Hori & Fujino); 1♀, 12. v. 1952 (Y. Hirashima). Hikosan (Buzen), 650 m: 11♀, 25. v. 1938 (K. Yasumatsu). Mt. Hikosan, Buzen: 2♂, 1. x. 1959 (Y. Hirashima). Hikosan: 1♀, 26. viii. 1963 (Y. Hirashima). Mt. Hiko, Soeda-machi: 3♂, 5. x. 1984 (K. Kusumoto). Mt. Hikosan: 2♀2♂, 8. viii. 2009 (O. Tadauchi).

47. *Lasioglossum* (*Leuchalictus*) *nipponicola* Sakagami & Tadauchi, 1995

Specimens examined. Hikosan (Buzen): 1♀, 1. viii. 1930 (K. Yasumatsu); 1♀, 11. viii. 1933 (T. Esaki); 3♂, 22. viii. 1938 (K. Yasumatsu); 2♂, 31. viii. 1938 (K. Yasumatsu); 1♀, 7. vii. 1939 (K. Yasumatsu). Mt. Hiko: 1♀, 21. vi. 1966 (K. Takeno); 1♀, 24. vi. 1966 (A. Taketani); 2♀, 25. vi. 1966 (A. Taketani); 1♀, 8. viii. 1967 (K. Takeno); 3♂, 8. ix. 1968 (K. Kanmiya); 1♀, 11. vii. 1969 (K. Kanmiya); 1♂, 26. viii. 1975 (K. Takeno); 1♂, 30. ix. 1977 (K. Takeno); 1♀, 10. vii. 1978 (K. Takeno); 1♀, 4. x. 1978 (K. Takeno); 1♀, 19. v. 1980 (K. Takeno); 1♀, 14. viii. 1980 (K. Takeno). Mt. Hikosan, 1♂, 31. viii. 1998 (A. Dawut).

48. *Lasioglossum* (*Leuchalictus*) *occidens* (Smith, 1873)

Specimens examined. Hikosan (Buzen), 1♂, 10. xi. 1934 (Esaki & Hori); 1♂, 12. viii. 1935 (T. Esaki); 1♂, 8. vii. 1939 (K. Yasumatsu); 1♀, 18. viii. 1939 (K. Yasumatsu); 1♀, 6. viii. 1949 (K. Yasumatsu); 1♀, 19. v. 1950 (Y. Hirashima). Hikosan: 2♀, 5. vii. 1959 (Y. Hirashima). Mt. Hikosan, Buzen: 1♀, 1. x. 1959 (Y. Hirashima). Mt. Hiko: 1♀, 8. vi. 1965 (K. Takeno); 1♀, 18. vi. 1965 (K. Takeno); 1♀, 6. vii. 1966 (K. Takeno); 3♀, 21. vi. 1966 (K. Takeno); 4♀, 22. vi. 1966 (A. Taketani); 2♀, 23. vi. 1966 (K. Takeno); 5♀, 25. vi. 1966 (A. Taketani); 1♀, 15. vii. 1966 (S. Kimoto); 17♀, 23. vi. 1975 (K. Takeno); 5♀, 4. viii. 1975 (K. Takeno); 1♂, 1. x. 1975 (K. Takeno); 1♂, 13. ix. 1977 (K. Takeno); 1♀, 26. ix. 1977 (K. Takeno); 2♂, 6. x. 1977 (K. Takeno); 1♂, 11. x. 1977 (K. Takeno); 1♀, 12. vi.1979 (K. Takeno). Mt. Hikosan: 1♂, 31. vii. 1998 (A. Dawut); 1♀4♂, 8. viii. 2009 (O. Tadauchi).

49. *Lasioglossum* (*Leuchalictus*) *scitulum* (Smith, 1873)

Specimens examined. Mt. Hiko: 1♂, 1. vi. 1971 (K. Takeno). Mt. Hikosan: 2♀, 14. vi. 2009 (O. Tadauchi).

50. *Lasioglossum* (*Dialictus*) *virideglaucum* Ebmer & Sakagami, 1994

Published record. A specimen collected in 1965 was used by Murao *et al*. (2015).

51. *Lasioglossum* (*Dialictus*) *yamanei* Murao, Ebmer & Tadauchi, 20068

Published record. 3 specimens in total collected in 1951 and 1973 were used by Murao *et al*. (2006, 2015).

Specimens examined. Mt. Hiko: 1♂, 3. ix. 1968 (K. Kanmiya).

52. *Lasioglossum* (*Hemihalictus*) *allodalum* Ebmer & Sakagami, 1985

Specimens examined. Mt. Hikosan: 2♀, 10. v. 1951 (Y. Hirashima). Mt. Hiko: 1♀, 4. iv. 1969 (K. Kanmiya); 1♀, 21. v. 1975 (K. Takeno).

53. *Lasioglossum* (*Hemihalictus*) *hirashimae hirashimae* Ebmer & Sakagami, 1985

Specimens examined. Mt. Hikosan: 1♀, 13. v. 1955 (Esaki, Yasumatsu & Hirashima). Mt. Hiko: 1♀, 16. vi. 1964 (S. Kimoto); 1♀, 23. vi. 1966 (A. Taketani); 1♂, 27. vii. 1966 (A. Taketani); 1♀, 22. x. 1966 (K. Takeno); 1♀, 11. vii. 1969 (K. Kanmiya); 1♀, 11. v. 1972 (K. Takeno). Mt. Hiko, Soeda-machi: 1♀, 19. v. 1985 (K. Kusumoto). Mt. Hikosan, Soeda-machi: 1♂, 30. vii. 2003 (R. Murao).

54. *Lasioglossum* (*Hemihalictus*) *japonicum*

(Dalla Torre, 1896)

Specimens examined. Hikosan (Buzen): 1♀, 10. x. 1937 (K. Yasumatsu); 1♀, 30. viii. 1938 (K. Yasumatsu); 1♂, 29. vii. 1939 (K. Yasumatsu). Hikosan: 1♀, 14. x. 1944 (K. Yasumatsu); 1♀, 8. viii. 1946 (K. Yasumatsu). Mt. Hiko: 1♀, 16. vi. 1964 (S. Kimoto); 1♂, 7. ix. 1964 (K. Takeno); 1♀, 12. v. 1965 (K. Takeno); 2♀, 13. v. 1966 (K. Takeno); 1♀, 23. vi. 1966; 1♂, 9. ix. 1967 (K. Takeno); 1♀, 17. v. 1967 (K. Takeno); 1♀, 31. v. 1967 (S. Kimoto); 1♀, 18. vii. 1968 (K. Kanmiya); 1♀, 22. x. 1968 (K. Kanmiya); 2♀, 11. vii. 1969 (K. Kanmiya); 1♂, 16. ix. 1969 (K. Kanmiya); 1♂, 22. x. 1970 (K. Takeno); 1♂, 16. ix. 1972 (M.T. Chûjô); 1♀, 30. x. 1973 (M.T. Chûjô); 1♀, 24. vi. 1976 (A. Taketani); 1♀, 9. vii. 1976 (Y. Hirashima); 1♀, 30. viii. 1978 (K. Takeno); 1♀, 16. vii. 1980 (K. Takeno); 1♀, 14. viii. 1980 (K. Takeno). Kajiya, Mt. Hiko: 1♀, 10-12. v. 1973 (K. Takeno); 1♀, 24. v. 1973 (M.T. Chûjô); 1♀, 4. vi. 1973 (K. Takeno); 3♂, 10. viii. 1073 (K. Takeno); 1♀, 22. viii. 1973 (K. Takeno); 1♀, 12. x. 1973 (K. Takeno); 1♀, 11. ix. 1973 (M.T. Chûjô). Hikosan Biological Laboratory: 2♀, 13. vi. 2013 (R. Murao).

55. *Lasioglossum* (*Hemihalictus*) *kuroshio* Takahashi & Sakagami, 1993

Specimens examined. Mt. Hiko: 1♀, 9. vii. 1976 (Y. Hirashima); 1♀, 22. v. 1981 (K. Takeno).

56. *Lasioglossum* (*Hemihalictus*) *metis* Ebmer, 2002

Published record. A specimen collected in 2002 was used by Murao & Tadauchi (2008).

Specimens examined. Hikosan (Buzen): 1♀, 12. v. 1952 (Y. Hirashima). Mt. Hiko: 1♀, 13. vi. 1966 (K. Takeno); 1♀, 24. vi. 1966 (A. Taketani); 2♀, 25. vi. 1966 (A. Taketani); 1♀, 22. iv. 1969 (K. Kanmiya); 1♀, 25. iv. 1973 (M.T. Chûjô); 1♀, 27. iv. 1973 (M.T. Chûjô); 1♂, 18. ix. 1974 (M.T. Chûjô); 1♀, 9. vii. 1976 (Y. Hirashima); 1♂, 2. ix. 1976 (K. Takeno); 1♂, 16. vii. 1980 (K. Takeno); 1♀, 30. v. 1981 (K. Takeno). Hikosan Biological Laboratory: 1♀, 13. vi. 2013 (R. Murao).

57. *Lasioglossum* (*Hemihalictus*) *spectrum* Murao, 2021

Published record. 49 specimens in total collected in 1939, 1966–1973, 1976, 1980, and 2013–2014 were designated as type series by Murao (2021).

Comments. The type locality of this species is Hikosan Biological Laboratory (Murao 2021).

58. *Lasioglossum* (*Hemihalictus*) *sulcatulum longifacies* Sakagami & Tadauchi, 1995

Specimens examined. Hikosan (Buzen), 650 m: 1♀, 22. iv. 1938 (K. Yasumtasu). Hikosan (Buzen): 1♀, 2. vi. 1939 (K. Yasumatsu); 1♀, 19. vii. 1939 (K. Yasumatsu). Mt. Hiko: 2♂, 7. ix. 1964 (K. Takeno & S. Kimoto); 1♀, 25. vi. 1966 (A. Taketani); 1♀, 20. vii. 1966 (S. Kimoto); 1♂, 22. vii. 1966 (K. Takeno); 3♂, 4. vii. 1967 (K. Takeno); 1♂, 24. vii. 1968 (K. Takeno); 2♂, 25. vii. 1968 (K. Takeno); 1♂, 25. viii. 1968 (K. Kanmiya); 1♂, 21. vi. 1969 (K. Takeno); 1♂, 30. viii. 1969 (K. Kanmiya); 1♂, 10. vii. 1970 (K. Nozato); 1♂, 7. vii. 1971 (Y. Hirashima); 1♀, 9. vii. 1976 (Y. Hirashima); 1♀, 27. x. 1989 (K. Takeno). Hikosan: 1♂, 3. x. 1965 (S. Ide); 1♀, 6. v. 1973 (O. Tadauchi).

59. *Lasioglossum* (*Hemihalictus*) *taeniolellum* (Vachal, 1903)

Specimens examined. Mt. Hiko: 1♀, 11. ix. 1973 (M.T. Chûjô); 1♀, 30. x. 1973 (M.T. Chûjô).

60. *Lasioglossum* (*Hemihalictus*) *transpositum* (Cockerell, 1925)

Specimens examined. Hikosan (Buzen): 1♀, 20. v. 1939 (K. Yasumatsu). Mt. Hikosan: 2♀, 10. v. 1951 (Y. Hirashima). Mt. Hiko: 1♀, 29. v. 1972 (K. Takeno); 3♀, 1. vi. 1972 (K. Takeno); 1♀, 8. xi. 1978 (K. Takeno); 1♀, 14. v. 1981 (K. Takeno). Hikosan: 1♀, 5. v. 1973 (O. Tadauchi); 1♀, 1. v. 1974 (K. Ohara); 1♀, 4. v. 1976 (K. Ohara). Mt. Hiko, Soeda-machi: 3♀, 4. vi. 1985 (K. Kusumoto). Hikosan Flower Park: 1♀, 4. v. 2016 (R. Murao).

61. *Lasioglossum* (*Hemihalictus*) *zunaga* Sakagami & Tadauchi, 1995

Specimens examined. Hikosan (Buzen): 1♀, 28. vii. 1939 (K. Yasumatsu). Mt. Hikosan (Bungo): 1♀, 12. v. 1953 (Y. Hirashima); 1♀, 13. v. 1955 (Esaki, Yasumatsu & Hirashima). Hikosan: 2♀3♂, 4. vii. 1959 (Y. Hirashima). Mt. Hiko: 1♀, 13. vi. 1966 (K. Takeno); 1♀, 24. vii. 1963 (S. Kimoto); 1♀, 19. vi. 1966 (K. Takeno); 2♀, 22. vi. 1966 (K. Takeno); 1♀, 26. vi. 1966 (A. Taketani); 1♂, 6. vii. 1966 (K. Takeno); 1♀, 17. v. 1967 (K. Takeno); 1♀, 16. vii. 1968 (K. Takeno); 1♀, 24. vii. 1968 (K.

Takeno); 1♂, 1. viii. 1968 (K. Kanmiya); 1♂, 11. vii. 1969 (K. Kanmiya); 2♂, 16. x. 1969 (K. Kanmiya). Hikosan Biological Laboratory: 1♂, 30. vii. 2003 (R. Murao).

62. *Lasioglossum* (*Sphecodogastra*) *affine* (Smith, 1853)
Specimens examined. Hikosan: 1♀, 5. vii. 1959 (Y. Hirashima). Mt. Hikosan: 7♀, 1. x. 1959 (Y. Hirashima); 3♀, 14. x. 1959 (Y. Hirashima). Mt. Hiko: 2♂, 14. xi. 1972 (M.T. Chûjô).

63. *Lasioglossum* (*Sphecodogastra*) *apristum* (Vachal, 1903)
Specimens examined. Hikosan (Buzen): 6♀10♂, 10. x. 1937 (K. Yasumatsu); 3♀, 28. vii. 1939 (K. Yasumatsu). Mt. Hiko: 1♀, 13. vi. 1966 (K. Takeno); 1♀, 27. vii. 1966 (K. Takeno); 1♀, 26. iv. 1968 (K. Takeno); 1♀, 25. vii. 1968 (K. Takeno); 1♀, 1. viii. 1968 (K. Kanmiya); 1♂, 27. x. 1968 (K. Kanmiya); 1♂, 7. xi. 1974 (K. Takeno); 1♀, 23. vi. 1975 (K. Takeno); 1♀, 4. viii. 1975 (K. Takeno); 1♀2♂, 1. x. 1975 (K. Takeno); 2♂, 13. ix. 1977 (K. Takeno); 1♀1♂, 26. ix. 1977 (K. Takeno); 1♂, 6. x. 1977 (K. Takeno); 2♂, 11. x. 1977 (K. Takeno); 1♀, 30. viii. 1978 (K. Takeno); 1♂, 4. x. 1978 (K. Takeno); 1♀, 18. viii. 1979 (K. Takeno); 3♂, 10. ix. 1979 (K. Takeno); 1♂, 2. xi. 1979 (K. Takeno); 1♀, 14. v. 1981 (K. Takeno); 2♀, 22. v. 1980 (K. Takeno); 1♀, 25. vii. 1980 (K. Takeno); 1♀, 14. viii. 1980 (K. Takeno); 1♂, 27. x. 1989 (K. Takeno). Nr. Notouge (alt. 800 m), Mts. Hikosan: 1♀, 5. iv. 2002 (H. Inoue).

64. *Lasioglossum* (*Sphecodogastra*) *baleicum* (Cockerell, 1937)
Specimens examined. Mt. Hiko: 1♂, 10. ix. 1979 (K. Takeno).

65. *Lasioglossum* (*Sphecodogastra*) *caliginosum* Murao, Ebmer & Tadauchi, 2006
Published record. A specimen collected in 1952 was used by Murao *et al*. (2006).

66. *Lasioglossum* (*Sphecodogastra*) *hoffmanni* (Strand, 1915)
Specimens examined. Mt. Hiko-san, Soeda-machi: 2♀, 10. iv. 2004 (T. Sugimoto); 1♀, 13. iv. 2004 (T. Sugimoto).

67. *Lasioglossum* (*Sphecodogastra*) *sibiriacum* (Blüthgen, 1923)
Specimens examined. Hikosan, Yakushi-toge: 1♀, 26. iv. 1938 (K. Yasumatsu). Mt. Hikosan: 3♀, 9. v. 1951 (Y. Hirashima); 1♀, 4. vii. 1959 (Y. Hirashima). Mt. Hiko: 1♀, 16. iv. 1965 (K. Takeno); 1♀, 16. vii. 1968 (S. Kimoto); 1♂, 24. ix. 1970 (M.T. Chûjô); 1♂, 29. viii. 1973 (M.T. Chûjô); 1♀, 24. iv. 1975 (K. Takeno); 1♀, 21. v. 1975 (K. Takeno); 1♀, 15. vi. 1975 (K. Takeno); 1♀, 25. iv. 1978 (K. Takeno). Hikosan: 2♀, 5–6. v. 1973 (O. Tadauchi); 1♀, 4. v. 1976 (K. Ohara).

68. *Lasioglossum* (*Sphecodogastra*) *vulsum* (Vachal, 1903)
Specimens examined. Mt. Hikosan: 1♀, 10. v. 1951 (Y. Hirashima). Mt. Hiko: 1♂, 22. vi. 1966 (K. Takeno); 1♂, 23. vi. 1976 (K. Takeno). Mt. Hikosan: 1♂, 14. vi. 2009 (O. Tadauchi). Hikosan: 3♀, 25. iv. 1973 (K. Takeno); 1♀, 29. iv. 1973 (H. Makihara); 6♀, 5. v. 1973 (O. Tadauchi). Hikosan Biological Laboratory: 1♀, 13. iv. 2013 (R. Murao).

69. *Lasioglossum primavera* Sakagami & Maeta, 1990
Published record. 2 specimens collected in 1973 and 2004 were used by Murao & Tadauchi (2011).

70. *Sphecodes geoffrellus* (Kirby, 1802)
Specimens examined. Mt. Hiko: 1♀, 1. viii. 1968 (K. Kanmiya); 1♀, 17. vii. 2014 (R. Murao). Hikosan Biological Laboratory: 1♀, 23. v. 2014 (R. Murao).

71. *Sphecodes murotai* Tsuneki, 1983
Specimens examined. Mt. Hiko: 1♂, 23. vi. 1975 (K. Takeno).

72. *Sphecodes nipponicus* Yasumatsu & Hirashima, 1951
Specimens examined. Mt. Hiko: 1♀, 9. vii. 1976 (Y. Hirashima).

73. *Sphecodes okuyetsu* Tsuneki, 1983
Specimens examined. Hikosan (Buzen) 1,000 m: 1♀, 19. iv. 1938 (K. Yasumatsu). Mt. Hiko: 1♀, 13. vi. 1966 (K. Takeno); 1♀, 23. vi. 1975 (K. Takeno); 1♀, 9. vii. 1976 (Y. Hirashima).

74. *Sphecodes simillimus* Smith, 1873
Specimens examined. Hikosan (Buzen): 1♀, 20. iv. 1969 (K. Kanmiya); 1♀, 27. iv. 1937 (K.

Yasumatsu); 2♀, 17. v. 1969 (K. Yasumatsu); 2♀, 17. v. 1971 (M.T. Chûjô); 2♀, 20. v. 1971 (M.T. Chûjô). Hikosan Biological Laboratory: 1♀, 10–12. v. 1971 (by Malaise trap); 1♀, 18. iv. 1972 (by Malaise trap); 1♀, 7. vi. 1972 (by Malaise trap); 2♀, 23. v. 2014 (R. Murao); 1♀, 4. vi. 2015 (R. Murao).

75. *Sphecodes tanoi* Tsuneki, 1983
Specimens examined. Kajiya, Mt. Hiko: 1♂, 30. vi. 1972 (K. Takeno); 1♂, 15. vi. 1973 (K. Takeno).

Megachillidae

76. *Osmia* (*Helicosmia*) *orientalis* Benoist, 1929
Specimens examined. Hikosan, Yakushi-toge (Buzen), 950 m: 1♀, 30. iv. 1938 (K. Yasumatsu). Hikosan-Kakinoyama-Kottoidake-Yusubaru (Buzen): 1♀, 31. v. 1938 (Esaki, Nomura & Yasumatsu). Hikosan (Buzen): 2♀, 20. v. 1939 (K. Yasumatsu). Mt. Hiko: 1♀, 21. vi. 1966; 1♀, 22. vi. 1966. Hikosan Biological Laboratory: 1♀, 21. v. 1971 (by Malaise trap); 1♂, 18. iv. 1972 (by Malaise trap). Hikosan: 2♀, 5. v. 1973 (O. Tadauchi).

77. *Osmia* (*Osmia*) *excavata* Alfken, 1903
Specimens examined. Hikosan: 1♀, 19. iv. 1972 (Y. Hirashima); 1♀, 5. v. 1973 (O. Tadauchi).

78. *Osmia* (*Osmia*) *pedicornis* Cockerell, 1920
Specimens examined. Hikosan, 1♀, 18. vi. 1972 (K. Takeno).

79. *Osmia* (*Osmia*) *taurus* Smith, 1873
Published record. 2 specimens collected in 1930 were used by Yasumatsu & Hirashima (1950).
Specimens examined. Hikosan (Buzen), 650 m: 2♂, 28. iv. 1930 (K. Yasumatsu). Hikosan Biological Laboratory: 1♀, 11–12. v. 1972 (by Malaise trap). Hikosan Flower Park: 1♀, 9. v. 2021 (R. Murao).

80. *Euaspis basalis* (Ritsema, 1874)
Specimens examined. Hikosan (Buzen): 1♀, 7. viii. 1935 (T. Esaki); 2♀, 23. vii. 1938 (K. Yasumatsu); 1♀, 9. viii. 1945 (S. Ito). Mt. Hiko: 1♂, 21. vii. 1966 (K. Takeno); 1♀, 14. viii. 1967 (K. Takeno); 1♀, 27. vii. 1967 (K. Takeno); 1♀, 30. vii. 1985 (K. Takeno). Hikosan Biological Laboratory: 1♂, 24. vii. 2013 (R. Murao).

81. *Coelioxys* (*Boreocoelioxys*) *hiroba* Nagase, 2003
Specimens examined. Hikosan (Buzen): 1♀6♂, 31. viii. 1938 (K. Yasumatsu); 1♀, 18. ix. 1938 (K. Yasumatsu). Hikosan: 1♀, 26. viii. 1963 (Y. Hirashima). Hikosan Biological Laboratory: 1♀, 3. ix. 1971 (Malaise trap). Mt. Hiko: 1♀, 5. ix. 1978 (K. Takeno); 1♀, 22. vii. 1980 (K. Takeno). Mt. Hikosan: 1♂, 8. vii. 2000 (O. Tadauchi). Mt. Hiko-san, Soeda-machi, Tagawa-gun: 1♀, 21. viii. 2014 (R. Murao).

82. *Coelioxys* (*Boreocoelioxys*) *yanonis* Matsumura, 1912
Specimens examined. Hikosan (Buzen): 1♂, 16. viii. 1938 (K. Yasumatsu); 1♀, 28. viii. 1938 (K. Yasumatsu). Mt. Hiko: 1♀, 16. ix. 1969 (K. Kanmiya); 2♂, 28. viii. 1973 (K. Takeno).

83. *Megachile* (*Callomegachile*) *sculpturalis* Smith, 1853
Specimens examined. Hikosan (Buzen): 1♂, 29. viii. 1935 (T. Esaki); 1♀, 9. ix. 1937 (K. Yasumatsu); 2♂, 23. vii. 1938 (K. Yasumatsu); 1♀1♂, 4. viii. 1938 (K. Yasumatsu); 1♀, 28. vii. 1939 (K. Yasumatsu). Mt. Hiko: 1♀, 18. viii. 1964 (K. Takeno); 1♀, 11. viii. 1966 (K. Takeno); 1♀, 18. vii. 1967 (K. Takeno); 1♀, 11. viii. 1967 (K. Takeno); 1♀, 1. ix. 1967 (S. Kimoto); 1♀, 20. viii. 1968 (K. Kanmiya); 1♀, 25–30. vii. 1969 (M.T. Chûjô); 1♀, 28. vii. 1969 (K. Kanmiya); 1♀, 17. viii. 1969 (K. Takeno); 2♀, 15. viii. 1979 (K. Takeno); 1♀, 3. ix. 1980 (K. Takeno); 1♀, 23. vii. 1984 (K. Takeno). Hikosan Biological Laboratory: 1♀, 7. ix. 2011 (S. Okudera).

84. *Megachile* (*Chelostomoda*) *spissula* Cockerell, 1911
Specimens examined. Mt. Hiko: 2♀, 30. viii. 1978 (K. Takeno).

85. *Megachile* (*Xanthosarus*) *willughbiella sumizome* Hirashima & Maeta, 1974
Published record. A specimen collected in 1938 was designated as the holotype by Hirashima & Maeta (1974).
Specimens examined. Mt. Hiko-san: 1♀, 14. vi. 2009 (O. Tadauchi).
Comments. The type locality of this species is

Mt. Hiko (Hirashima & Maeta, 1974).

86. *Megachile humilis* Smith, 1879
Specimens examined. Hikosan (Buzen): 1♀, 4. viii. 1938 (K. Yasumatsu); 4♀, 25. viii. 1938 (K. Yasumatsu); 1♀, 27. viii. 1943 (Esaki & Yasumatsu). Mt. Hiko: 1♀, 27. viii. 1966 (K. Takeno); 2♀, 30. viii. 1966 (K. Takeno); 1♀, 1. ix. 1966 (K. Takeno); 1♀, 10. vii. 1984 (K. Takeno). Mt. Hiko-san, Soeda-machi, Tagawa-gun: 1♀, 18. ix. 2013 (R. Murao).

87. *Megachile nipponica nipponica* Cockerell, 1914
Specimens examined. Hikosan: 1♀, 5. vi. 1927 (Hori & Fujino). Mt. Hiko-san, Soeda-machi, Tagawa-gun, 33.48582166, 130.90407361: 1♂, 18. ix. 2013 (R. Murao).

88. *Megachile remota sakagamii* Hirashima & Maeta, 1974
Published record. A part of paratypes was collected from Mt. Hiko without detailed data (Hirashima & Maeta 1974).

89. *Megachile tsurugensis* Cockerell, 1924
Specimens examined. Hikosan-Kakinoyama-Kottoidake-Yusubaru (Buzen): 1♀, 31. v. 1938 (Esaki, Nomura & Yasumatsu). Hikosan (Buzen): 1♀, 5. viii. 1938 (T. Esaki); 2♂, 18. ix. 1938 (K. Yasumatsu); 4♂, 4. vi. 1939 (K. Yasumatsu); 2♂, 6. vi. 1939 (K. Yasumatsu); 1♀, 8. vi. 1939 (K. Yasumatsu); 1♀, 18. vii. 1939 (K. Yasumatsu). Mt. Hiko: 1♂, 29. viii. 1973 (M.T. Chûjô); 2♂, 11. ix. 1973 (M.T. Chûjô); 2♀1♂, 5. ix. 1978 (K. Takeno); 2♂, 6. ix. 1978 (K. Takeno); 1♀, 11. ix. 1979 (K. Takeno); 6♀1♂, 14. vi. 2009 (O. Tadauchi). Hikosan Yaei-jyo: 1♂, 18. ix. 2013 (R. Murao).

90. *Megachile yasumatsui* Hirashima, 1974
Published record. A part of paratypes was collected from Mt. Hiko without detailed data (Hirashima 1974).
Specimens examined. Hikosan (Buzen): 1♀, 31. viii. 1938 (K. Yasumatsu). Mt. Hiko: 1♀, 6. ix. 1978 (K. Takeno).

Apidae

91. *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolans* Smith, 1873
Specimens examined. Mt. Hiko: 1♀, 3–4. vi. 1980 (K. Takeno).

92. *Ceratina* (*Ceratina*) *iwatai* Yasumatsu, 1936
Specimens examined. Mt. Hikosan: 1♂, spring 1956 (Y. Hirashima). Hikosan Biological Laboratory: 1♀, 3. ix. 1971 (Malaise trap); 1♀, 18. vii. 2014 (R. Murao).

93. *Ceratina* (*Ceratina*) *megastigmata* Yasumatsu & Hirashima, 1969
Published record. 2 specimens collected in 1952 were designated as type series by Yasumatsu & Hirashima (1969).
Specimens examined. Mt. Hiko: 1♀, 1. v. 1975 (Y. Yoneda).
Comments. The type locality of this species is Mt. Hiko (Yasumatsu & Hirashima 1969).

94. *Ceratina* (*Ceratina*) *satoi* Yasumatsu, 1936
Specimens examined. Mt. Hiko: 1♀, 9. vii. 1976 (Y. Hirashima); 1♀, 11. vii. 1969 (K. Kanmiya).

95. *Ceratina* (*Ceratinidia*) *flavipes* Smith, 1879
Specimens examined. Mt. Hiko: 1♂, 11. v. 1971 (M.T. Chûjô); 5♂, 11. v. 1971 (Y. Hirashima); 1♀, 20. v. 1971 (M.T. Chûjô); 2♂, 7. vii. 1971 (M.T. Chûjô); 1♀, 1. vi. 1972 (K. Takeno); 1♀, 1. v. 1975 (Y. Yoneda).

96. *Ceratina* (*Ceratinidia*) *japonica* Cockerell, 1911
Specimens examined. Hikosan (Buzen): 1♀, 2. viii. 1930 (K. Yasumatsu); 2♀, 18. v. 1950 (Y. Hirashima). Hikosan: 1♀, 16. v. 1955 (T. Hidaka). Mt. Hikosan: 2♀, 14. vi. 1959 (Y. Maeta). Mt. Hiko: 1♂, 9. v. 1970 (K. Takeno); 2♂, 9. v. 1970 (M.T. Chûjô); 1♀, 21. v. 1970 (K. Takeno); 1♀, 10. vii. 1970 (K. Nozato); 1♀, 4. viii. 1970 (K. Takeno); 3♀, 8. vii. 1970 (K. Nozato); 1♀, 11. v. 1971 (H. Makihara); 9♀2♂, 11. v. 1971 (Y. Hirashima); 1♀, 20. v. 1971 (K. Takeno); 1♂, 21. v. 1971 (K. Takeno); 5♀1♂, 25. v. 1971 (K. Takeno); 5♀, 26. v. 1971 (K. Takeno); 3♀, 1. vi. 1971 (K. Takeno); 5♀1♂, 13. vi. 1971 (M.T. Chûjô); 3♀, 7. vii. 1971 (M.T. Chûjô); 1♂, 29. v. 1972 (K. Takeno); 1♀, 2. viii. 1972 (M.T. Chûjô); 3♀, 30. v. 1973 (K. Takeno); 2♀, 29. viii. 1973 (M.T. Chûjô); 1♀, 11. ix. 1973 (M.T. Chûjô); 1♂, 2. vi .1974 (M.T. Chûjô); 5♀, 18. ix. 1974 (M.T. Chûjô); 1♂, 25. iv. 1975 (K. Takeno); 4♀1♂, 1. v. 1975 (Y. Yoneda); 1♂, 15. v. 1975 (K. Takeno); 2♀, 23. v. 1975 (K. Takeno); 1♂, 29. v. 1975 (K. Takeno); 1♀1♂, 23. vi. 1975 (K. Takeno); 2♀, 4. viii. 1975 (K. Takeno); 2♀, 9. vii. 1976 (Y.

Hirashima); 1♂, 6. x. 1977 (K. Takeno); 1♀, 26. iv. 1978 (K. Takeno); 1♀, 6. v. 1978 (O. Tadauchi); 1♀, 24. v. 1978 (K. Takeno); 1♀, 26. v. 1978 (K. Takeno); 1♀, 6. ix. 1978 (K. Takeno); 1♀, 25. iv. 1985 (K. Takeno); 2♀5♂, 27. iv. 1983 (K. Takeno); 1♀, 14. v. 1981 (K. Takeno); 1♀, 6. vi. 1980 (K. Takeno); 1♂, 22. v. 2014 (R. Murao). Hikosan Biological Laboratory: 2♀, 13. vi. 2013 (R. Murao); 5♀, 18. ix. 2013 (R. Murao); 1♀, 19. ix. 2013 (R. Murao); 1♀1♂, 18. vii. 2014 (R. Murao); 1♂, 4. vi. 2015 (R. Murao). Hikosan Yaei-jyo: 1♀, 27. vii. 2015 (R. Murao). Hikosan Flower Park: 1♂, 9. v. 2021 (R. Murao).

97. *Nomada amurensis* Radoszkowsky, 1876
Published record. 3 specimens collected in 1933, 1937, and 1951 were used by Yasumatsu & Hirashima (1953, as *Nomada esakii*).

98. *Nomada aswensis* Tsuneki, 1973
Published record. A specimen collected in 1975 was used by Mitai & Tadauchi (2007).

99. *Nomada fervens* Smith, 1873
Specimens examined. Hikosan Biological Laboratory: 1♀, 23. v. 2014 (R. Murao).

100. *Nomada flavoguttata* (Kirby, 1802)
Specimens examined. Hikosan (Buzen) 1,000 m: 2♂, 19. iv. 1938 (K. Yasumatsu). Hikosan-Yakushi-toge (Buzen) 900 m: 1♂, 26. iv. 1938 (K. Yasumatsu). Hikosan, 1,000 m: 1♂, 4. v. 1937 (K. Yasumatsu). Mt. Hikosan: 1♂, 6. v. 1951 (Y. Hirashima); 1♀, 12. iv. 1967 (K. Takeno). Mt. Hikosan (Bungo): 1♀, 12. v. 1953 (Y. Hirashima). Mt. Hiko, Buzen: 1♀, 15. v. 1955 (T. Hidaka). Hikosan: 1♀, 6. v. 1973 (O. Tadauchi); 1♀, 10. v. 1974 (H. Makihara); 2♂, 15. iv. 1975 (K. Ohara); 1♂, 30. iv. 1975 (K. Ohara); 2♂, 2. v. 1975 (K. Ohara). Mt. Hiko: 2♂, 12. v. 1975 (Y. Yoneda); 1♂, 6. v. 1951 (Y. Hirashima); 1♂, 10. iv. 1980 (K. Takeno); 1♀, 10. iv. 1980 (M.T. Chûjô); 1♀, 13. v. 1981 (M.T. Chûjô).
Comments. All specimens were identified by Dr. K. Mitai.

101. *Nomada fukuiana* Tsuneki, 1973
Published record. A specimen collected in 1951 was used by Mitai & Tadauchi (2007).

102. *Nomada galloisi* Yasumatsu & Hirashima, 1953
Published record. A specimen collected in 1974 was used by Mitai & Tadauchi (2003).

103. *Nomada ginran* Tsuneki, 1973
Specimens examined. Hikosan Biological Laboratory: 1♀, 23. v. 2014 (R. Murao).

104. *Nomada hakonensis* Cockerell, 1911
Specimens examined. Mt. Hiko: 1♂, 11. v. 1971 (Y. Hirashima). Hikosan Biological Laboratory: 1♀, 5. vi. 1972 (by Malaise trap). Mt. Hiko: 1♀, 28. iv. 1975 (K. Takeno); 1♀, 23. iv. 1981 (K. Takeno); 1♀, 5. iv. 1982 (K. Takeno).

105. *Nomada harimensis* Cockerell, 1914
Specimens examined. Mt. Hiko: 1♂, 11. v. 1971 (Y. Hirashima).

106. *Nomada icazti* Tsuneki, 1976
Published record. A specimen collected in 1951 was used by Mitai & Tadauchi (2007).

107. *Nomada japonica* Smith, 1873
Specimens examined. Mt. Hiko: 1♀, 14. vi. 1974 (K. Takeno); 2♀, 2. vi. 1974 (K. Takeno); 1♀, 28. iv. 1976 (K. Takeno); 1♀, 25. iv. 1978 (K. Takeno); 2♀, 24. v. 1978 (K. Takeno); 1♀, 27. v. 1980 (K. Takeno). Hikosan Biological Laboratory: 1♀, 18. v. 2011 (R. Murao, observation).

108. *Nomada leucophthalma* (Kirby, 1802)
Published record. A specimen collected in 1951 was used by Mitai & Tadauchi (2007).

109. *Nomada nipponica* Yasumatsu & Hirashima, 1951
Specimens examined. Mt. Hiko: 1♀, 22. v. 1972 (K. Takeno); 1♀, 14. v. 1981 (K. Takeno).

110. *Nomada okubira* Tsuneki, 1973
Specimens examined. Hikosan (Buzen): 1♀, 20. v. 1939 (K. Yasumatsu); 1♂, 18. viii. 1941 (K. Yasumatsu); 1♀, 8. viii. 1946 (K. Yasumatsu). Mt. Hikosan: 1♀1♂, 10. v. 1951 (Y. Hirashima). Mt. Hikosan (Bungo): 2♂, 12. v. 1953 (Y. Hirashima). Hikosan Biological Laboratory: 1♀, 29. v. 1969 (Malaise trap); 1♀, 5. vi. 1972 (Malaise trap). Mt. Hiko: 1♂, 11. v. 1971 (Y. Hirashima); 1♂, 31. v. 1974 (K. Takeno); 4♂, 2. v. 1975 (Y. Yoneda); 1♂, 27. v. 1975 (K. Takeno); 2♂, 23. v. 2014 (R. Murao); 1♀, 18. vii. 2014 (R. Murao). Hikosan

Biological Laboratory: 1♀, 23. v. 2014 (R. Murao).

111. *Nomada pacifica* Tsuneki, 1973
Published record. 11 specimens collected in 1951 were used by Mitai & Tadauchi (2007).
Specimens examined. Hikosan Biological Laboratory: 1♀, 5. vi. 1972 (Malaise Trap).

112. *Nomada temmasana akitsushimae* Mitai, Hirashima & Tadauchi, 2003
Published record. 4 specimens collected in 1968 were used by Mitai & Tadauchi (2003).
Specimens examined. Mt. Hiko: 1♂, 29. viii. 1973 (K. Takeno).

113. *Nomada towada* Tsuneki, 1973
Published record. 9 specimens collected in 1951 were used by Mitai & Tadauchi (2007).

114. *Epeolus melectiformis* Yasumatsu, 1938
Specimens examined. Mt. Hikosan (Bungo): 1♂, 22. viii. 1954 (K. Yasumatsu). Hikosan: 1♀, 20. viii. 1956 (T. Esaki).

115. *Triepeolus ventralis* (Meade-Waldo, 1913)
Specimens examined. Hikosan (Buzen): 1♂, 17. viii. 1930 (T. Esaki); 1♂, 23. viii. 1935 (T. Esaki).

116. *Eucera* (*Eucera*) *spurcatipes* Pérez, 1905
Specimens examined. Hikosan (Buzen): 1♂, 20. v. 1939 (K. Yasumatsu). Mt. Hiko: 1♂, 17. v. 1968 (T. Teshima).

117. *Eucera* (*Synhalonia*) *nipponensis* (Pérez, 1905)
Specimens examined. Hikosan (Buzen): 2♀1♂, 20. v. 1939 (K. Yasumatsu); 1♂, 2. vi. 1939 (K. Yasumatsu); 1♂, 6. v. 1964 (S. Kimoto); 1♂, 22. iv. 1969 (K. Kanmiya); 1♂, 16. v. 1980 (K. Takeno); 2♂, 19. v. 1980 (K. Takeno); 1♂, 14. v. 1981 (K. Takeno). Mt. Hiko: 1♀, 12. vi. 1967 (K. Takeno); 2♀, 25. v. 1975 (K. Takeno); 1♀, 28. iv. 1976 (K. Takeno); 1♀, 24. v. 1978 (K. Takeno); 1♀, 23. v. 1980 (K. Takeno). Hikosan Biological Laboratory: 1♀, 4. v. 2016 (R. Murao, observation). Hikosan Flower Park: 1♀1♂, 8–9. v. 2021 (R. Murao, observation). Hikosan Yaei-jyo: 1♀1♂, 8–9. v. 2021 (R. Murao, observation).

118. *Amegilla florea* (Smith, 1879)
Specimens examined. Hikosan (Buzen): 1♂, 17. viii. 1935 (T. Esaki). Hikosan Biological Laboratory: 1♂, 24. vii. 2013 (R. Murao); 1♂, 27. vii. 2015 (R. Murao, observation).

119. *Anthophora* (*Anthophora*) *plumipes* (Pallas, 1773)
Specimens examined. Hikosan (Buzen): 2♂, 4. v. 1938 (K. Yasumatsu); 3♀2♂, 20. v. 1939 (K. Yasumatsu). Mt. Hiko: 1♂, 30. iv. 1965 (K. Takeno); 1♂, 12. v. 1965 (K. Takeno); 1♀, 25. v. 1965 (S. Kimoto); 1♀, 11. v. 1967 (S. Kimoto); 1♂, 28. iv. 1969 (K. Kanmiya); 1♀, 25. iv. 1985 (K. Takeno). Hikosan Biological Laboratory: 1♀, 4. v. 2016 (R. Murao, observation). Hikosan Flower Park: 1♀1♂, 8–9. v. 2021 (R. Murao, observation). Hikosan Yaei-jyo: 1♀1♂, 8–9. v. 2021 (R. Murao, observation).

120. *Thyreus decorus* (Smith, 1852)
Specimens examined. Hikosan (Buzen): 1♂, 15. viii. 1933 (T. Esaki); 1♀, 24. viii. 1954 (H. Kuroko). Hikosan: 1♀, 17. viii. 1954 (C. Okuma).

121. *Bombus* (*Bombus*) *ignites* Smith, 1869
Specimens examined. Hikosan (Buzen): 1♀, 11. v. 1952 (Y. Hirashima). Mt. Hiko: 1♂, 4. x. 1978 (K. Takeno); 1♀, 14. vi. 2009 (O. Tadauchi). Hikosan Biological Laboratory: 1♂, 18. ix. 2013 (R. Murao, observation). Hikosan Yaei-jyo: 1♂, 18. ix. 2013 (R. Murao, observation).

122. *Bombus* (*Megabombus*) *diversus diversus* Smith, 1869
Specimens examined. Hikosan (Buzen): 1♀, 10. vi. 1937 (K. Yasumatsu); 2♀, 4. vi. 1939 (K. Yasumatsu); 2♀, 4. vi. 1939 (K. Yasumatsu); 1♀, 6. vi. 1939 (K. Yasumatsu); 1♀, 7. vi. 1939 (K. Yasumatsu); 1♀, 17. vii. 1948 (S. Ito); 2♀, 5. vii. 1939 (K. Yasumatsu); 2♀, 31. viii. 1943 (T. Esaki & K. Yasumatsu); 1♀, 9. vi. 1951 (A. Habu). Mt. Hiko: 2♀, 15. vi. 1964 (S. Kimoto); 1♀, 25. v. 1965 (S. Kimoto); 1♀, 8. vi. 1965 (K. Takeno); 1♀, 13. vii. 1965 (K. Takeno); 1♀, 5. vi. 1966 (S. Kimoto); 1♀, 21. vi. 1966 (K. Takeno); 3♀, 22. vi. 1966 (K. Takeno); 1♀, 24. vi. 1970 (T. Teshima); 1♂, 22. x. 1970 (M.T. Chûjô); 1♀, 21. v. 1971 (K. Takeno); 3♀, 14. vi. 1974 (K. Takeno); 1♀, 26. ix. 1977 (K. Takeno); 3♀, 24. v. 1978 (K. Takeno); 2♀, 4. x. 1978 (K.

Takeno); 1♀, 17. vii. 1981 (K. Takeno); 2♀, 23. ix. 1982 (K. Takeno); 1♀, 17. vii. 2014 (R. Murao). Hikosan Biological Laboratory: 1♀, 16. vii. 1969 (Malaise trap). Hikosan Flower Park: 1♀, 8–9. v. 2021 (R. Murao, observation). Hikosan Yaei-jyo: 1♀, 8–9. v. 2021 (R. Murao, observation).

123. *Bombus* (*Pyrobombus*) *ardens ardens* Smith, 1879

Specimens examined. Hikosan (Buzen): 4♂, 10. vi. 1937 (K. Yasumatsu); 1♂, 20. v. 1939 (K. Yasumatsu); 8♂, 4. vi. 1939 (K. Yasumatsu); 4♂, 6. vi. 1939 (K. Yasumatsu); 1♂, 7. vi. 1939 (K. Yasumatsu). Mt. Hiko: 1♂, 8. vii. 1965 (K. Takeno); 1♀, 2. vi. 1966 (S. Kimoto); 1♀8♂, 11. vi. 1966 (S. Kimoto); 1♂, 13. vi. 1966 (K. Takeno); 2♀1♂, 21. vi. 1966 (K. Takeno); 3♂, 22. vi. 1966 (K. Takeno); 1♀, 25. vi. 1966 (A. Taketani); 1♀, 27. vi. 1966 (K. Takeno); 1♀, 15. vii. 1966 (K. Takeno); 2♀1♂, 29. v. 1968 (K. Yano); 1♀, 14. vi. 1974 (K. Takeno); 1♀, 23. vi. 1975 (K. Takeno); 1♂, 29. v. 1980 (K. Takeno); 1♀, 9. vi. 1982 (K. Takeno); 1♀, 16. iv. 1985 (K. Takeno); 1♂, 17. vii. 2014 (R. Murao). Hikosan Biological Laboratory: 1♀, 18. v. 2011 (R. Murao, observation); 1♀, 26. v. 2012 (R. Murao, observation); 1♀1♂, 13. vi. 2013 (R. Murao, observation); 3♀1♂, 24. v. 2014 (R. Murao); 1♀, 29. v. 2014 (N. Ohara); 1♀1♂, 17–18. vii. 2014 (R. Murao, observation); 1♀, 12. iv. 2015 (R. Murao, observation); 1♀, 23–24. iii. 2016 (R. Murao, observation); 1♀, 4. v. 2016 (R. Murao, observation); 1♀, 8–9. v. 2021 (R. Murao, observation). Hikosan Flower Park: 1♀, 8–9. v. 2021 (R. Murao, observation).

124. *Apis* (*Apis*) *cerana japonica* Radoszkowski, 1887

Specimens examined. Mt. Hikosan: 1♀, 11. v. 1951 (Y. Hirashima). Hikosan (Buzen): 3♂, 1. vi. 1958 (H. Kuroko); 1♀, 25. vii. 1960 (H. Kuroko). Mt. Hiko: 1♀, 18. vi. 1966 (K. Takeno); 1♀, 22. vi. 1966 (K. Takeno); 1♀, 23. vi. 1966 (K. Takeno); 1♀, 25. vi. 1966 (A. Taketani); 4♀, 25. vi. 1966 (K. Takeno); 1♀, 22. iv. 1969 (K. Kanmiya); 1♀, 26. v. 1971 (K. Takeno); 1♀, 1. vi. 1971 (K. Takeno); 1♀, 26. vi. 1974 (K. Takeno); 1♀, 9. vii. 1975 (K. Takeno); 1♀, 26. iv. 1978 (K. Takeno); 4♀, 27. viii. 1978 (K. Takeno); 1♀, 21. v. 1979 (K. Takeno). Kajiya, Mt. Hiko: 2♀, 28. v. 1973 (K. Takeno); 1♀, 14. vi. 1973 (K. Takeno). Mt. Kita-dake: 1♀, 22. v. 2014 (R. Murao). Hikosan Biological Laboratory: 1♀, 23. iii. 2016 (R. Murao).

125. *Apis* (*Apis*) *mellifera* Linnaeus, 1758

Specimens examined. Mt. Hiko: 1♀, 6. x. 1964 (K. Takeno); 1♀, 21. v. 1971 (K. Takeno); 2♀, 25. v. 1971 (K. Takeno); 2♀, 26. v. 1971 (K. Takeno); 1♀, 31. v. 1971 (K. Takeno); 8♀, 1. vi. 1971 (K. Takeno); 10♀, 13.

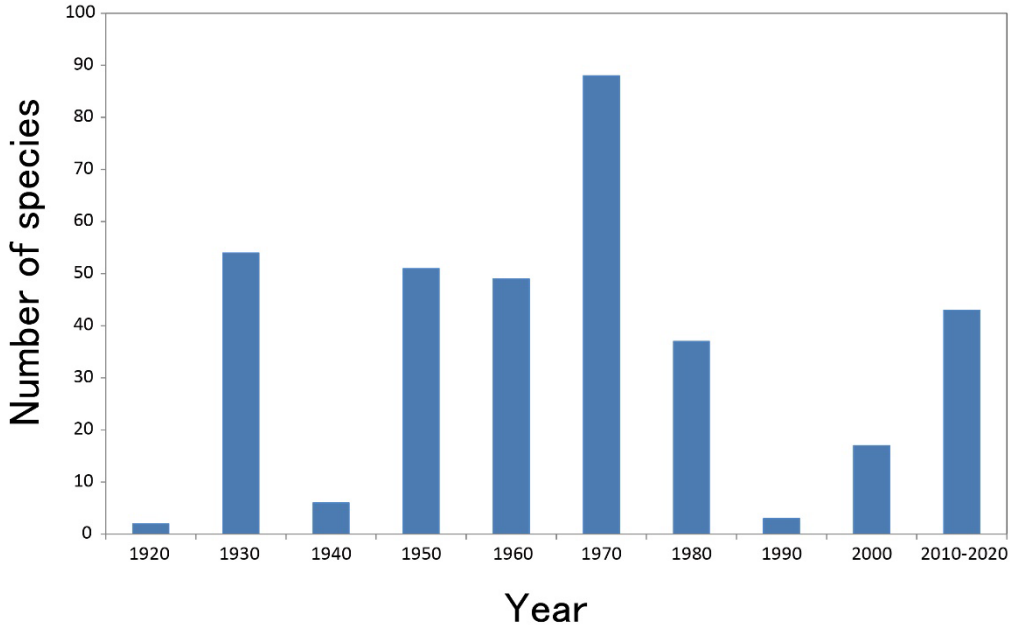

FIGURE 2. The number of bee species during 1920's to 2020's in Mt. Hiko.

vi. 1971 (M.T. Chûjô); 3♀, 22. ix. 1972 (K. Takeno); 2♀, 23. v. 1973 (K. Takeno); 4♀, 30. x. 1973 (K. Takeno); 1♀, 9. vii. 1975 (K. Takeno); 1♀, 26. iv. 1978 (K. Takeno); 1♀, 4. x. 1978 (K. Takeno). Kajiya, Mt. Hiko: 2♀, 30. vi. 1972 (K. Takeno).

Discussion

As a result of specimens examination, literature, and field survey, 125 bee species in 5 families were listed from Mt. Hiko. According to Mitai (2020), Murao (2020, 2021), and Tadauchi (2020), 225 bee species have been recorded from the mainland of Kyushu, which means that approximately 56% of bees from the mainland of Kyushu inhabit Mt. Hiko. In recent years, more accurate regional inventory has been reported from Kyushu (Yamamoto 2017; Murao 2019; Otsui *et al*. 2020, etc.), with the progress in taxonomic studies of Japanese bees. According to these papers, 124 species were recorded from the mainland of Nagasaki Prefecture (Yamamoto 2017), 72 species from Mt. Shaka located at the border of Fukuoka and Oita Prefectures (Uemori *et al*. 2018; Imasaka & Murao 2019; Otsui *et al*. 2020), 86 species from Kuju Plain in Oita Prefecture (Murao 2019), 124 species in Miyazaki Prefecture (Ikudome *et al*. 2020), and 92 species from the mainland of Kagoshima Prefecture (Ikudome 1992, 2013; Tsukada & Ikudome 2021). Comparing the number of species between Mt. Hiko and the above paper, it can be understood that the species diversity of bees in Mt. Hiko is quite high despite being part of the mountain area in Kyushu. This fact seems to indicate that the bee fauna of Mt. Hiko has been well surveyed by the efforts of successive generations of Kyushu University researchers.

To examine the changes in the number of bee species in Mt. Hiko, I assigned each collection record into the following 10 categories by every 10 years: 1920's (spans 1920 to 1929), 1930's (1930 to 1939), 1940's (1940 to 1949), 1950's (1950 to 1959), 1960's (1960 to 1969), 1970's (1970 to 1979), 1980's (1980 to 1989), 1990's (1990 to 1999), 2000's (2000 to 2009), 2010's–2020's (2010 to 2021). The number of bee species for each period is shown in Fig. 2. The highest number of species was 88 spp. in the 1970's, followed by 54 spp. in the 1930's, 51 spp. in the 1950's, and 49 spp. in the 1960's. The number of species was low in the 1940's (6 spp.) and 1990's–2000's (15 spp.). The reason for the low number of species in the 1940's is probably due to World War II. Also, the low number of species in the 1990's to 2000's may be because few bee surveys were conducted in Mt. Hiko. In a recent field survey conducted by the author in the 2010's to 2020's, 43 species were recorded from Mt. Hiko. However, this result is about half in the 1970's when the largest number of species were recorded. 41 of 43 species have been also collected in the past.

The density of sika deer in Mt. Hiko has increased significantly since the 1990's, and serious damage to the lower vegetation has become a problem (Kumagae 2010). During the field survey at Mt. Hiko, I frequently observed sika deer or found their droppings everywhere. At the site where I collected bees at Mt. Hiko, the lower vegetation that bees visit to forage was quite poor, and only plants that sika deer do not like such as *Boenninghausenia albiflora* var. *albiflora* (Rutaceae) conspicuous. The fact that the number of recorded species in recent years is lower than the peak in the 1970's may be due to the decline of the lower vegetation which is a food source for bees, caused by the increased density of sika deer.

I have established basic information for monitoring the bee fauna of Mt. Hiko by this checklist. To monitor the environmental changes in Mt. Hiko more accurately, I think that need to conduct more accurate faunal surveys using quantitative and various collecting methods.

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