

Floral Records of Wild Bees in Tosayama-mura,
Kôchi Prefecture, Shikoku, Japan
(Hymenoptera, Apoidea)¹⁾

Shuichi IKUDOME

*Laboratory of Biology,
Kagoshima Women's Junior College, Kagoshima 890*

Synopsis Flowering plants visited by bees are recorded based on a wild bee survey in 1975 and 1976. There are 43 species of wild bees represented by 704 individuals and belonging to 12 genera in 6 families, and flowering plants visited by these bees are 55 species in 24 families in total. This paper concludes "the wild bee survey in Kôchi, Japan".

INTRODUCTION

In 1975 and 1976, in two areas, Kôchi Plain and Tosayama-mura (200 to 900 meters high), of Kôchi Prefecture a biofaunistic investigation was made in order to obtain some basic information upon the faunal makeup, phenology and flower-visiting habits, by collecting bees at fixed periods during the bee season from April (February in Kôchi Plain) to October.

The result of these surveys has been reported in serial form "the wild bee survey in Kôchi, Japan". The result of survey in Kôchi Plain was already reported in from No. I to VI except No. II, that is to say, the first report (Sr. No. I) is on ecological and systematic generalization of investigation (1978), the second to the fourth reports aimed at discussing the mutual relation between each bee species and flowering plants visited by her, especially from the point of view of such flower-visiting habits as the period of the flower-visiting bee activity, the number of flower-visiting bee individuals, species of flowering plants visited by bees, and the flowering period of each of those plant species. But, because the data is not enough to discuss that mutual relation, reports on the bee groups except megachilid bees gave an account of only floral records. Namely, the second report (Sr. No. III) is on megachilid bees (1979 b), the third (Sr. No. IV) is on andrenid bees (1980), the fourth (Sr. No. V) is on halictid bees (1981), and the fifth (Sr. No. VI) is on colletid, anthophorid and bombyline bees (1982).

As for the result of survey in Tosayama-mura, the first report was already made on ecological and systematic generalization (Sr. No. II, 1979 a). This paper gives an account of

1) The wild bee survey in Kôchi, Japan VII.

flowering plants visited by bees as basic materials which will make clear the mutual relation between each bee species and flowering plants visited by her from the point of view of flower-visiting habits. In addition, flowering plants visited by all the bee species collected in this area are reported here in full.

This paper (Sr. No. VII), then, concludes not only reports of the result of biofaunistic investigation in Tosayama-mura but also the series "the wild bee survey in Kôchi, Japan".

I would like to conclude by saying that a study like this requires a steady further accumulation of the data by many men who have an interest in the wild bee.

METHODS OF SURVEY & OUTLOOK OF AREA SURVEYED

The explanation of the method of survey and the outlook of the area surveyed is omitted, as it was already described in the first report (Sr. No. II, 1979 a).

FLORAL RECORDS

The data of specimens treated in this paper contain some those irregular survey in addition to those of regular survey shown in the first report (1979 a). There are one individual of *Andrena* (*Andrena*) *ishiharai* HIRASHIMA (which was not included in the first report) and two individuals of *Bombus diversus* SMITH.

The wild bees are 43 species represented by 704 individuals and belonging to 12 genera (20 genera, if the subgenus of the genus *Andrena* is regarded as an independent genus) in 6 families in total, that is to say, colletid bees are 3 species belonging to 2 genera; halictid bees, 14 species belonging to 3 genera (two subgenera of the genus *Lasioglossum* are regarded as each independent genus); andrenid bees, 13 species belonging to 1 genus (9 subgenera); megachilid bees, 4 species belonging to 2 genera; anthophorid bees, 7 species belonging to 3 genera; apid (only bombine) bees, 2 species belonging to 1 genus.

As the taxonomy of the wild bee inhabiting Shikoku province is still not in a satisfactory state, some unnamed species are cited with Arabic code numbers that were adopted in my previous studies and will be used in the subsequent papers until the accurate names are established.

On the other hand, flowering plants visited by bees recorded are 55 species (the genus *Saussurea* and the genus *Rhododendron* whose specific names are not yet identified are regarded as one species respectively) in 24 families.

Now, in the following description, as the author himself collected specimens, the names of the collector are all omitted. As for the year collected, 1975 is abbreviated to 75, and 1976 to 76.

Scientific names of plant species principally depend on OHWI (1972).

COLLETIDAE

1. *Colletes patellatus* PÉREZ 4 ♀♀, 5 ♂♂
 - i) Compositae 4 ♀♀, 5 ♂♂

Kalimeris yomena KITAM.: 30. IX. 76, 2 ♀♀, 2 ♂♂; 6. X. 75, 1 ♀, 2 ♂♂; 8. X. 75, 1 ♂.

Solidago virga-aurea LINN. var. *asiatica* NAKAI: 30. IX. 76, 1 ♀.
2. *C. perforator* SMITH 20 ♀♀, 27 ♂♂
 - i) Compositae 20 ♀♀, 27 ♂♂

K. yomena KITAM.: 30. IX. 76, 9 ♂♂; 21. X. 76, 7 ♀♀.

Youngia denticulata KITAM.: 30. IX. 76, 1 ♂; 6. X. 75, 3 ♂♂; 21. X. 76, 3 ♀♀, 3 ♂♂.

Bidens biternata MERR. et SHERFF: 21. X. 76, 6 ♀♀, 3 ♂♂.

Lactuca indica LINN.: 30. IX. 76, 7 ♂♂.

S. virga-aurea LINN. var. *asiatica* NAKAI: 21. IX. 76, 4 ♀♀, 1 ♂.
3. *Hylaeus floralis* (SMITH) 2 ♂♂
 - i) Rosaceae 1 ♂

Spiraea cantoniensis LOUR.: 14. V. 76, 1 ♂.
 - ii) Saxifragaceae 1 ♂

Deutzia crenata SIEB. et ZUCC.: 3. VI. 76, 1 ♂.

HALICTIDAE

1. *Lasioglossum (Lasioglossum) mutilum* (VACHAL) 63 ♀♀, 10 ♂♂
 - i) Compositae 16 ♀♀, 4 ♂♂

Erigeron annuus PERS.: 30. VI. 76, 5 ♀♀; 27. VII. 76, 5 ♀♀.

Hieracium umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 2 ♀♀.

K. yomena KITAM.: 30. IX. 76, 1 ♀; 6. X. 75, 1 ♀.

Aster scaber THUNB.: 27. VIII. 76, 2 ♂♂.

Saussurea sp.: 3. VI. 76, 1 ♀.

B. biternata MERR. et SHERFF: 21. X. 76, 1 ♀.

S. virga-aurea LINN. var. *asiatica* NAKAI: 21. X. 76, 1 ♂.

Y. denticulata KITAM.: 21. X. 76, 1 ♂.
 - ii) Saxifragaceae 15 ♀♀

Hydrangea paniculata SIEB.: 3. VI. 76, 1 ♀; 27. VII. 76, 1 ♀; 6. VIII. 76, 5 ♀♀; 27. VIII. 76, 2 ♀♀.

D. crenata SIEB. et ZUCC.: 3. VI. 76, 6 ♀♀.
 - iii) Guttiferae 13 ♀♀

Hypericum patulum THUNB.: 30. VI. 76, 13 ♀♀.
 - iv) Umbelliferae 7 ♀♀

Angelica pubescens MAXIM.: 27. VIII. 76, 5 ♀♀; 9. IX. 75, 1 ♀; 16. IX. 76, 1 ♀.
 - v) Polygonaceae 3 ♀♀, 3 ♂♂

Polygonum cuspidatum SIEB. et ZUCC.: 16. IX. 76, 2 ♀♀, 2 ♂♂.

P. thunbergii SIEB. et ZUCC.: 16. IX. 76, 1 ♀.

P. filiforme THUNB.: 30. IX. 76, 1 ♂.

- vi) Araliaceae 5 ♀♀
Aralia elata SEEM.: 27. VII. 76, 1 ♀; 6. VIII. 76, 4 ♀♀.
- vii) Geraniaceae 3 ♂♂
Geranium thumbergii SIEB. et ZUCC.: 30. IX. 76, 3 ♂♂.
- viii) Rosaceae 2 ♀♀
Rubus microphyllus LINN.: 15. IV. 76, 1 ♀.
Photinia glabra MAXIM.: 14. V. 76, 1 ♀.
- ix) Papaveraceae 1 ♀
Macleaya cordata R. BR.: 30. VI. 76, 1 ♀.
- x) Valerianaceae 1 ♀
Patrinia villosa JUSS.: 9. IX. 76, 1 ♀.
- 2. *L. (L.) occidens* (SMITH) 19 ♀♀, 14 ♂♂
 - i) Compositae 6 ♀♀, 2 ♂♂
K. yomena KITAM.: 30. IX. 76, 1 ♀, 1 ♂; 21. X. 76, 1 ♀.
Y. denticulata KITAM.: 21. X. 76, 3 ♀♀.
A. scaber THUNB.: 27. VIII. 76, 1 ♂.
S. virga-aurea LINN. var. *asiatica* NAKAI: 21. X. 76, 1 ♀.
 - ii) Polygonaceae 5 ♀♀, 2 ♂♂
P. cuspidatum SIEB. et ZUCC.: 16. IX. 76, 5 ♀♀, 1 ♂.
P. longisetum DE BRUYN: 30. IX. 76, 1 ♂.
 - iii) Valerianaceae 1 ♀, 3 ♂♂.
P. villosa JUSS.: 9. IX. 76, 1 ♀, 3 ♂♂.
 - iv) Araliaceae 1 ♀, 3 ♂♂
A. elata SEEM.: 6. VIII. 76, 1 ♀; 27. VIII. 76, 3 ♂♂.
 - v) Umbelliferae 1 ♀, 2 ♂♂
A. pubescens MAXIM.: 27. VIII. 76, 2 ♂♂; 16. IX. 76, 1 ♀.
 - vi) Saxifragaceae 2 ♀♀
H. paniculata SIEB.: 6. VIII. 76, 2 ♀♀.
 - vii) Geraniaceae 2 ♂♂
G. thumbergii SIEB. et ZUCC.: 30. IX. 76, 2 ♂♂.
 - viii) Rosaceae 1 ♀
R. microphyllus LINN.: 15. IV. 76, 1 ♀.
 - ix) Ranunculaceae 1 ♀
Ranunculus quelpaertensis NAKAI: 14. V. 76, 1 ♀.
 - x) Vitaceae 1 ♀
Ampelopsis brevipedunculata TRAUTV.: 6. VIII. 76, 1 ♀.
- 3. *L. (L.) scitulum* (SMITH) 15 ♀♀
 - i) Guttiferae 5 ♀♀
H. patulum THUNB.: 30. VI. 76, 5 ♀♀.
 - ii) Euphorbiaceae 4 ♀♀
Mallotus japonicus MUELL. ARG.: 30. VI. 76, 4 ♀♀.
 - iii) Leguminosae 2 ♀♀
Astragalus sinicus LINN.: 13. IV. 76, 1 ♀; 15. IV. 76, 2 ♀♀.

- iv) Ranunculaceae 2 ♀♀
R. japonicus THUNB.: 25. IV. 76, 2 ♀♀.
- v) Cruciferae 1 ♀
Brassica rapa LINN.: 15. IV. 76, 1 ♀.
- 4. *L. (L.) discrepans* (PÉREZ) 5 ♀♀, 1 ♂
 - i) Ranunculaceae 2 ♀♀
R. japonicus THUNB.: 25. IV. 76, 2 ♀♀.
 - ii) Ebenaceae 1 ♀
Diospyros kaki THUNB.: 13. V. 76, 1 ♀.
 - iii) Leguminosae 1 ♀
A. sinicus LINN.: 14. V. 76, 1 ♀.
 - iv) Umbelliferae 1 ♀
A. pubescens MAXIM.: 16. IX. 76, 1 ♀.
 - v) Cruciferae 1 ♂
B. rapa LINN.: 15. IV. 76, 1 ♂.
- 5. *L. (L.)* sp. 1 2 ♀♀
 - i) Ericaceae 1 ♀
Rhododendron sp.: 14. V. 76, 1 ♀.
 - ii) Umbelliferae 1 ♀
A. pubescens MAXIM.: 16. IX. 76, 1 ♀.
- 6. *L. (L.)* sp. 2 14 ♀♀
 - i) Saxifragaceae 6 ♀♀
H. paniculata SIEB.: 6. VIII. 76, 6 ♀♀.
 - ii) Compositae 4 ♀♀
H. umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 1 ♀.
E. annuus PERS.: 30. VI. 76, 1 ♀; 27. VII. 76, 1 ♀.
A. scaber THUNB.: 16. IX. 76, 1 ♀.
 - iii) Guttiferae 2 ♀♀
H. patulum THUNB.: 30. VI. 76, 2 ♀♀.
 - iv) Rosaceae 1 ♀
R. palmatus THUNB.: 15. IV. 76, 1 ♀.
 - v) Vitaceae 1 ♀
A. brevipedunculata TRAUTV.: 6. VIII. 76, 1 ♀.
- 7. *L. (Evyllaeus) pallidulum* (MATSUMURA) 2 ♀♀, 14 ♂♂
 - i) Compositae 1 ♀, 14 ♂♂
A. ageratoides TURCZ. var. *semiamplexicaulis* OHWI: 6. X. 75, 13 ♂♂.
K. yomena KITAM.: 21. X. 76, 1 ♀.
Y. denticulata KITAM.: 6. X. 75, 1 ♂.
 - ii) Polygonaceae 1 ♀
P. longisetum DE BRUYN: 30. IX. 76, 1 ♀.
- 8. *L. (E.) trispine* (VACHAL) 8 ♀♀
 - i) Ranunculaceae 2 ♀♀
R. japonicus THUNB.: 25. IV. 76, 2 ♀♀.

- ii) Saxifragaceae 2♀♀
D. maximowicziana MAKINO: 14. V. 76, 1♀.
H. paniculata SIEB.: 6. VIII. 76, 1♀.
- iii) Rosaceae 2♀♀
R. microphyllus LINN.: 15. IV. 76, 1♀
Rosa wichuraiana CRÉP.: 27. VII. 76, 1♀.
- iv) Compositae 1♀
E. annuus PERS.: 30. VI. 76, 1♀.
- v) Cruciferae 1♀
B. rapa LINN.: 15. IV. 76, 1♀.
- 9. *L. (E.)* sp. 1 9♀♀
 i) Compositae 4♀♀
H. umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 1♀.
E. annuus PERS.: 30. VI. 76, 3♀♀.
- ii) Rosaceae 3♀♀
R. multiflora THUNB.: 3. VI. 76, 2♀♀.
R. wichuraiana CRÉP.: 30. VI. 76, 1♀.
- iii) Umbelliferae 2♀♀
Osmorhiza aristata MAKINO: 3. VI. 76, 2♀♀.
- 10. *L. (E.)* sp. 2 3♀♀
 i) Saxifragaceae 3♀♀
D. crenata SIEB. et ZUCC.: 3. VI. 76, 3♀♀.
- 11. *L. (E.)* sp. 4 3♀♀
 i) Compositae 3♀♀
E. annuus PERS.: 30. VI. 76, 1♀; 27. VII. 76, 2♀♀.
- 12. *L. (E.)* sp. 5 1♀
 i) Saxifragaceae 1♀
D. crenata SIEB. et ZUCC.: 3. VI. 76, 1♀.
- 13. *L. (E.)* sp. 7 1♀
 i) Saxifragaceae 1♀
D. crenata SIEB. et ZUCC.: 3. VI. 76, 1♀.
- 14. *Sphecodes* sp. 1 2♀♀
 i) Compositae 2♀♀
K. yomena KITAM.: 6. X. 75, 1♀; 8. X. 75, 1♀.

ANDRENIDAE

- 1. *Anrena (Andrena) longitibialis* HIRASHIMA 3♀♀
 i) Ericaceae 3♀♀
Rhododendron sp.: 14. V. 76, 3♀♀.
- 2. *A. (A.) ishiharai* HIRASHIMA 1♀
 i) Saxifragaceae 1♀
D. crenata SIEB. et ZUCC.: 14. V. 76, 1♀.

3. *A. (Calomelissa) tsukubana* HIRASHIMA 13 ♀♀, 19 ♂♂
 - i) Saxifragaceae 12 ♀♀, 16 ♂♂

D. crenata SIEB. et ZUCC.: 3. VI. 76, 12 ♀♀, 16 ♂♂.
 - ii) Rosaceae 1 ♀, 3 ♂♂

P. glabra MAXIM.: 14. V. 76, 3 ♂♂.

Stephanandra incisa ZABEL: 14. V. 76, 1 ♀.
4. *A. (C.) prostomias* PÉREZ 5 ♀♀, 27 ♂♂
 - i) Saxifragaceae 3 ♀♀, 27 ♂♂

D. crenata SIEB. et ZUCC.: 3. VI. 76, 3 ♀♀, 27 ♂♂.
 - ii) Rosaceae 1 ♀

P. glabra MAXIM.: 14. V. 76, 1 ♀.
 - iii) Ranunculaceae 1 ♀

R. quelpaertensis NAKAI: 14. V. 76, 1 ♀.
5. *A. (Crysandrena?) knuthi* ALFKEN 5 ♂♂
 - i) Cruciferae 5 ♂♂

B. chinensis LINN.: 15. IV. 76, 5 ♂♂.
6. *A. (Euandrena) hebes* PÉREZ 2 ♀♀, 1 ♂.
 - i) Rosaceae 1 ♀, 1 ♂

R. palmatus THUNB.: 15. IV. 76, 1 ♀, 1 ♂.
 - ii) Ranunculaceae 1 ♀

R. japonicus THUNB.: 15. IV. 76, 1 ♀.
7. *A. (Gymnandrena) watasei* COCKERELL 5 ♂♂
 - i) Saxifragaceae 4 ♂♂

D. maximowicziana MAKINO: 14. V. 76, 3 ♂♂.

D. crenata SIEB. et ZUCC.: 14. V. 76, 1 ♂.
 - ii) Compositae 1 ♂

H. umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 1 ♂.
8. *A. (Habromelissa) omogensis* HIRASHIMA 1 ♀
 - i) Umbelliferae 1 ♀

A. pubescens MAXIM.: 9. IX. 76, 1 ♀.
9. *A. (Hoplandrena) dentata* SMITH 6 ♀♀, 4 ♂♂
 - i) Saxifragaceae 5 ♀♀

D. crenata SIEB. et ZUCC.: 14. V. 76, 4 ♀♀.

H. paniculata SIEB.: 6. VIII. 76, 1 ♀.
 - ii) Cruciferae 3 ♂♂

Raphanus sativus LINN.: 15. IV. 76, 2 ♂♂

B. rapa LINN.: 15. IV. 76, 1 ♂.
 - iii) Rosaceae 1 ♀, 1 ♂

R. microphyllus LINN.: 15. IV. 76, 1 ♀, 1 ♂.
10. *A. (H.) pruniphora* HIRASHIMA 1 ♂
 - i) Saxifragaceae 1 ♂

H. paniculata SIEB.: 6. VIII. 76, 1 ♂.
11. *A. (Micrandrena) kaguya* HIRASHIMA 10 ♀♀, 2 ♂♂

- i) Cruciferae 3♀♀
B. rapa LINN.: 15. IV. 76, 2♀♀.
B. chinensis LINN.: 15. IV. 76, 1♀.
- ii) Compositae 2♀♀
Ixeris dentata NAKAI: 25. IV. 76, 1♀.
H. umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 1♀.
- iii) Salicaceae 2♂♂
Salix sp.: 15. IV. 76, 2♂♂.
- iv) Rosaceae 1♀
R. microphyllus LINN.: 15. IV. 76, 1♀.
- v) Leguminosae 1♀
A. sinicus LINN.: 25. IV. 76, 1♀.
- vi) Crassulaceae 1♀
Sedum subtile MIQ.: 25. IV. 76, 1♀.
- vii) Ranunculaceae 1♀
R. japonicus THUNB.: 25. IV. 76, 1♀.
- viii) Saxifragaceae 1♀
D. crenata SIEB. et ZUCC.: 14. V. 76, 1♀.
- 12. *A. (Simandrena) kerriae* HIRASHIMA 1♀, 3♂♂
- i) Rosaceae 3♂♂
S. incisa ZABEL: 14. V. 76, 2♂♂.
S. cantoniensis LOUR.: 14. V. 76, 1♂.
- ii) Caprifoliaceae 1♀
Viburnum dilatatum THUNB.: 3. VI. 76, 1♀.
- 13. *A. (S.) opacifovea* HIRASHIMA 2♂♂
- i) Rosaceae 2♂♂
S. cantoniensis LOUR.: 14. V. 76, 2♂♂.

MEGACHILIDAE

- 1. *Megachile tsurgensis* COCKERELL 6♀♀, 4♂♂
- i) Leguminosae 2♀♀, 2♂♂
A. sinicus LINN.: 25. IV. 76, 1♀; 14. V. 76, 1♂.
Lespedeza bicolor TURCZ. var. *japonica* NAKAI: 30. IX. 76, 1♀, 1♂.
- ii) Compositae 2♀♀, 1♂
Saussurea sp.: 6. X. 75, 1♀.
Y. denticulata KITAM.: 21. X. 76, 1♀, 1♂.
- iii) Araliaceae 1♀
A. elata SEEM.: 6. VIII. 76, 1♀.
- iv) Valerianaceae 1♀
P. villosa JUSS.: 9. IX. 75, 1♀.
- v) Ranunculaceae 1♂
R. japonicus THUNB.: 15. IV. 76, 1♂.

2. *M. humilis* SMITH 1♀, 5♂♂
 - i) Leguminosae 5♂♂

Pueraria lobata OHWI: 27. VIII. 76, 4♂♂.
L. bicolor TURCZ. var. *japonica* NAKAI: 30. IX. 76, 1♂.
 - ii) Umbelliferae 1♀

A. pubescens MAXIM.: 27. VIII. 76, 1♀.
3. *M. remota sakagamii* HIRASHIMA et MAETA 1♀
 - i) Leguminosae 1♀

L. bicolor TURCZ. var. *japonica* NAKAI: 16. IX. 76, 1♀.
4. *Osmia orientalis* BENOIST 2♀♀
 - i) Leguminosae 1♀

A. sinicus LINN.: 25. IV. 76, 1♀.
 - ii) Ranunculaceae 1♀

R. japonicus THUNB.: 25. IV. 76, 1♀.

ANTHOPHORIDAE

1. *Tetralonia nipponensis* PÉREZ 46♀♀, 32♂♂
 - i) Leguminosae 43♀♀, 23♂♂

A. sinicus LINN.: 15. IV. 76, 1♀, 2♂♂; 25. IV. 76, 36♀♀, 15♂♂; 14. V. 76, 6♀♀, 3♂♂.
Wisteria brachybotrys SIEB. et ZUCC.: 25. IV. 76, 3♂♂.
 - ii) Ericaceae 1♀, 2♂♂

R. sp.: 14. V. 76, 1♀, 2♂♂.
 - iii) Elaeagnaceae 3♂♂

Elaeagnus multiflora THUNB.: 15. IV. 76, 3♂♂.
 - iv) Rosaceae 2♂♂

R. microphyllus LINN.: 15. IV. 76, 1♂; 25. IV. 76, 1♂.
 - v) Ranunculaceae 1♀

R. japonicus THUNB.: 15. IV. 76, 1♀.
 - vi) Compositae 1♀

Saussurea sp.: 14. V. 76, 1♀.
 - vii) Cruciferae 1♂

B. chinensis LINN.: 15. IV. 76, 1♂.
 - viii) Papaveraceae 1♂

Corydalis incisa PERS.: 15. IV. 76, 1♂.
2. *Ceratina japonica* COCKERELL 84♀♀, 13♂♂
 - i) Compositae 56♀♀, 8♂♂

H. umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 3♀♀, 5♂♂.
E. annuus PERS.: 30. VI. 76, 13♀♀, 1♂; 27. VII. 76, 30♀♀, 1♂; 6. VIII. 76, 5♀♀, 1♂.
A. scaber THUNB.: 16. IX. 76, 3♀♀.
K. yomena KITAM.: 30. IX. 76, 1♀; 10. X. 75, 1♀.
 - ii) Valerianaceae 21♀♀, 1♂

P. villosa JUSS.: 9. IX. 75, 21♀♀, 1♂.

- iii) Rosaceae 1♀, 4♂♂
R. microphyllus LINN.: 15. IV. 76, 4♂♂.
S. incisa ZABEL; 14. V. 76, 1♀.
- iv) Umbelliferae 3♀♀
A. pubescens MAXIM.: 9. IX. 75, 3♀♀.
- v) Saxifragaceae 2♀♀
H. paniculata SIEB.: 6. VIII. 76, 2♀♀.
- vi) Geraniaceae 1♀
G. thunbergii SIEB. et ZUCC.: 30. IX. 76, 1♀.
- 3. *C. esakii* HIRASHIMA et YASUMATSU 1♀
 i) Compositae 1♀
E. annuus PERS.: 30. VI. 76, 1♀.
- 4. *C. satoi* YASUMATSU 1♀
 i) Compositae 1♀
H. umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 1♀.
- 5. *Nomada japonica* SMITH 1♀
 i) Leguminosae 1♀
A. sinicus LINN.: 25. IV. 76, 1♀.
- 6. *N. sp. 2* 1♂
 i) Compositae 1♂
H. umbellatum LINN. var. *japonicum* HARA: 14. V. 76, 1♂.
- 7. *N. sp. 4* 1♀
 i) Rosaceae 1♀
R. microphyllus LINN.: 15. IV. 76, 1♀.

APIDAE BOMBINAE

- 1. *Bombus diversus* SMITH 20qq, 60ww
 i) Compositae 33ww
E. annuus PERS.: 27. VII. 76, 2ww.
Saussurea sp.: 16. IX. 76, 3ww; 30. IX. 76, 4ww; 6. X. 75, 4ww; 8. X. 75, 7ww;
 21. X. 76, 11ww.
E. canadensis LINN.: 16. IX. 76, 1w.
Y. denticulata KITAM.: 21. X. 76, 1w.
- ii) Ericaceae 19qq
Rhododendron sp.: 25. IV. 76, 1q; 14. V. 76, 18qq.
- iii) Balsaminaceae 12ww
Impatiens balsamina LINN.: 27. VII. 76, 7ww; 6. VIII. 76, 3ww; 27. VIII. 76, 2ww.
- iv) Leguminosae 6ww
L. bicolor TURCZ. var. *japonica* NAKAI: 16. IX. 76, 3ww; 30. IX. 76, 3ww.
- v) Rosaceae 3ww
R. wichuraiana CRÉP.: 27. VII. 76, 1w.

- R. buergeri* MIQ.: 30. IX. 76, 2ww.
- vi) Labiatae 3ww
Keiskea japonica MIQ.: 21. X. 76, 3ww.
- vii) Araliaceae 2ww
A. elata SEEM.: 27. VIII. 76, 2ww.
- viii) Caprifoliaceae 1q
Weigela floribunda K. KOCH: 14. V. 76, 1q.
- ix) Polygonaceae 1w
P. thunbergii SIEB. et ZUCC.: 16. IX. 76, 1w.
2. *B. ardens* SMITH 2qq, 67ww, 1♂
- i) Leguminosae 4lww
A. sinicus LINN.: 25. IV. 76, 3ww; 14. V. 76, 38ww.
- ii) Saxifragaceae 1q, 17ww
D. maximowicziana MAKINO: 14. V. 76, 1q, 16ww.
D. crenata SIEB. et ZUCC.: 3. VI. 76, 1w.
- iii) Ericaceae 5ww
Rhododendron sp.: 14. V. 76, 5ww.
- iv) Rosaceae 1q, 3ww
R. palmatus THUNB.: 15. IV. 76, 1q, 1w.
P. glabra MAXIM.: 14. V. 76, 1w.
R. multiflora THUNB.: 3. VI. 76, 1w.
- v) Compositae 1w, 1♂
Saussurea sp.: 3. VI. 76, 1w, 1♂.

ACKNOWLEDGEMENTS

I am indebted to Professor K. KOJIMA of Kôchi University for kind guidance in this wild bee survey and to Professor Y. HIRASHIMA of Kyushu University for valuable advice and identification of many bee specimens.

REFERENCES

- IKUDOME, S., 1978. A wild bee survey in Kôchi Plain (Kôchi Pref.), Shikoku, Japan (Hymenoptera, Apoidea). *Kontyû, Tokyo*, **46**(3): 512-536. (The wild bee survey in Kôchi, Japan I. In Japanese with English synopsis and summary.)
- , 1979a. A wild bee survey in Tosayama-Mura (Kôchi Pref.), Shikoku, Japan (Hymenoptera, Apoidea). *Kontyû, Tokyo*, **47**(3): 416-428. (The wild bee survey in Kôchi, Japan II. In Japanese with English synopsis and summary.)
- , 1979b. Flower-visiting habits of fifteen species of megachilid bees in Kôchi Plain (Hymenoptera, Megachilidae). *Gensei, Kôchi*, **36**: 9-15. (The wild bee survey in Kôchi, Japan III. In Japanese with English summary.)

- IKUDOME, S., 1980. Flower-visiting habits of twenty species of andrenid bees in Kôchi Plain, Shikoku, Japan (Hymenoptera, Andrenidae). *Bull., Kagoshima Women's Jr. Coll.*, **15**: 311-326. (The wild bee survey in Kôchi, Japan IV. In Japanese with English summary.)
- . 1981. Floral records of eighteen species of halictid bees in Kôchi Plain, Shikoku, Japan (Hymenoptera, Halictidae). *Bull., Kagoshima Women's Jr. Coll.*, **16**: 159-162. (The wild bee survey in Kôchi, Japan V.)
- . 1982. Floral records of fourteen species of colletid, anthophorid and bombyne bees in Kôchi Plain, Shikoku, Japan (Hymenoptera, Apoidea). *Bull., Kagoshima Women's Jr. Coll.*, **17**: 131-136. (The wild bee survey in Kôchi, Japan VI.)
- OHWI, J., 1972. *Flora of Japan* (revised edition). Shibundo, Tokyo.