

**Insect-flower Relationship in the Campus of Kyoto University,
Kyoto: An Overview of the Flowering Phenology
and the Seasonal Pattern of Insect Visits¹**

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ABSTRACT In 1985-1987 insect visitors to flowers were weekly or biweekly surveyed on a total of 113 plant species or 48 families in the campus of Kyoto University in Kyo-to city, Japan. Although the total number of plant species was nearly equal to those in Ashu and Kibune, native species were only 25, due to urbanization and disturbance. Flowering started from cultivated plants, e.g. *Prunus spachina*, in early April and ended also in cultivated plants, e.g. *Camellia sazanqua* in late November. The total number of plant species at flowering peaked in May. The flowering period of a single species was 17 days on average.

A total of 2109 individuals of 320 species in nine orders of Insecta and two orders in Arachnoidea were collected in our samples. The total number of arthropod species was estimated to be 790 by the Preston's octave method and thus 40.5 % were in our samples. The most abundant order was Hymenoptera (50 % of individuals), followed by Coleoptera (26 %) and Diptera (16 %). The number of species was highest in Diptera (34%), followed by Hymenoptera (33 %) and Coleoptera (14 %).

Compared with the undisturbed areas, Ashu and Kibune, two dominant Coleopteran families, Cerambycidae and Nitidulidae were quite rare here. In Hymenoptera, Megachilidae were quite abundant on exotic cultivated plants. The estimated total number of bee species (170 sp.) was more than those in the undisturbed areas.

The number of insect species peaked twice in June and September, while the total number of individuals peaked in May and September. Coleoptera peaked in May and June, Diptera peaked in June and October, while Hymenoptera appeared rather constantly throughout the flowering season.

Cluster analysis separated 48 plant families into four groups: 30 families mainly visited by Hymenoptera, 6 families by Diptera, 9 families by Coleoptera and the others (3 families) by Lepidoptera.

KEY WORDS flowering phenology / anthophilous fauna / Kyoto / disturbed area

Introduction

We surveyed interrelations between anthophilous fauna and entomophilous flora at three locations in Kyoto Prefecture of which climates and vegetations are different from each other. Ashu is an undisturbed beech forest under cool weather condition (Kato *et al.*, 1990). Kibune contains both an undisturbed deciduous oak forest and a planted forest of *Chryptomeria japonica* (Inoue *et al.*, 1990). The third location is the campus of Kyoto University in the urban area of Kyoto city (this paper). Although the original vegetation of this area is thought to be an evergreen *Castanopsis*-dominated forest, at present this area contains botanical gardens with planted exotic trees and we-

¹Contribution to the ecological and bioeconomical studies of the pollinator community in Kyoto IV.

dy patches among trees. As shown in Results and Discussion, native plant species are only 24 % of the total number of flowering plant species. This paper clarifies how such drastic changes in vegetation influence the community structure of insect visitors that are almost native to central Japan.

Bee faunas have been studied in various locations in Japan (Miyamoto, 1962; Sakagami and Matsumura, 1967; Matsumura and Munakata, 1969; Sakagami and Fukuda, 1973; Matsuura *et al.*, 1974; Yamauchi *et al.*, 1974; Ikudome, 1978; Nakamura and Matsumura, 1985). But, these studies neglect flower visitors other than bees, except for Yumoto (1986, 1987). In our surveys (Kato *et al.*, 1990; Inoue *et al.*, 1990; this paper), we collected all the insect visitors on flowering plants we found along the fixed sampling routes and most samples were identified at species level by specialists listed in Acknowledgments. This paper shows the community organization of flower visitors in an urban disturbed area.

Study Site

The campus of Kyoto University is located in the northern urban area of Kyoto city ($35^{\circ} 02'N$, $135^{\circ} 47'E$, elevation = 60 m above sea level). We set up three sampling

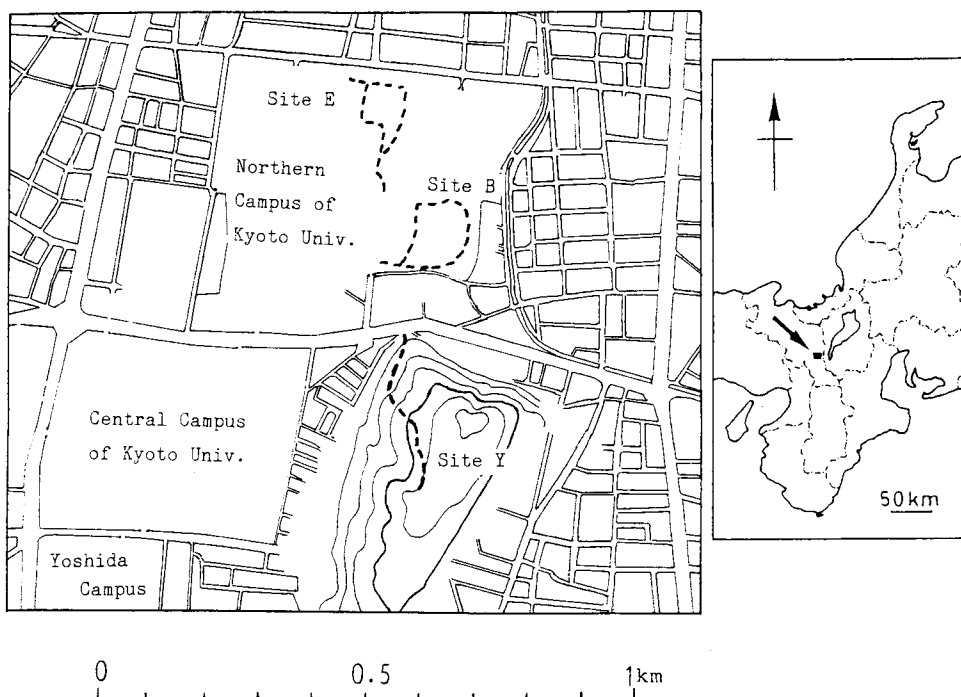


Fig. 1. The study area in the campus of Kyoto University and its location in the Kinki District, Japan (inset). Broken lines show three sampling routes: Site E - the Experimental Forest Station of Kyoto University Research Forest, Site B - the Botanical Garden of Kyoto University, and Site Y - the Yoshida-yama hill that has natural flora with evergreen *Quercus*.



Fig. 2. Landscape of the study area.

routes in and around this campus (Fig. 1, 2): Site Y - the Yoshidayama hill (elevation of the hill top = 123 m, about 200 ha), Site B - the Botanical Garden of Kyoto University (about 2 ha), and Site E - the Experimental Forest Station of Kyoto University Research Forest (1.3 ha).

The three locations we have surveyed, Ashu, Kibune and the campus of Kyoto University, are located at nearly same longitude (ca. $135^{\circ} 50'E$). Ashu ($35^{\circ} 20'N$, altitude 620 - 959 m) has cool temperate beech forests with heavy snow (Kato *et al.* 1990). Kibune ($35^{\circ} 10'N$, 300 - 740 m), an intermediate location between Ashu and the campus, originally has deciduous oak forests or evergreen coniferous forests predominated by *Abies firma* and *Tsuga sieboldii* (Inoue *et al.*, 1990). The campus ($35^{\circ} 02'N$, 60 m) is thought to have been evergreen oak forests under warm temperate climate before human disturbance. Natural flora, dominated by evergreen *Castanopsis*, partly remain in Site Y. Many plants, including both plant species native to Japan and exotic plant species, are cultivated in Sites B and E. Thus, natural flora in this area is poor because of human disturbance and urbanization. However, it is an interesting subject how native flower visitors utilize an assemblages of exotic and native plants.

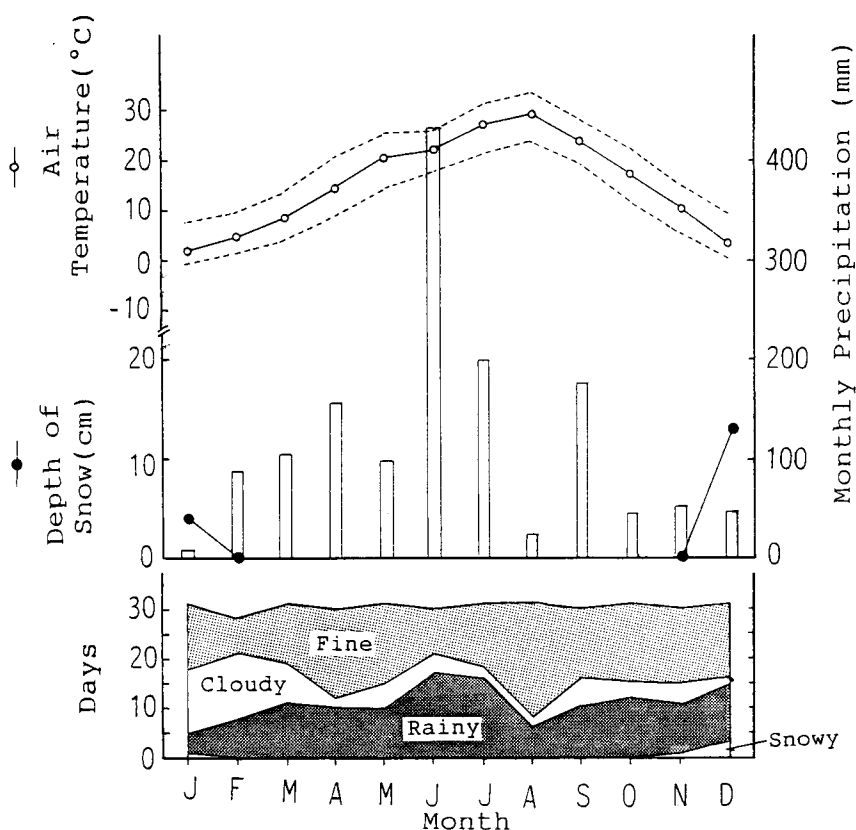


Fig. 3. Changes in mean (open circles), maximum and minimum (broken lines) of air temperature, rainfall (columns), the maximum depth of snow (closed circles), and the weather condition (the number of days per month) in 1985, at Site E (from Kyoto University Research Forest, 1987).

Fig. 3 shows the meteorological data taken at Site E (from Kyoto University Research Forests, 1987). The annual precipitation was 1434 mm, and the average air temperature was 14.3 °C. Scanty rainfall (10.5 mm) and the lowest mean air temperature (1.3 °C) were recorded in January. Rainfall was peaked in the monsoon (June, 432 mm). There were > 15 rainy days in June and July. Air temperature was highest in August (29.2 °C, monthly average), when there were only 6 rainy days. Snowfall was quite few.

Methods

We chose, for sampling, fine days during flowering seasons from April to November, in 1985 - 1987. We sampled once or twice per week, usually in the three fixed routes (Fig. 1, Table 1), by the methods shown in Kato *et al.* (1990): Insect visitors on all flowering plants we found at the fixed routes were collected for 10 minutes at each plant species. Thus, our samples included not only true flower visitors that utilize nectar and pollen for food source, but also ambush predators, phytophagous insects and even insects just resting on flowers. These can be partly distinguished by information about feeding habits of respective taxa. Flower visitors include true pollinators and robbers. Detailed analysis of effectiveness as pollinators will be discuss in other papers.

Flowering periods of individual plant species were estimated with the method of Kato *et al.* (1990), based on the interval from the latest date at which flowering had not started to the earliest date at which flowering had not yet finished. All arthropod specimens were labeled with complete census data (sample date, study site and plant species). Most of them were identified at species level by specialists that are shown in Acknowledgments.

Statistical analysis were done by the SAS package in the Data Processing Center, Kyoto University. We first analyzed total floral and faunal make-ups, flowering phenology and seasonal patterns of insect visits. Then, species diversity of insects on each flower species, H , was calculated by $-\sum P_i \log P_i$, where P_i is the ratio of i 'th insect species. H is zero when only one species is predominant. If all insect species were equally collected (all $P_i = 1/S$), $H = H_{max} = \log S$, where S is the total number of insect species. Species diversity of flower utilization for each insect species was calculated just like insect species diversity for plant species. Finally, insect-flower relationship was analyzed at plant family level by the Ward minimum variance methods (Ward, 1963). Analysis at species level will appear in another paper.

Table 1. Sampling dates, durations, and sites (*). B: Botanical Garden,
E: Experimental Forest Station, Y: Yoshidayama hill.
Routes are shown in Fig. 1.

Year	Month	Date	Start of Sampling	Duration of Sampling (min.)	Sites BEY	Year	Month	Date	Start of Sampling	Duration of Sampling (min.)	Sites BEY
1985											
	Apr.	9	13:00	120	* * *		Jun.	2	10:00	120	*
		19	6:00	180	* * *			3	11:00	90	*
		25	13:00	180	* * *			11	9:00	180	* *
		26	9:00	60	* *			26	13:20	45	* * *
	May	1	14:00	105	* * *		Jul.	1	13:20	70	* * *
		4	7:30	120	* * *			4	9:10	60	* * *
		9	13:30	120	* * *			12	13:00	60	* * *
		12	7:20	130	* * *			17	12:50	25	*
		16	13:30	60	* * *			19	8:15	95	* * *
		18	7:20	130	* * *			23	13:10	45	* *
		22	13:30	130	* *			30	13:10	60	* * *
		26	7:00	150	* * *		Aug.	2	6:40	55	* * *
		29	13:15	105	* * *			7	13:10	45	* *
		31	7:00	70	* *			10	10:10	30	* *
	Jun.	5	13:00	105	* * *			13	13:00	55	* * *
		7	7:00	90	* * *			18	9:30	45	* *
		14	9:15	110	* *			22	13:35	30	* *
		15	13:00	105	* * *			27	13:30	65	* * *
		19	13:00	110	* * *			31	9:00	75	* * *
		26	13:00	90	* * *		Sep.	5	13:30	40	* *
	Jul.	5	9:15	55	* *			11	9:30	70	* * *
		10	12:55	60	* * *			26	13:20	55	* * *
		19	13:20	75	* * *		Oct.	4	13:15	45	* * *
		20	7:00	60	* *			14	13:25	50	* *
		24	13:10	70	* * *			20	13:00	35	* *
		26	6:55	65	* * *			27	13:45	35	* *
		31	13:15	45	* *			30	10:30	15	*
	Aug.	3	7:05	55	* *		Nov.	20	13:55	20	*
		7	13:05	55	* * *	1987					
		10	7:10	110	* * *		Apr.	8	13:30	65	* *
		14	12:50	70	* *			16	13:20	85	* * *
		17	7:00	85	* * *			22	13:55	45	* *
		21	13:10	55	* *			30	14:05	30	*
		24	7:20	50	* *		May	6	13:20	60	* *
		28	13:15	75	* * *			16	10:40	55	* *
		30	7:20	60	* * *			28	9:25	130	* * *
	Sep.	3	13:00	75	* * *			28	13:10	110	* * *
		9	7:05	75	* * *		Jun.	5	13:10	110	* * *
		12	13:00	85	* * *			16	13:30	45	* *
		19	13:10	95	* * *			17	10:30	70	* *
		30	8:50	30	* * *			23	13:00	80	* * *
	Oct.	2	12:10	70	* *			26	10:15	30	*
		7	8:50	50	* *			30	13:55	30	*
		14	12:35	65	* * *		Jul.	7	13:40	30	* *
		18	9:00	40	* *			10	9:15	75	*
		21	12:45	65	* * *			23	13:10	45	* *
		24	8:55	40	* *			25	10:40	40	* *
		28	13:00	40	* *		Aug.	1	13:50	20	*
		31	9:25	45	* *			6	13:45	45	* *
1986								14	13:25	25	*
	Apr.	12	13:10	50	* *			15	13:40	40	* *
		16	13:25	65	* * *			20	13:00	40	* *
		21	13:05	65	* * *			26	13:05	45	* * *
		24	11:25	35	*		Sep.	4	13:00	40	* *
		29	13:40	70	* *			14	13:00	50	* *
		30	8:10	90	* * *			21	13:30	25	*
	May	7	14:30	45	* *			29	13:05	35	* *
		12	8:40	80	* * *		Oct.	7	13:35	55	* * *
		15	13:30	60	* * *			14	13:35	85	* *
		25	11:00	60	*			19	13:05	75	* *
		26	9:30	120	* *			23	13:15	25	* *

Results and Discussion

1. Studied plants

We collected insect visitors on a total of 113 plant species (92 genera and 48 families, Table 2) in the campus of Kyoto University. These included 25 trees, 49 shrubs, five annuals, three biennials, 25 perennials, three climbing perennials and three woody lianas. Breeding systems were hermaphrodite in 107 species, monoecious in one, andromonoecious in one and dioecious in four (Table 2). Although the numbers of plant species and families in this study area were nearly equal to those in Ashu (91 spp., 37 fam., Kato *et al.*, 1990) and in Kibune (115 spp., 48 fam., Inoue *et al.*, 1990), native species were only 27 (mainly in site Y, but some native herbs were also in sites E and B, Table 2).

Table 2 also shows the species diversity of insect visitors sampled on each plant species. On 25 plant species, e.g. *Cercis siliquastrum* (#51 of Table 2), *Wisteria floribunda* (#57) and *Euonymus fortunei* (#64), only one insect species was collected. On *Besella rubra* (#8) and *Photinia glabra* (#33) eight insect species were collected, but diversity index, H , was not so high. This is because only one species (*Anthrenus verbasci*) was predominant. On *Aesculus carnea* (#68) six species were collected, but H was relatively high and was nearly equal to H_{max} , because six species were nearly equally abundant. H was highest on *Stenactis annuus* (#106). See Appendix 1 for details of insect visitors on respective plant species.

2. Flowering phenology

Flowering was staggered from early April to late November (Fig. 4). Earliest bloomers were cultivated shrubs, *Edgeworthia chrysantha* (#59 of Table 2), *Spiraea thunbergii* (#42) and *Forsythia suspensa* (#77), followed by cultivated trees, *Prunus omentosa* (#34) and *Prunus spachiana* (#35). Native biennial herbs, e.g. *Stellaria media* (#6) bloomed from middle April. Annual polygonaceous herbs, e.g. *Persicaria thunbergii* (#9) bloomed in late autumn, and two cultivated species, *Camellia sazanqua* (#13) and *Fatsia japonica* (#74) bloomed until winter, after our census terminated. Although *C. sazanqua* have visitors only in October, it still bloomed to the end of our census season.

The mean flowering period of a single plant species was 17 days (S.E. = 2.5 days). The longest flowering period, 134 days, was observed in *Stenactis annuus* (#106 of Table 2). This weed bloomed longest also in Kibune (Inoue *et al.*, 1990). Some plants which started blooming in late May or June had longer flowering periods over summer: *Trifolium repens* (#56, 110 days), *Vitex cannabifolia* (#86, 110 days), *Lespedeza thunbergii* (#55, 94 days) and *Cayratia japonica* (#67, 84 days). Most plants which started blooming in April or after July had shorter flowering periods (Fig. 4). They are respectively spring and autumn flowers.

Seasonal replacement of species in a specific plant group that were observed in

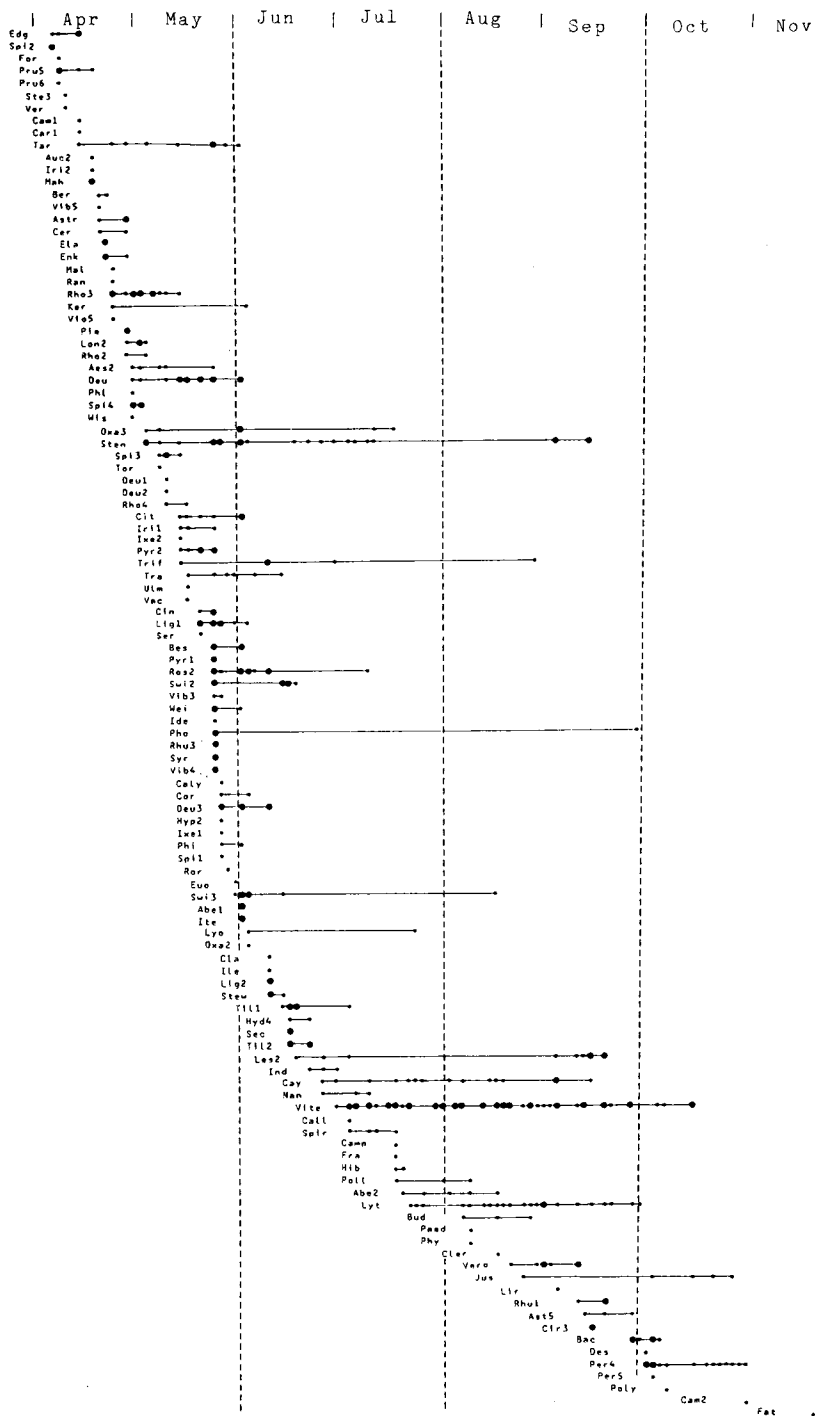


Fig. 4. Flowering phenology of 113 plant species. Species codes are shown in Table 2. Small and large circles respectively distinguish whether the number of insect individuals ≥ 5 or < 5 .

FAMILY (ABBR.) Code# Species		Japanese Name	Species Code	Life Forms ¹⁾	Breed- ing Systems ²⁾	Distri- bution Origins ³⁾	No. of Species	No. of Indivi- duals	Diversity indices <i>H</i>	<i>H</i> _{max}
LAURACEAE (LAU)										
	1 <i>Cinnamomum camphora</i>	Kusunoki	Cin	T	H	J	12	24	2.02	2.48
BERBERIDACEAE (BER)										
	2 <i>Berberis thunbergii</i>	Megi	Ber	S	H	J	4	5	1.33	1.39
	3 <i>Mahonia japonica</i>	Hiraginanten	Mah	S	H	E	5	7	1.48	1.61
	4 <i>Nandina domestica</i>	Nanten	Nan	S	H	J	4	4	1.39	1.39
RANUNCULACEAE (RAN)										
	5 <i>Ranunculus silerifolius</i>	Kitsunenobotan	Ran	P	H	N	2	2	0.69	0.69
CARYOPHYLLACEAE (CAR)										
	6 <i>Stellaria media</i>	Hakobe	Ste3	B	H	N	2	3	0.64	0.69
PHYTOLACCACEAE (PHY)										
	7 <i>Phytolacca americana</i>	Amerikayamagobou	Phy	P	H	E	1	1	0.00	0.00
BASELLACEAE (BAS)										
	8 <i>Besella rubra</i>	Tsurumurasaki	Bes	A	H	E	8	58	0.80	2.08
POLYGONACEAE (POL)										
	9 <i>Persicaria thunbergii</i>	Mizosoba	Per4	A	H	N	30	81	2.83	3.40
	10 <i>Persicaria yokusaiana</i>	Hanatade	Per5	A	H	N	3	3	1.10	1.10
	11 <i>Polygonum aubertii</i>	Natsuyukikazura	Poly	A	H	E	1	1	0.00	0.00
THEACEAE (THE)										
	12 <i>Camellia japonica</i>	Tsubaki	Cam1	T	H	J	1	1	0.00	0.00
	13 <i>Camellia sasanqua</i>	Sazanka	Cam2	T	H	J	2	4	0.56	0.69
	14 <i>Stewartia monadelphra</i>	Himeshara	Stew	T	H	J	8	13	1.88	2.08
GUTTIFERAE (GUT)										
	15 <i>Hypericum patulum</i>	Kinshibai	Hyp2	S	H	E	1	1	0.00	0.00
TILIACEAE (TIL)										
	16 <i>Tilia japonica</i>	Shinanoki	Til2	T	H	J	9	14	2.07	2.20
	17 <i>Tilia Miqueliana</i>	Bodaijyu	Til1	T	H	E	12	38	2.14	2.48
MALVACEAE (MLP)										
	18 <i>Hibiscus syriacus</i>	Mukuge	Hib	S	H	E	4	6	1.24	1.39
ULMACEAE (ULM)										
	19 <i>Ulmus daavidiana</i>	Harunire	Ulm	T	H	J	2	2	0.69	0.69
VIOLACEAE (VIO)										
	20 <i>Viola mandshurica</i>	Sumire	Vio5	P	H	N	1	1	0.00	0.00
FLACOURTIACEAE (FLA)										
	21 <i>Idesia polycarpa</i>	Iigiri	Ide	T	M	J	1	2	0.00	0.00
CRUCIFERAE (CRU)										
	22 <i>Cardamine regeliana</i>	Oobatanetsukebana	Car1	P	H	N	1	1	0.00	0.00
	23 <i>Rorippa indica</i>	Inugarashi	Ror	P	H	N	1	1	0.00	0.00
ERICACEAE (ERI)										
	24 <i>Enkianthus perulatus</i>	Doudantsutsuji	Enk	S	H	J	2	7	0.41	0.69
	25 <i>Lyonia ovalifolia</i>	Nejiki	Lyo	T	H	N	4	4	1.39	1.39
	26 <i>Pieris japonica</i>	Asebi	Pie	T	H	N	3	15	0.49	1.10
	27 <i>Rhododendron macrosepalum</i>	Motitutsuji	Rho4	S	H	N	2	2	0.69	0.69
	28 <i>Rhododendron mucronata</i>	Hiradotsutsuji	Rho2	S	H	J	4	10	1.17	1.39
	29 <i>Rhododendron oomurasaki</i>	Oomurasaki	Rho3	S	H	J	21	79	2.42	3.04
	30 <i>Vaccinium oldhami</i>	Natsuhaze	Vac	S	H	N	2	2	0.69	0.69
ROSACEAE (ROS)										

FAMILY (ABBR.)		Japanese Name	Species Code	Life Forms ¹⁾	Breed-ing Systems ²⁾	Distri-bution Origins ³⁾	No. of Species	No. of Indi-viduals	Diversity indices	
Code#	Species								<i>H</i>	<i>H</i> _{max}
31	<i>Kerria japonica</i>	Yamabuki	Ker	S	H	N	2	2	0.69	0.69
32	<i>Malus halliana</i>	Kaidou	Mal	T	H	E	6	7	1.75	1.79
33	<i>Photinia glabra</i>	Kanamemochi	Pho	T	H	N	8	103	0.50	2.08
34	<i>Prunus tomentosa</i>	Yusuraume	Pru6	T	H	E	2	2	0.69	0.69
35	<i>Prunus spachiana</i>	Shidarezakura	Pru5	T	H	E	11	30	1.65	2.40
36	<i>Pyracantha angustifolia</i>	Pirakansa	Pyr2	T	H	E	18	34	2.37	2.89
37	<i>Pyracantha crenulata</i>	Himarayatokiwasanzasi	Pyr1	S	H	E	8	9	2.04	2.08
38	<i>Rosa borboniana</i>	Seiyoubara	Ros2	S	H	E	18	53	2.33	2.89
39	<i>Spiraea blumei</i>	Mitubaiwagasa	Spi4	S	H	E	4	16	0.99	1.39
40	<i>Spiraea tossensis</i>	Tosasimotuke	Spi3	S	H	J	2	13	0.27	0.69
41	<i>Spiraea cantoniensis</i>	Kodemari	Spi1	S	H	E	3	4	1.04	1.10
42	<i>Spiraea thunbergii</i>	Yukiyanagi	Spi2	S	H	J	3	7	0.80	1.10
SAXIFRAGACEAE (SAX)										
43	<i>Deutzia gracilis</i>	Himeutsugi	Deu3	S	H	J	1	1	0.00	0.00
44	<i>Deutzia crenata</i>	Utsugi	Deu1	S	H	J	19	48	2.22	2.94
45	<i>Deutzia scabra</i>	Marubautsugi	Deu	S	H	J	11	88	1.60	2.40
46	<i>Deutzia maximowicziana</i>	Urajirimitsugi	Deu2	S	H	J	2	3	0.64	0.69
47	<i>Hydrangea macrophylla</i>	Ajisai	Hyd4	S	H	E	4	4	1.39	1.39
48	<i>Itea parviflora</i>	Himezuina	Ite	S	H	E	23	39	2.98	3.14
49	<i>Philadelphus coronarius</i>	Mokkuorenji	Phi	S	H	J	4	4	1.39	1.39
LEGUMINOSAE (LEG)										
50	<i>Astragalus sinicus</i>	Renge	Astr	P	H	N	5	7	1.55	1.61
51	<i>Cercis siliquastrum</i>	Seiyouzuhou	Cer	S	H	E	1	3	0.00	0.00
52	<i>Cladrastis sikokiana</i>	Yukunoki	Cla	T	H	J	2	3	0.64	0.69
53	<i>Desmodium podocarpum</i>	Nusubito-hagi	Des	P	H	W	1	1	0.00	0.00
54	<i>Indigofera tinctoria</i>	Kidachiniwafuji	Ind	S	H	E	6	8	1.73	1.79
55	<i>Lespedeza thunbergii</i>	Miyagino-hagi	Les2	S	H	J	10	35	1.95	2.30
56	<i>Trifolium repens</i>	Shirotsumekusa	Trif	P	H	W	9	19	1.82	2.20
57	<i>Wisteria floribunda</i>	Fuji	Wis	L	H	J	1	5	0.00	0.00
LYTHRACEAE (LYT)										
58	<i>Lythrum anceps</i>	Misohagi	Lyt	P	H	N	20	58	2.34	3.00
THYMELAEACEAE (THY)										
59	<i>Edgeworthia chrysantha</i>	Mitsumata	Edg	S	H	E	4	10	1.17	1.39
CORNACEAE (COR)										
60	<i>Aucula japonica</i>	Aoki	Auc2	S	D	N	1	1	0.00	0.00
61	<i>Swida macrophylla</i>	Kumanomizuki	Swi2	T	H	J	26	55	2.89	3.26
62	<i>Swida sllonigera</i>	Akakukimizuki	Swi3	T	H	E	4	28	0.56	1.39
ELAEAGNACEAE (ELA)										
63	<i>Elaeagnus multiflora</i>	Natsugumi	Ela	S	H	J	3	7	0.96	1.10
CELASTRACEAE (CEL)										
64	<i>Euonymus fortunei</i>	Turumasaki	Euo	L	H	J	1	4	0.00	0.00
AQUIFOLIACEAE (AQU)										
65	<i>Ilex serrata</i>	Umemodoki	Ile	T	H	J	2	2	0.69	0.69
EUPHORBIACEAE (EUP)										
66	<i>Securinega suffruticosa</i>	Hitotsubahagi	Sec	S	D	J	5	20	0.90	1.61
VITACEAE (VIT)										
67										

Table 2 (continued)

FAMILY (ABBR.) Code# Species	Japanese Name	Species Code	Life Forms ¹⁾	Breed -ing Systems ²⁾	Distri- bution Origins ³⁾	No. of Species	No. of Indivi- duals	Diversity indices <i>H</i> <i>H</i> _{max}	
69 <i>Rhus javanica</i>	Nurude	Rhu1	T	D	N	5	10	1.36	1.61
70 <i>Rhus sylvestris</i>	Yamahaze	Rhu3	T	D	N	17	28	2.61	2.83
RUTACEAE (RUT)									
71 <i>Citrus tachibana</i>	Tachibana	Cit	T	H	J	13	19	2.45	2.56
OXALIDACEAE (OXA)									
72 <i>Oxalis corniculata</i>	Katabami	Oxa2	P	H	N	1	1	0.00	0.00
73 <i>Oxalis corymbosa</i>	Murasakikatabami	Oxa3	P	H	E	9	10	2.16	2.20
ARALIACEAE (ARL)									
74 <i>Fatsia japonica</i>	Yatsude	Fat	S	H	J	3	4	1.04	1.10
UMBELLIFERAE (UMB)									
75 <i>Torilis japonica</i>	Yabujirami	Tor	P	H	N	1	1	0.00	0.00
LOGANIACEAE (LOG)									
76 <i>Buddleia davidii</i>	Nishikifujiutsugi	Bud	S	H	E	1	3	0.00	0.00
OLEACEAE (OLE)									
77 <i>Forsythia suspensa</i>	Rengyou	For	S	H	E	2	3	0.64	0.69
78 <i>Fraxinus griffithii</i>	Shimatoneriko	Fra	T	H	J	2	2	0.69	0.69
79 <i>Ligustrum japonicum</i>	Nezumimochi	Lig2	T	H	N	16	23	2.65	2.77
80 <i>Ligustrum obtusifolium</i>	Ibota	Lig1	S	H	J	10	29	1.91	2.30
81 <i>Syringa vulgaris</i>	Rairakku	Syr	S	H	E	11	47	1.75	2.40
CONVOLVULACEAE (CON)									
82 <i>Calystegia japonica</i>	Hirugao	Caly	C	H	W	1	1	0.00	0.00
POLEMONIACEAE (PLM)									
83 <i>Phlox subulata</i>	Sibazakura	Phl	P	H	E	1	1	0.00	0.00
VERBENACEAE (VER)									
84 <i>Callicarpa japonica</i>	Murasakishikibu	Call	S	H	J	1	1	0.00	0.00
85 <i>Clerodendron trichotomum</i>	Kusagi	Cler	S	H	N	1	1	0.00	0.00
86 <i>Vitex cannabifolia</i>	Ninjinboku	Vite	S	H	E	64	343	3.10	4.16
SCROPHULARIACEAE (SCR)									
87 <i>Veronicastrum sibiricum</i>	Kugaisou	Vero	S	H	J	9	18	1.78	2.20
88 <i>Veronica persica</i>	Ooinunofuguri	Ver	B	H	W	1	1	0.00	0.00
BIGNONIACEAE (BIG)									
89 <i>Campsis grandiflora</i>	Nouzenkazura	Camp	L	H	E	2	5	0.50	0.69
ACANTHACEAE (ACA)									
90 <i>Justicia procumbens</i>	Kitsunenomago	Jus	P	H	N	9	18	2.06	2.20
RUBIACEAE (RUB)									
91 <i>Paederia scandens</i>	Hekusokazura	Paed	C	H	W	1	1	0.00	0.00
92 <i>Serissa japonica</i>	Hakuchouge	Ser	S	H	E	1	1	0.00	0.00
CAPRIFOLIACEAE (CAP)									
93 <i>Abelia grandiflora</i>	Hanatsukubaneutsugi	Abel	S	H	E	4	9	1.00	1.39
94 <i>Abelia spathulata</i>	Tsukubaneutugi	Abe2	S	H	J	2	9	0.35	0.69
95 <i>Lonicera morrowii</i>	Kinginboku	Lon2	S	H	J	8	10	2.03	2.08
96 <i>Viburnum dilaiatum</i>	Gamazumi	Vib3	S	H	N	4	5	1.33	1.39
97 <i>Viburnum erosum</i>	Kobanogamazumi	Vib4	S	H	N	7	10	1.75	1.95
98 <i>Viburnum suspensum</i>	Gomoju	Vib5	S	H	J	2	2	0.69	0.69
99 <i>Weigela hortensis</i>	Taniutsugi	Wei	S	H	J	6	8	1.73	1.79
COMPOSITAE (COM)									
100 <i>Aster ageratoides</i>	Kongiku	Ast5	P	H	J	4	7	1.15	1.39
101 <i>Baccharis trimera</i>	Baccharis trimera	Bac	S	H	E	20	43	2.53	3.00
102 <i>Cirsium nipponicum</i>	Nanbuazami	Cir3	P	H	J	7	7	1.95	1.95
103 <i>Coreopsis basalis</i>	Kinkeigiku	Cor	A	H	E	3	3	1.10	1.10

Table 2 (continued)

FAMILY (ABBR.) Code# Species	Japanese Name	Species Code	Life Forms ¹⁾	Breed -ing Systems ²⁾	Distri- bution Origins ³⁾	No. of Species	No. of Indivi- duals	Diversity indices <i>H</i>	<i>H</i> _{max}
104 <i>Ixeris debilis</i>	Oojisibari	Ixe2	P	H	W	2	2	0.69	0.69
105 <i>Ixeris dentata</i>	Nigana	Ixel	P	H	N	2	2	0.69	0.69
106 <i>Stenactis annuus</i>	Himejion	Sten	B	H	W	68	155	3.62	4.22
107 <i>Taraxacum japonicum</i>	Kansaitanpopo	Tar	P	H	N	12	34	2.02	2.48
COMMELINACEAE (CMM)									
108 <i>Tradescantia ohimensis</i>	Murasakitsuyukusa	Tra	P	H	E	5	9	1.30	1.61
109 <i>Pollia japonica</i>	Yabumyoga	Poll	P	H	N	4	6	1.33	1.39
IRIDACEAE (IRI)									
110 <i>Iris pseudacorus</i>	Kishoubu	Iri1	P	H	E	5	9	1.43	1.61
111 <i>Iris japonica</i>	Shaga	Iri2	P	H	E	1	1	0.00	0.00
LILIACEAE (LIL)									
112 <i>Liriope platyphylla</i>	Yaburan	Lir	P	H	N	3	5	1.05	1.10
ORCHIDACEAE (ORC)									
113 <i>Spiranthes sinensis</i>	Nejibana	Spir	P	H	N	3	8	0.90	1.10

¹ T, tree; S, shrub; A, annual; B, biennial; P, perennial; C, climbing perennial; L, woody liana.

² H, hermaphrodite; D, dioecious; M, monoecious; A, andromonoecious.

³ N, native; W, exotic weed; J, cultivated in the study area, but native to Japan; E, exotic cultivated.

Ashu (Kato *et al.*, 1990) and Kibune (Inoue *et al.*, 1990) was not clear in this study area (Fig. 4). Clear interrelation among life form of plants, insect visitors, and flowering periods that were observed Yumoto (1987) in the Yaku Island also did not found in this study area. These may be because that many cultivated plants bloomed without any coevolutional interaction among them.

The total number of plant species at flowering was peaked in May (48 species) and gradually decreased in summer and autumn (Fig. 5). This pattern was quite different from that in Ashu, which peaked in August (Kato *et al.*, 1990), and was similar to that in Kibune (Inoue *et al.*, 1990). But the summer dearth of flowering that was observed in Kibune was not found in this study area. This is because cultivated species continued flowering over summer, e.g. *V. cannabifolia* and *L. thunbergii*.

3. Anthophilous fauna

3.1 Faunal make-up: A total of 2109 individuals of 320 species in 9 orders of Insecta and 2 orders of Arachnoidea were collected (Table 3). Fig. 6 shows the number of arthropod species plotted in octave, which is logarithm of the number of individuals to base 2 (1 as 1, 2-3 as 2, 4-7 as 3, 8-15 as 4, ...; Preston, 1949; May, 1975). This curve shows the truncated upper 40.5 % of the normal distribution that theoretically appears at infinitive sampling effort. The total number of arthropod species is estimated to be 790. This figure is 37 % of that in Kibune (2137 spp., Inoue *et al.*, 1990) and 23 % of that in Ashu (3394 spp., Kato *et al.*, 1990).

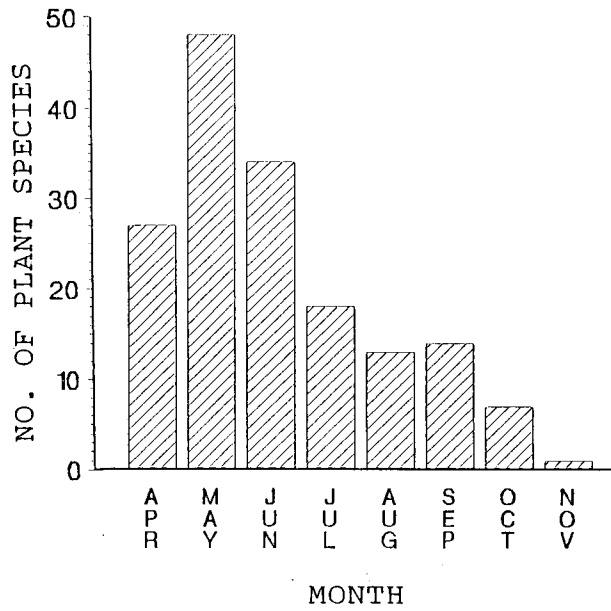


Fig. 5. Changes in the number of flowering plant species per month.

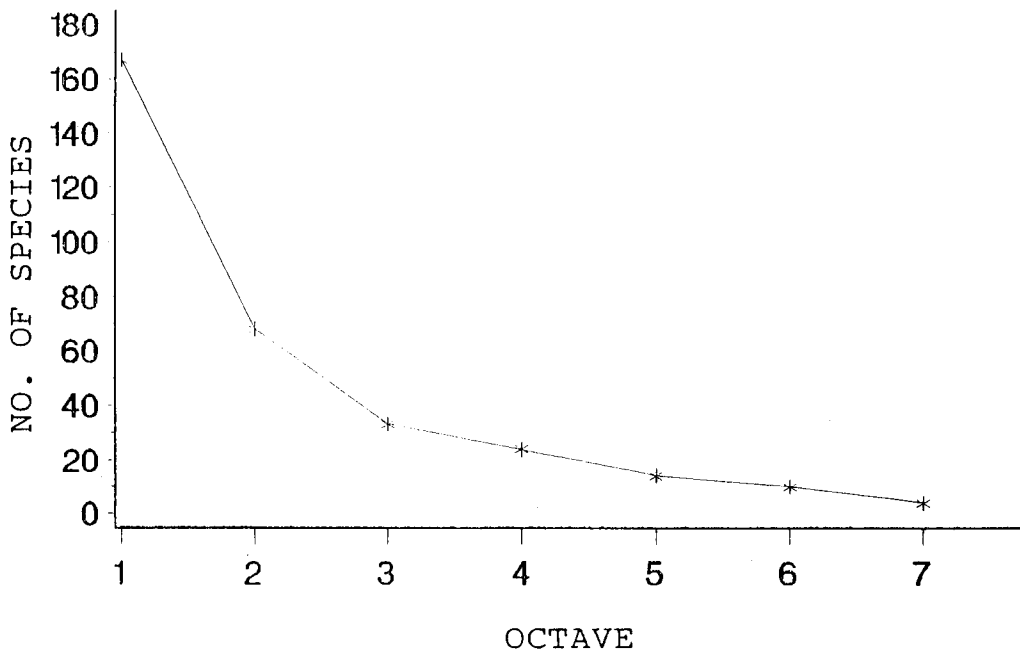


Fig. 6. The number of insect species plotted in the Preston's octave. See text for details.

Table 3. The numbers of arthropod species and individuals in each order and/or family with the number of plant species visited by respective groups. Subfamilies are also distinguished in Anthophoridae and Apidae.

ORDER (Abbrev.) Family (Abbrev.)	No. of Species	No. of Individuals	No. of Plant Species
ARACHNOIDEA			
PHALANGIDA(Pha)	1	1	1
ARANEIDA(Ara)	20	26	6
INSECTA			
ORTHOPTERA(Ort)	4	4	4
PSOCOPTERA(Pso)	1	1	1
HEMIPTERA(Hem)	15	55	12
Pentatomidae(Pen)	2	3	2
Coreidae(Cor)	3	3	3
Lygaeidae(Lyg)	3	30	4
Anthocoridae(Ant)	1	1	1
Miridae(Mir)	4	13	6
Tettigellidae(Tet)	1	4	2
Psyllidae(Psy)	1	1	1
NEUROPTERA(Neu)	2	3	3
TRICHOPTERA(Tri)	2	2	2
LEPIDOPTERA(Lep)	17	86	27
Sesiidae(Ses)	1	1	1
Hesperiidae(Hes)	1	12	7
Papilionidae(Pap)	4	19	13
Pieridae(Pie)	4	30	10
Lycaenidae(Lyc)	3	14	5
Libytheidae(Lib)	1	1	1
Satyridae(Sat)	1	7	6
Lymantriidae(Lym)	1	1	1
Noctuidae(Noc)	1	1	1
DIPTERA(Dip)	110	334	64
Mycetophilidae(Myc)	2	4	3
Sciaridae(Sci)	3	3	3
Bibionidae(Bib)	1	1	1
Chironomidae(Chi)	2	11	2
Ceratopogonidae(Cer)	1	1	1
Solvidae(Sol)	1	1	1
Bombyliidae(Bom)	1	3	3
Acroceridae(Acr)	1	12	7
Dolichopodidae(Dol)	3	9	6
Lonchopteridae(Lon)	1	1	1
Pipunculidae(Pip)	1	1	1
Syrphidae(Syr)	20	128	40
Tephritidae(Tep)	5	5	5
Lauxaniidae(Lau)	5	13	5
Lonchaeidae(Lon)	3	4	3
Ulidiidae(Uli)	1	1	1
Agromyzidae(Agr)	2	2	1
Drosophilidae(Dro)	4	4	4

Table 3 (Continued)

ORDER (Abbrev.) Family (Abbrev.)	No. of Species	No. of Individuals	No. of Plant Species
Ephydriidae(Eph)	9	14	7
Canaceidae(Can)	1	1	1
Chloropidae(Chl)	6	12	7
Clusiidae(Clu)	1	2	2
Scatophagidae(Sca)	1	1	1
Anthomyiidae(Ant)	11	56	19
Tachinidae(Tac)	9	10	7
Phasiidae(Pha)	1	2	2
Calliphoridae(Cal)	8	20	8
Sarcophagidae(Sar)	6	12	6
COLEOPTERA(Col)	44	547	40
Histeridae(His)	1	1	1
Staphylinidae(Sta)	1	1	1
Scarabaeidae(Sca)	10	89	21
Elateridae(Ela)	1	1	1
Buprestidae(Bup)	1	15	2
Helodidae(Hel)	1	2	2
Dermestidae(Der)	2	294	18
Melyridae(Mel)	1	1	1
Nitidulidae(Nit)	3	5	3
Phalacridae(Pha)	1	1	1
Mordellidae(Mor)	8	50	10
Oedemeridae(Oed)	1	3	1
Cerambycidae(Cer)	3	3	3
Bruchidae(Bru)	3	7	6
Chrysomelidae(Chr)	5	72	19
Curculionidae(Cur)	2	2	2
HYMENOPTERA(Hym)	107	1051	94
Tenthredinidae(Ten)	7	33	7
Arigidae(Ari)	1	6	5
Braconidae(Bra)	3	3	3
Ichneumonidae(Ich)	1	1	1
Chalcididae(Cha)	2	2	2
Chrysididae(Chr)	1	2	2
Tiphiidae(Tip)	1	2	2
Formicidae(For)	4	54	13
Scolidae(Sco)	6	43	9
Pompilidae(Pom)	1	1	1
Eumenidae(Eum)	7	13	10
Vespidae(Ves)	7	52	18
Sphecidae(Sph)	5	15	4
Colletidae(Col)	4	4	3
Halictidae(Hal)	13	101	40
Andrenidae(And)	9	59	18
Megachilidae(Meg)	17	254	17
Anthophoridae(Ant)	11	205	43
Anthophorinae	3	60	13
Xylocopinae	5	140	34
Nomadinae	3	5	5
Apidae(Api)	6	201	40
Bombinae	4	62	19
Apinae	2	139	30
TOTAL	320	2109	113

The number of insect species in each order was largest in Diptera (110 species, 34 %), followed by Hymenoptera (107 spp., 33 %), Coleoptera (44 spp., 14 %), Lepidoptera (17 spp., 5.3 %) and Hemiptera (15 spp. 4.6 %) (Table 3, Fig. 7). These five orders occupied 91 % of the total of insect species. On the other hand, the numbers of individuals were large in Hymenoptera (1051, 50 %), Coleoptera (547, 26 %), Diptera (334, 16 %), Lepidoptera (86, 4.1 %), and Hemiptera (55, 2.6 %, Table 3, Fig. 7). These five orders occupied 98 % of the total number of individuals. As a result, the mean number of individuals per species was highest in Coleoptera (12.4), followed by Hymenoptera (9.8), Lepidoptera (5.0), Hemiptera (3.6) and Diptera (3.0). Hymenoptera, Diptera, Hemiptera, Coleoptera and Lepidoptera respectively visited 94 plant species (83 % of the total number of plant species), 64 species (56 %), 55 speices (49 %), 40 species (35 %) and 27 species (24 %, Table 3).

3.2 Hemiptera and Lepidoptera: Seven families of Hemiptera were recorded, of which the two most dominant families were Lygaeidae (3 species, 30 individuals) and Miridae (4 spp., 13, Table 3). The most dominant species was an unidentified species in Lygaeidae (22 individuals, Table 3), which visited only four plant species (Table 4).

Nine families of Lepidoptera were recorded, of which the most dominant was Pieridae (4 spp., 30, Table 3). The most dominant species was *Pieris rapae* (17), visiting 7 plant species and $H = 1.8$. Because we sampled only in daytime (Table 1), our samples included only diurnal species.

3.3 Diptera: Twenty eight families were recorded. Dominant families were Syrphidae (20 species., 128 individuals) and Anthomyiidae (11 spp., 56, Table 3). Dominant species were *Sphaerophoria macrogaster* (Syrphidae, 45 individuals) and an

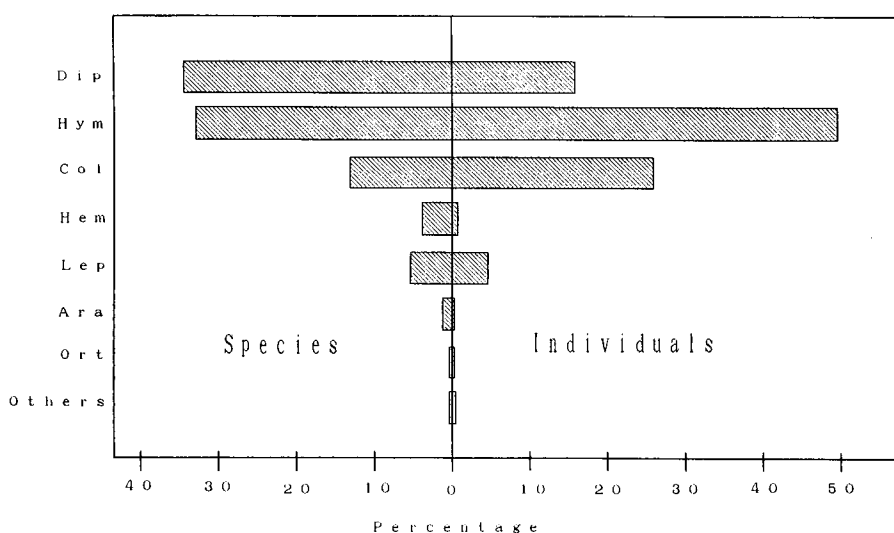


Fig. 7. The percentages of arthropod species (left) and individuals (right) in each order. Order abbreviations are shown in Table 3.

unidentified anthomyiid species (41, Table 4). All dipteran species with ≥ 10 individuals visited a wide range of plant species ($H > 1$, Table 4).

3.4 *Coleoptera*: Sixteen families were recorded. The family including most species was Scarabaeidae (10 species, 89 individuals) and the most abundant family was

Table 4. Insect species of which ≥ 10 individuals were collected (except bees, see Table 5 for bees) with the number of visited plant species. Diversity index in flower utilization are also shown. Unidentified species are shown with species codes.

Order Family Species	No. of Plant Species	No. of Insect Individuals	H	H_{max}
Hemiptera				
Lygaeidae				
LYGAEIDAE3	4	22	0.66	1.39
Lepidoptera				
Hesperiidae				
<i>Parnara guttata</i>	7	12	1.70	1.95
Pieridae				
<i>Pieris rapae</i>	7	17	1.84	1.95
Diptera				
Acroceridae				
<i>Philopota nigroaenea</i>	7	12	1.82	1.95
Syrphidae				
<i>Episyrphus balteatus</i>	10	17	2.15	2.30
<i>Eristalis cerealis</i>	11	32	1.67	2.40
<i>Sphaerophoria macrogaster</i>	14	45	2.01	2.64
Anthomyiidae				
ANTHOMYIIDAE50	9	41	1.52	2.20
Coleoptera				
Scarabaeidae				
<i>Eucetonia pilifera</i>	10	18	2.12	2.30
<i>Oxycetonia jucunda</i>	14	53	2.24	2.64
Buprestidae				
<i>Anthaxia proteus</i>	2	15	0.24	0.69
Dermestidae				
<i>Anthrenus verbasci</i>	18	290	2.21	2.89
Mordellidae				
<i>Mordellistena</i> sp.1	4	12	1.24	1.39
<i>Mordellistena</i> sp.2	2	11	0.47	0.69
Chrysomelidae				
<i>Aulacophora nigripennis</i>	2	29	0.15	0.69
<i>Nonartha cyaneum</i>	16	38	2.41	2.77
Hymenoptera				
Tenthredinidae				
<i>Loderus insulicola</i>	1	16	0.00	0.00
Formicidae				
<i>Formica japonica</i>	7	32	1.45	1.95
<i>Pristomyrmex punger</i>	7	13	1.78	1.95
Scoliidae				
<i>Campsomoris grossa matsumurai</i>	5	23	1.21	1.61
Vespidae				
<i>Vespa xanthoptera</i>	12	25	2.05	2.48

Dermestidae (2 spp., 294, Table 3). The most abundant species was *Anthrenus verbasci* (Dermestidae, 290 individuals). This was also the most abundant species even in all insect species and utilized pollen of a wide range of plant species (18 spp., $H = 2.21$, Table 4). Scarabaeidae also utilized pollen of a wide range of plant species. The two dominant scarabaeids, *Eucetonia pilifera* (18 individuals) and *Oxycetonia jucunda* (53), had $H > 2$ (Table 4). On the other hand, Buprestidae and Mordellidae visited specific plant species (Table 3, 4).

Faunal make-up in Coleoptera was quite different among the three locations in Kyoto. Cerambycidae, the most dominant anthophilous family in Ashu (Kato *et al.*, 1990), was only 3 individuals (3 spp.) here, and Nitidulidae, the most dominant species in Kibune (Inoue *et al.*, 1990), was only 5 individuals (3 spp.) here (Table 3). Rareness of Cerambycidae and Nitidulidae in the campus of Kyoto University is responsible for lower anthophilous diversity here than in Ashu and Kibune.

3.5 Hymenoptera: Nineteen families were recorded. Dominant families were Megachilidae (17 species, 254 individuals), Anthophoridae (11 spp., 205), Apidae (6 spp., 201) and Halictidae (13 spp., 101). These four dominant families included 72 % of the total number of hymenopteran individuals. Andrenidae included 9 species, but were less abundant (Table 3).

The most dominant sawfly was *Loderus insulicola* (16 individuals) and was collected only on *Prunus spachiana*. The most dominant ant was *Formica japonica* (32). The most dominant wasp was *Vespa xanthoptera* (25). *F. japonica* and *V. xanthoptera* were collected on a wide range of plant species (Table 4).

There were 62 bee species in this study. This number is less than those in Sapporo (122 species, Sakagami and Fukuda, 1973), Kibune (72 spp., Inoue *et al.*, 1990), Sasayama (69 spp., Miyamoto, 1962), Kochi (68 spp., Ikudome, 1978) and Ashu (66 spp., Kato *et al.*, 1990), but more than Gifu (51 spp., Yamauchi *et al.*, 1974) and Wakayama (48 spp., Matsuura *et al.*, 1974).

Dominant bee species were *Xylocopa appendiculata* (99 individuals), *Apis cerana* (92), *Chalicodoma spissula* (82) and *Anthidium septemspinosum* (73). In these four dominant bees, *Xy. appendiculata* and *Ap. cerana* were polylectic, whereas two Megachilidae, *Ch. spissula* and *An. septemspinosum* were oligolectic (Table 5). Most *Ch. spissula* and *An. septemspinosum* were collected on an exotic cultivated shrub, *Vitex cannabifolia* (#86 of Table 2, Appendices 1, 2). Such dominance of Megachilid bees that utilize mainly exotic cultivated plants was unique to this study area. Most megachilid and andrenid species were oligolectic ($H < 1.5$, except *Megachile tsurugensis*), while Halictidae, Apidae, and most Anthophoridae (except *Tetralonia*) visited a wide variety of flowering plants ($H > 1.5$ for species with ≥ 10 individuals, Table 5).

Megachilidae tended to be abundant in relatively warm temperate regions in Japan (Matsumura, 1974 in Wakayama; Ikudome, 1978 in Kochi). In northern regions

Table 5. Bee species with the number of visited plant species, the number of collected individuals, and diversity indices.

FAMILY Species	No. of Plant Species	No. of Insect Individuals	H	H_{max}
Colletidae				
<i>Colletes</i> sp.1	1	1	0.00	0.00
<i>Colletes</i> sp.2	1	1	0.00	0.00
<i>Hylaeus floralis</i>	1	1	0.00	0.00
<i>Hylaeus nippon</i>	1	1	0.00	0.00
Halictidae				
<i>Halictus (Seladonia) aerarius</i>	4	4	1.39	1.39
<i>Lasioglossum (Carinate Evylaeus) duplex</i>	3	3	1.10	1.10
<i>Lasioglossum (Carinaless Evylaeus) japonicum</i>	9	11	2.15	2.20
<i>Lasioglossum (Carinaless Evylaeus) sp.18</i>	7	11	1.77	1.95
<i>Lasioglossum (Carinaless Evylaeus) taniolellum</i>	5	5	1.61	1.61
<i>Lasioglossum (Carinate Evylaeus) baleicum</i>	1	1	0.00	0.00
<i>Lasioglossum (Carinate Evylaeus) sibiriacum</i>	1	2	0.00	0.00
<i>Lasioglossum (Lasioglossum) exiliceps</i>	1	1	0.00	0.00
<i>Lasioglossum (Lasioglossum) mutilum</i>	2	2	0.69	0.69
<i>Lasioglossum (Lasioglossum) occidens</i>	19	55	2.60	2.94
<i>Lasioglossum (Lasioglossum) proximatum</i>	2	3	0.64	0.69
<i>Lasioglossum (Lasioglossum) scitulum</i>	2	2	0.69	0.69
<i>Lasioglossum (Lasioglossum) sp.6</i>	1	1	0.00	0.00
Andrenidae				
<i>Andrena (Andrena) benefica</i>	1	1	0.00	0.00
<i>Andrena (Calomelissa) protomias</i>	4	29	0.89	1.39
<i>Andrena (Chlorandrena) Knuthi</i>	3	15	0.49	1.10
<i>Andrena (Micrandrena) brassicae</i>	1	1	0.00	0.00
<i>Andrena (Micrandrena) komachi</i>	1	2	0.00	0.00
<i>Andrena (Mitsukuriella) japonica</i>	2	2	0.69	0.69
<i>Andrena (Simandrena) opacifovea opacifovea</i>	4	5	1.33	1.39
<i>Andrena (Simandrena) yamamotoi</i>	2	2	0.69	0.69
<i>Panurginus crawfordi</i>	2	2	0.69	0.69
Megachilidae				
<i>Anthidium septemspinosum</i>	3	73	0.66	1.10
<i>Chalicodoma disjunctiformis</i>	2	18	0.21	0.69
<i>Chalicodoma sculpturalis</i>	1	11	0.00	0.00
<i>Chalicodoma spissula</i>	2	82	0.11	0.69
<i>Coelioxys fenestrata</i>	1	2	0.00	0.00
<i>Coelioxys yanonis</i>	1	1	0.00	0.00
<i>Euapis basalis</i>	1	5	0.00	0.00
<i>Lithurgus collaris</i>	1	1	0.00	0.00
<i>Megachile kobensis</i>	3	16	0.95	1.10
<i>Megachile nipponica</i>	4	12	0.98	1.39
<i>Megachile pseudomonticola</i>	1	1	0.00	0.00
<i>Megachile remota sakagamii</i>	2	3	0.64	0.69
<i>Megachile subalbuta</i>	5	13	1.31	1.61
<i>Megachile tsurugensis</i>	6	10	1.61	1.79
<i>Osmia imaii</i>	3	3	1.10	1.10
<i>Osmia orientalis</i>	1	2	0.00	0.00
<i>Osmia taurus</i>	1	1	0.00	0.00
Anthophoridae				
<i>Anthophora pilipes villosula</i>	3	4	1.04	1.10

Table 5 (continued)

FAMILY Species	No. of Plant Species	No. of Insect Individuals	<i>H</i>	<i>H</i> _{max}
<i>Tetralonia mitsukurii</i>	1	10	0.00	0.00
<i>Tetralonia nipponens</i>	11	46	1.67	2.40
<i>Xylocopa (Alloxylocopa) appendiculata</i> <i>circumvolans</i>	26	99	2.66	3.26
<i>Ceratina esakii</i>	1	1	0.00	0.00
<i>Ceratina flavipes</i>	11	36	2.00	2.40
<i>Ceratina iwatai</i>	1	2	0.00	0.00
<i>Ceratina japonica</i>	2	2	0.69	0.69
<i>Nomada ginran</i>	3	3	1.10	1.10
<i>Nomada japonica</i>	1	1	0.00	0.00
<i>Nomada sheppardana okubira</i>	1	1	0.00	0.00
Apidae				
<i>Bombus (Bombus) hypocrita hypocrita</i>	7	16	1.72	1.95
<i>Bombus (Bombus) ignitus</i>	9	17	1.95	2.20
<i>Bombus (Diversobombus) diversus diversus</i>	2	3	0.64	0.69
<i>Bombus (Pyrobombus) ardens ardens</i>	8	26	1.94	2.08
<i>Apis cerana japonica</i>	23	92	2.73	3.14
<i>Apis mellifera</i>	15	47	2.35	2.71

or alpine areas, Halictidae and/or Apidae (especially Bombinae) predominated in bee faunas (Sakagami and Fukuda, 1973 in Sapporo; Yumoto, 1986 in Kisokoma). The campus of Kyoto University has warmer temperate climate than those in Ashu and Kibune, and it favors Megachilidae. Megachilids tend to utilize only some groups of flowers, e.g. Leguminosae and Verbenaceae, which are often naturalized or cultivated in mildly disturbed areas. Vegetational disturbance also provides them with nest sites. Thus, these two factors, warmer climate and vegetational mild disturbance may explain higher abundance of Megachilidae in this study area than in Ashu and Kibune.

Fig. 8 shows the number of bee species plotted in octave. Our samples included 35.2 % of the estimated total number of bee species, 170. This estimation is larger than those of Ashu and Kibune (both ca. 80 spp.). As mentioned above, this is due to that Megachilidae were abundant on exotic plants here.

3.6 Other Insecta and Arachnoidea: A few individuals in Orthoptera, Psocoptera, Neuroptera and Trichoptera (Table 3) were collected when resting on flower. They are not active flower visitors, but some Neuroptera and Trichoptera are reported to consume nectar and pollen (Kevan and Baker, 1983). There were 20 species of Araneida and one species of Phalangida (Table 3). They are ambush predators for flower visitors.

4. Phenology of flower visitors

The number of insect species peaked twice in June and September (Fig. 9). The number in hymenopteran species was between 30 and 40 before and in September.

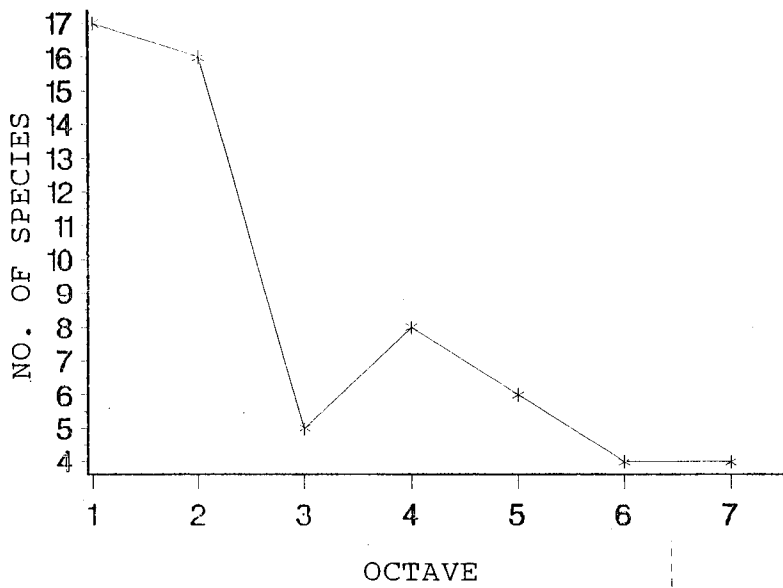


Fig. 8. The number of bee species plotted in the Preston's octave. See text for details.

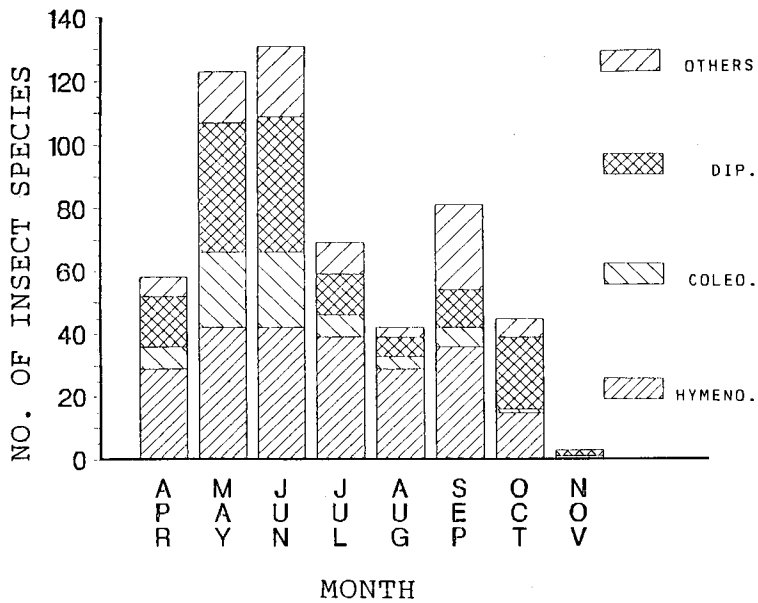


Fig. 9. Seasonal changes in the number of insect species in three insect orders and the others.

There were virtually no hymenopterans after October. Coleoptera peaked only in June. Diptera peaked in both June and October. In November, most flower visitors were Diptera.

The total number of insect individuals peaked twice in May and September (Fig. 10). Hymenoptera and Diptera peaked in June. Coleoptera peaked in May. *Anthrenus verbasci* were quite abundant at that time (Appendix 2).

Figs. 11 and 12 show phenology of all the bee families and species. Colletid and some halictid species were rare throughout the season. Three halictid species with ≥ 10 individuals were active from early May to September. Most andrenids were active only before the monsoon. Active periods of most andrenids were ≤ 2 months, as observed in other locations (Sakagami and Matsumura, 1967; Matsumura and Munakata, 1969; Kato *et al.*, 1990; Inoue *et al.* 1990)

Megachilidae and Anthophoridae included three types of seasonal activity patterns: species that were active only in spring (e.g. three *Osmia* species and *Tetralonia nipponens*), those active in summer-autumn (e.g. three *Chalicodoma* species and *Tetralonia mitsukurii*), and those active throughout the flowering season (e.g. *Megachile tsurugensis* and *Xylocopa appendiculata*). Three Apidae, *Bombus ignitus*, *Apis cerana* and *Ap. mellifera*, were active throughout the flowering season. *Bo. hypocrita* and *Bo. ardens* were collected only before June, and *Bo. diversus* was collected only after August (Fig. 12). *Bo. ardens* was active only before the monsoon as in other locations,

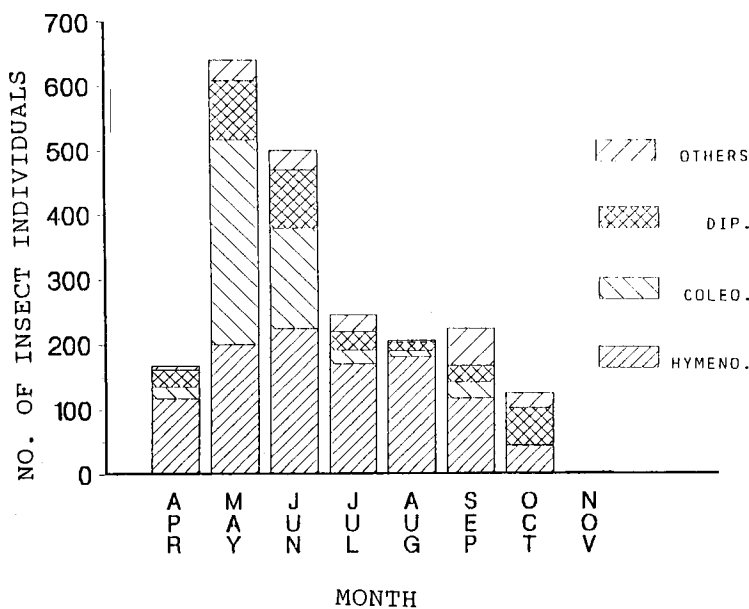


Fig. 10. Seasonal changes in the number of insect individuals in three insect orders and others.

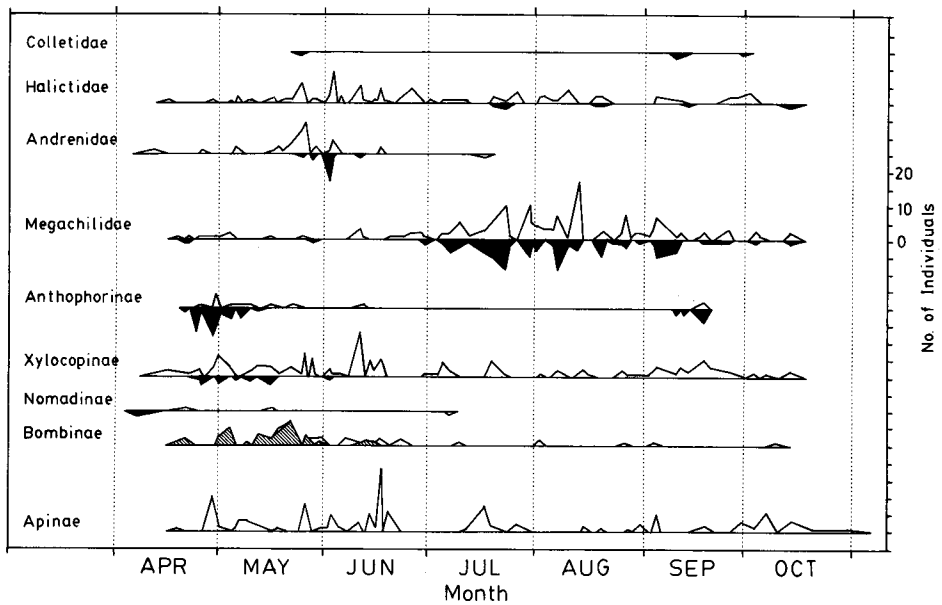


Fig. 11. Seasonal changes in the number of individuals in each bee family and subfamily. Open, solid and shaded divisions show females, males and queens (if social), respectively.

but *Bo. hypocrita* and *Bo. diversus* were active throughout flowering season in other locations (Miyamoto, 1962; Sakagami and Matsumura, 1967; Matsumura and Munakata, 1969; Sakagami and Fukuda, 1973; Matsuura *et al.*, 1974; Yamauchi *et al.*, 1974; Ikudome, 1978; Nakamura and Matsumura, 1985; Kato *et al.*, 1990; Inoue *et al.*, 1990). Our small sampling sizes of *Bo. hypocrita* workers and *Bo. diversus* queens may erroneously show such short activity periods of these two species in this study.

5. Anthophilous faunas on individual plant families

Patterns of insect visits to plants were examined at family level with cluster analysis (Fig. 13), based on the percentage of each insect order collected on respective plant families (Table 6). At a prediction ratio of 0.8, 48 plant families were divided into two clusters, indicating that 80 % of the total sum of squared distances among families can be explained by separation of the two clusters (Fig. 13). Cluster 1, including 30 families, was characterized by predominance of Hymenoptera (Table 6). The rest was sub-divided into two clusters at a prediction ratio of 0.7 (Fig. 13). Cluster 2 (6 families) was visited mainly by Diptera (Table 6). The rest was again divided into two clusters at a prediction ratio of 0.6. Cluster 3 (9 families) was dominated by Coleoptera and Cluster 4 (3 families) by Lepidoptera (Table 6).

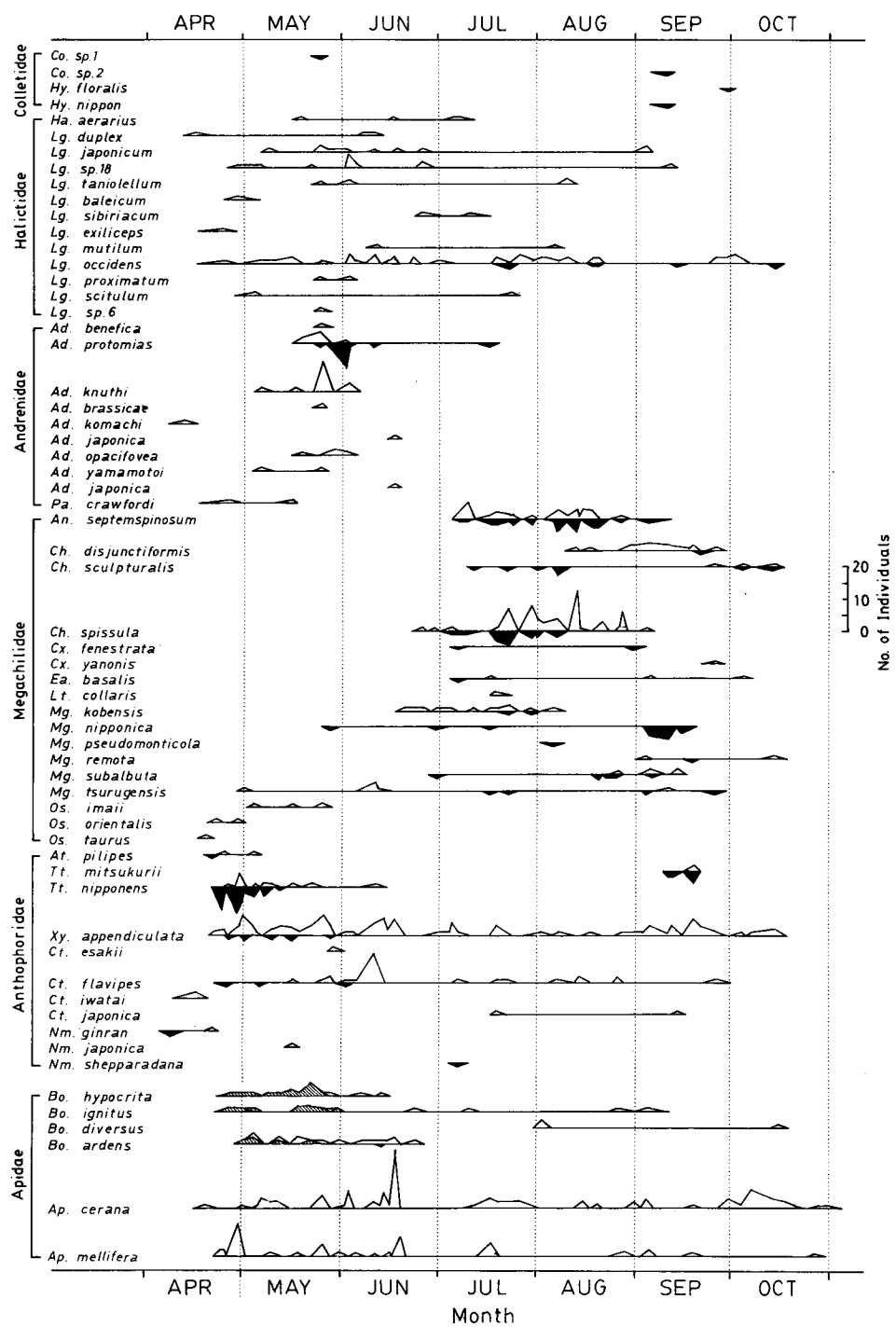


Fig. 12. Seasonal changes in the number of individuals in each bee species. See Table 5 for full species names. Sexes and castes are shown as in Fig. 11.

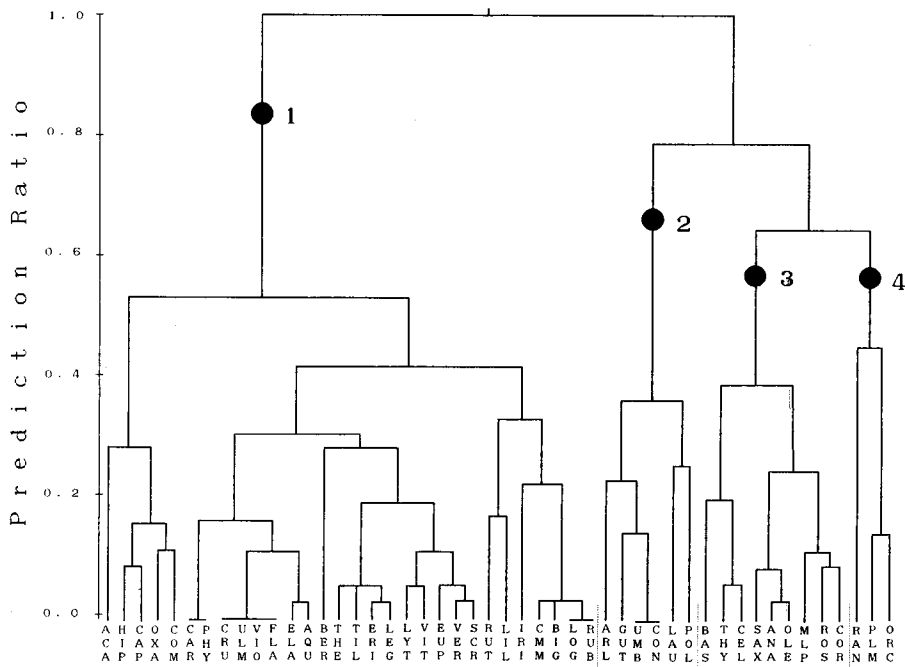


Fig. 13. A dendrogram of plant families, based on the percentages of individuals in respective insect order (data is in Table 6), with Ward minimum variance method (Ward, 1963).

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Table 6. Arthropod fauna on each plant family and the result of cluster analysis, based on the percentage of number of individuals in each order of arthropods. See Table 2 for plants family codes, Table 3 for order codes for arthropods and Fig. 13 for cluster codes.

Plant Family Codes	Percentage of Each Order of Arthropod											Cluster Codes
	Pha	Ara	Ort	Pso	Hem	Neu	Tri	Lep	Dip	Col	Hym	
LAU	-	-	-	-	-	4.2	4.2	-	83.3	8.3	-	2
BER	-	-	-	-	-	-	-	-	31.2	6.3	62.5	1
RAN	-	-	50.0	-	-	-	-	50.0	-	-	-	4
CAR	-	-	-	-	-	-	-	-	-	-	100.0	1
PHY	-	-	-	-	-	-	-	-	-	-	100.0	1
BAS	-	-	-	-	1.7	-	-	-	3.4	84.3	10.3	3
POL	-	-	-	-	-	-	-	21.2	54.1	-	24.7	2
THE	-	-	-	-	-	-	-	-	5.6	5.6	88.8	1
GUT	-	-	-	-	-	-	-	-	100.0	-	-	2
TIL	-	-	-	-	-	-	-	-	19.2	1.9	78.9	1
MLP	-	-	-	-	-	-	-	-	-	66.7	33.3	3
ULM	-	-	-	-	-	-	-	-	-	-	100.0	1
VIO	-	-	-	-	-	-	-	-	-	-	100.0	1
FLA	-	-	-	-	-	-	-	-	-	-	100.0	1
CRU	-	-	-	-	-	-	-	-	-	-	100.0	1
ERI	-	-	-	0.8	-	-	-	4.2	10.1	0.8	84.0	1
ROS	-	-	-	-	1.5	-	-	1.9	8.2	73.6	14.9	3
SAX	-	-	-	-	2.0	-	-	2.5	9.1	43.9	42.4	3
LEG	-	2.2	2.2	-	-	-	-	8.7	19.6	-	67.4	1
LYT	-	-	-	-	-	-	-	8.6	3.4	10.3	77.6	1
THY	-	-	-	-	-	-	-	-	-	90.0	10.0	3
COR	-	-	-	-	-	1.2	-	2.4	17.9	56.0	22.6	3
ELA	-	-	-	-	-	-	-	-	-	-	100.0	1
CEL	-	-	-	-	-	-	-	-	-	100.0	-	3
AQU	-	-	-	-	-	-	-	-	-	-	100.0	1
EUP	-	-	-	-	-	-	-	-	15.0	-	85.0	1
VIT	-	2.1	-	-	-	-	-	2.1	2.1	8.5	85.1	1
HIP	-	-	-	-	-	-	-	-	42.9	-	57.1	1
ANA	-	-	-	-	2.6	-	-	5.3	15.8	44.7	31.6	3
RUT	-	-	-	-	-	-	-	5.3	-	26.3	68.4	1
OXA	-	9.1	9.1	-	-	-	-	18.2	27.3	-	36.4	1
ARL	-	-	-	-	-	-	-	-	75.0	-	25.0	2
UMB	-	-	-	-	-	-	-	-	100.0	-	-	2
LOG	-	-	-	-	-	-	-	-	-	-	100.0	1
OLE	-	-	-	-	4.8	-	-	1.0	9.6	48.1	36.5	3
CON	-	-	-	-	-	-	-	-	100.0	-	-	2
PLM	-	-	-	-	-	-	-	100.0	-	-	-	4
VER	-	-	-	-	1.5	-	-	1.7	9.6	5.2	82.0	1
LAB	-	-	-	-	1.9	-	-	1.9	1.9	1.9	92.5	1
SCR	-	-	-	-	-	-	-	-	100.0	-	-	1
BIG	-	-	-	-	-	-	-	-	-	-	100.0	1
ACA	-	-	-	-	-	-	-	44.4	16.7	-	38.9	1
RUB	-	-	-	-	-	-	-	-	-	-	100.0	1
CAP	-	-	-	-	-	1.9	-	1.9	32.1	13.2	50.9	1
COM	0.4	9.1	0.4	-	11.9	-	0.4	4.0	31.6	13.0	29.2	1
CMM	-	-	-	-	-	-	-	-	-	-	100.0	1
IRI	-	-	-	-	-	-	-	-	20.0	-	80.0	1
LIL	-	-	-	-	-	-	-	-	-	40.0	60.0	1
ORC	-	-	-	-	-	-	-	87.5	-	-	12.5	4

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Appendix 1.

Insect visitors collected on 113 plant species which are arranged in the order of Table 2. Each record for insect is arranged in the following order: species (family: order), sex and caste (F - female, M - male, W - worker, Q - queen, if indistinguishable, no code is added), date in the form of year + month + day, and the number of individuals in parenthesis. Insects are arranged in the order of Table 3. If insect species are not identified only code (family or order name + species code number, common to Kato *et al.*, 1990) are shown.

LAURACEAE

1. *Cinnamomum camphora*

NEUROPTERA2 (Neu: Neu) 850526 (1); TRICHOPTERA2 (Tri: Tri) 850526 (1); CHIRONOMIDAE2 (Chi: Dip) 850526 (10); LAUXANIIDAE6 (Lau: Dip) 850526 (3); EPHYDRIDAE18 (Eph: Dip) 850526 (1); CHLOROPIDAE18 (Chl: Dip) 850526 (1); CHLOROPIDAE2 (Chl: Dip) 850526 (1); CHLOROPIDAE23 (Chl: Dip) 850526 (1); ANTHOMYIIDAE12 (Ant: Dip) F: 850526 (1); ANTHOMYIIDAE31 (Ant: Dip) F: 850526 (1), M: 850522 (1); *Anthrenus verbasci* (Der: Col) 850526 (1); *Dermestes haemorrhoidalis* (Der: Col) 850526 (1)

BERBERIDACEAE

2. *Berberis thunbergii*

Eristalis cerealis (Syr: Dip) 860421 (2); TACHINIDAE11 (Tac: Dip) 860424 (1); *Lasioglossum (Lasioglossum) exiliceps* (Hal: Hym) F: 860424 (1); *Apis mellifera* (Api: Hym) W: 860424 (1)

3. *Mahonia japonica*

Eristalis cerealis (Syr: Dip) M: 850419 (1); ANTHOMYIIDAE31 (Ant: Dip) M: 850419 (1); *Vespa xanthoptera* (Ves: Hym) Q: 850419 (1); *Osmia taurus* (Meg: Hym) M: 850419 (1); *Apis cerana japonica* (Api: Hym) W: 850419 (3)

4. *Nandina domestica*

Nonartha cyaneum (Chr: Col) 850626 (1); *Lasioglossum (Evylaeus) japonicum* (Hal: Hym) F: 850626 (1); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (Ant: Hym) 870707 (1); *Bombus (Bombus) ignitus* (Api: Hym) Q: 850710 (1)

RANUNCULACEAE

5. *Ranunculus silerifolius*

ORTHOPTERA9 (Ort: Ort) 850425 (1); *Anthocris scolymus* (Pie: Lep) M: 850425 (1)

CARYOPHYLLACEAE

6. *Stellaria media*

Stroglyogaster onocleae (Ten: Hym) F: 860412 (1); *Andrena (Micrandrena) komachi* (And: Hym) M: 860412 (2)

PHYTOLACCACEAE

7. *Phytolacca americana*

Lasioglossum (Evylaeus) taniolellum (Hal: Hym) F: 850810 (1)

BASELLACEAE

8. *Besella rubra*

PSYLLIDAE2 (Psy: Hem) 860525 (1); DOLICHOPODIDAE4 (Dol: Dip) 860525 (1); *Episyrphus balteatus* (Syr: Dip) F: 860525 (1); *Anthrenus verbasci* (Der: Col) 860525 (5), 860602 (42); *Mordellina* sp. (Mor: Col) 860602 (1); *Nonartha cyaneum* (Chr: Col) 860602 (1); *Macrophya falsifica* (Ten: Hym) F: 860525 (1); *Formica japonica* (For: Hym) 860602 (5)

POLYGONACEAE

9. *Persicaria thunbergii*

Parnara guttata (Hes: Lep) 851007 (1), M: 850930 (2), 851002 (2); *Graphium sarpedon nipponum* (Pap: Lep) F: 851007 (1); *Eurema hecabe* (Pie: Lep) 851002 (1), F: 851014 (1), 851021 (1), 861020 (1), M: 851007 (1); *Pieris melete* (Pie: Lep) M: 851002 (1); *Pieris rapae* (Pie: Lep) M: 851014 (2); *Zizeeria maha* (Lyc: Lep) F: 851018 (1), 851031 (1), M: 861020 (1), 861027 (1); MYCETOPHILIDAE1 (Myc: Dip) 851021 (1); *Cheilosia* sp.7 (Syr: Dip) F: 861004 (1); *Didea fasciata* (Syr: Dip) F: 861014 (1); *Episyrphus balteatus* (Syr: Dip) M: 851018 (1), 871019 (1), 871023 (1); *Eristalis cerealis* (Syr: Dip) F: 850930 (1), 851002 (1), 851007 (2), 851021 (1), 851028 (1), 871007 (1), M: 851002 (1), 851014 (1), 851018 (1), 851021 (1), 851024 (2), 851028 (1), 861004 (2), 871007 (1), 871019 (1); *Lathrophthalmus ocularis* (Syr: Dip) M: 851014 (1); *Melanostoma scalare* (Syr: Dip) F: 851018 (1), 851024 (1); *Pseudomerdon takasaensis* (Syr: Dip) M: 850930 (1); *Sphaerophoria macrogaster* (Syr: Dip) M: 851007 (1); ANTHOMYIIDAE11 (Ant: Dip) F: 851018 (1); TACHINIDAE1 (Tac: Dip) F: 871023 (1); TACHINIDAE32 (Tac: Dip) f: 871019 (1); CALLIPHORIDAE1 (Cal: Dip) F: 851014 (1), 851018 (1), M: 850930 (1); CALLIPHORIDAE3 (Cal: Dip) F: 851007 (1); CALLIPHORIDAE5 (Cal: Dip) F: 851007 (1), 871007 (1), M: 851021 (1), 871007 (1); CALLIPHORIDAE6 (Cal: Dip) M: 851024 (1); SARCOPHAGIDAE3 (Sar: Dip) 851018 (1), F: 851007 (1); SARCOPHAGIDAE8 (Sar: Dip) M: 851021 (1); CHRYSIDIDAE1 (Chr: Hym) 851002 (1); *Campsomeris primatica* (Sco: Hym) M: 861014 (1); *Vespa analis insularis* (Ves: Hym) Q: 861004 (1); *Hylaeus floralis* (Col: Hym) M: 850930 (1); *Apis cerana japonica* (Api: Hym) W: 850930 (3), 851007 (6), 851014 (1), 851018 (2), 851021 (1), 851028 (1); *Apis mellifera* (Api: Hym) W: 861027 (1)

10. *Persicaria yokusaiana*

Cheilosia sp.7 (Syr: Dip) M: 851002 (1); *Tiphia* sp. (Tip: Hym) F: 851002 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) F: 851002 (1)

11. *Polygonum aubertii*

TACHINIDAE28 (Tac: Dip) M: 851007 (1)

THEACEAE

12. *Camellia japonica*

Lasioglossum (Carinate Evylaeus) duplex (Hal: Hym) F: 870416 (1)

13. *Camellia sasanqua*

Syrphus japonica (Syr: Dip) F: 851031 (1); *Apis cerana japonica* (Api: Hym) W: 851031 (3)

14. *Stewartia monadelphae*

Eucetonia pilifera (Sca: Col) 860611 (1); *Polistes mandarinus* (Ves: Hym) F: 860611 (1); *Polistes rothneyi iwatai* (Ves: Hym) F: 860611 (1); *Vespa xanthoptera* (Ves: Hym) W: 860611 (1); *Lasioglossum (Evylaeus) japonicum* (Hal: Hym) F: 860611 (1); *Megachile tsurugensis* (Meg: Hym) F: 860611 (1); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (Ant: Hym) 850615 (2), 860611 (1); *Bombus (Pyrobombus) ardens* (Api: Hym) W: 850615 (1), 860611 (3)

GUTTIFERAE

15. *Hypericum patulum*
Episyrphus balteatus (Syr: Dip) F: 870528 (1)

TILIACEAE

16. *Tilia japonica*
 LONCHAEIDAE6 (Lon: Dip) 870623 (1); CHLOROPIDAE18 (Chl: Dip) 870623 (1); HISTERIDAE1 (His: Col) 870623 (1); *Oracistrocerus drewseni drewseni* (Ves: Hym) F: 870623 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) F: 870623 (2); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (Ant: Hym) 870617 (3); *Bombus (Bombus) ignitus* (Api: Hym) W: 870623 (1); *Bombus (Pyrobombus) ardens* (Api: Hym) W: 870617 (2), 870623 (1); *Apis cerana japonica* (Api: Hym) W: 870617 (1)
17. *Tilia Miqueliana*
Eristalis cerealis (Syr: Dip) M: 850614 (1); *Helophilus virgatus* (Syr: Dip) M: 850614 (1); LAUXANIIDAE8 (Lau: Dip) 850619 (5); CHLOROPIDAE12 (Chl: Dip) 850619 (1); *Scolia oculata* (Sco: Hym) M: 870617 (1); *Vespa xanthoptera* (Ves: Hym) 850614 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) 870617 (1), F: 870617 (1); *Andrena (Mitsukuriella) japonica* (And: Hym) F: 870617 (1); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (Ant: Hym) 850614 (2), 850615 (1), 850705 (4), 870617 (2); *Bombus (Pyrobombus) ardens* (Api: Hym) Q: 850614 (1), 850615 (1), W: 850619 (1); *Apis cerana japonica* (Api: Hym) W: 850614 (1), 850615 (1), 850619 (4), 870617 (1); *Apis mellifera* (Api: Hym) W: 850619 (6)

MALVACEAE

18. *Hibiscus syriacus*
 HELODIDAE1 (Hel: Col) 850719 (1); *Nonartha cyaneum* (Chr: Col) 850719 (2), 850720 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) F: 850719 (1); *Lithurgus collaris* (Meg: Hym) F: 850719 (1)

ULMACEAE

19. *Ulmus davidiana*
Andrena (Simandrena) opacifovea opacifovea (And: Hym) F: 850518 (1); *Apis cerana japonica* (Api: Hym) W: 850518 (1)

VIOLACEAE

20. *Viola mandshurica*
Tetralonia nipponens (Ant: Hym) F: 850426 (1)

FLACOURTIACEAE

21. *Idesia polycarpa*
Apis cerana japonica (Api: Hym) W: 860526 (2)

CRUCIFERAE

22. *Cardamine regeliana*
Athalia japonica (Ten: Hym) F: 870416 (1)
23. *Rorippa indica*
Ceratina esakii (Ant: Hym) F: 850529 (1)

ERICACEAE

24. *Enkianthus perulatus*
Bombylius major (Bom: Dip) 860424 (1); *Tetralonia nipponens* (Ant: Hym)
M: 860424 (5), 870430 (1)
25. *Lyonia ovalifolia*
PSOCOPTERA1 (Pso: Pso) M: 870605 (1); DOLICHOPODIDAE3 (Dol: Dip)
870605 (1); *Cyphononyx dorsalis* (Pom: Hym) F: 870725 (1); *Anterhynchium*
flavomarginatum micado (Ves: Hym) F: 870725 (1)
26. *Pieris japonica*
SCIARIDAE14 (Sci: Dip) 860429 (1); *Xylocopa (Alloxylocopa) appendiculata*
circumvolan (Ant: Hym) F: 860430 (1); *Apis mellifera* (Api: Hym) W: 8604
29 (8), 860430 (5)
27. *Rhododendron macrosepalum*
Xylocopa (Alloxylocopa) appendiculata circumvolan (Ant: Hym) 850518 (1);
Bombus (Bombus) hypocrita hypocrita (Api: Hym) Q: 850512 (1)
28. *Rhododendron mucronata*
SCIARIDAE4 (Sci: Dip) 870506 (1); *Philopota nigroaenea* (Acr: Dip) M: 87
0430 (1), 870506 (2); *Tetralonia nipponens* (Ant: Hym) 870430 (3), F: 870430
(1), M: 870506 (1); *Apis cerana japonica* (Api: Hym) W: 870506 (1)
29. *Rhododendron oomurasaki*
Papilio xuthus (Pap: Lep) M: 850504 (1), 860430 (1), 860507 (1), 860512 (1);
Papilix protenor demetrius (Pap: Lep) F: 850501 (1); *Bombylius major* (Bom:
Dip) 860512 (1); *Philopota nigroaenea* (Acr: Dip) 850509 (1); TEPHRITIDAE
7 (Tep: Dip) 850504 (1); SARCOPHAGIDAE3 (Sar: Dip) 850504 (1);
SARCOPHAGIDAE6 (Sar: Dip) F: 850426 (1); *Oxycetonia jucunda* (Sca: Col)
850501 (1); *Arge similis* (Ari: Hym) 850426 (1); *Stenodynerus frauenfeldi*
(Ves: Hym) F: 860430 (1), 860512 (1); *Lasioglossum (Evylaeus) sp.18* (Hal:
Hym) F: 860429 (1); *Lasioglossum (Evylaeus) baleicum* (Hal: Hym) F: 860
429 (1); *Megachile tsurugensis* (Meg: Hym) F: 850501 (1); *Anthophora pilipes*
villosula (Ant: Hym) F: 850425 (1); *Tetralonia nipponens* (Ant: Hym) F:
850504 (1), 860507 (1), M: 850425 (3), 850426 (2), 850501 (2), 850504 (2), 860429
(6), 860430 (3), 860507 (3), 860512 (1); *Xylocopa (Alloxylocopa) appendiculata*
circumvolan (Ant: Hym) 850425 (1), 850426 (1), 850501 (3), 850504 (3), 85051
2 (3); *Bombus (Bombus) hypocrita hypocrita* (Api: Hym) Q: 850426 (1), 85
0501 (1), 850504 (1), 850509 (1), 850516 (1); *Bombus (Bombus) ignitus* (Api:
Hym) Q: 850426 (2), 850501 (1), 850504 (1); *Bombus (Pyrobombus) ardens*
(Api: Hym) Q: 850501 (4), 850504 (1), 850512 (1); *Apis cerana japonica* (Api:
Hym) W: 850501 (1), 850509 (2), 850512 (1), 860507 (3), 860512 (1); *Apis*
mellifera (Api: Hym) W: 850425 (2), 850509 (1)
30. *Vaccinium oldhami*
Vespa xanthoptera (Ves: Hym) Q: 850518 (1); *Bombus (Pyrobombus) ardens*
(Api: Hym) W: 850518 (1)

ROSACEAE

31. *Kerria japonica*
Episyrphus balteatus (Syr: Dip) F: 850605 (1); *Ceratina flavipes* (Ant: Hym)
M: 850426 (1)
32. *Malus halliana*
Bombylius major (Bom: Dip) F: 850425 (1); *Philopota nigroaenea* (Acr: Dip)
F: 850425 (1), 850426 (1); *Eucetonia pilifera* (Sca: Col) 850425 (1); *Dasytes*
vulgaris (Mel: Col) 850425 (1); *Mordellistena* sp. (Mor: Col) 850425 (1);
Panurginus crawfordi (And: Hym) F: 850426 (1)
33. *Photinia glabra*
Parnara guttata (Hes: Lep) M: 870929 (1); *Sphaerophoria macrogaster* (Syr:
Dip) M: 860526 (1); ANTHOMYIIDAE1 (Ant: Dip) F: 860526 (1); *Anthrenus*

- verbasci* (Der: Col) 860526 (93); *Dermestes haemorrhoidalis* (Der: Col) 860526 (3); *Mordellistena* sp. (Mor: Col) 860526 (1); *Camponotus japonicus* (For: Hym) 860526 (2); *Formica japonica* (For: Hym) 860526 (1)
34. *Prunus tomentosa*
Helophilus virgatus (Syr: Dip) M: 850409 (1); *Nonartha cyaneum* (Chr: Col) 850409 (1)
35. *Prunus spachiana*
 LYGAEIDAE3 (Lyg: Hem) 850409 (1); *Eurema hecabe* (Pie: Lep) 850409 (1); *Libythea celtis* (Lib: Lep) 850409 (1); CHIRONOMIDAE4 (Chi: Dip) 850409 (1); *Episyrphus balteatus* (Syr: Dip) F: 850409 (1); *Eristalis cerealis* (Syr: Dip) M: 850409 (1); *Helophilus virgatus* (Syr: Dip) F: 850409 (1); SARCOPHAGIDAE3 (Sar: Dip) 850409 (1); *Loderus insulicola* (Ten: Hym) 850409 (13); 850419 (3); *Priophorus nigricans* (Ten: Hym) M: 870416 (5); *Polistes mandarinus* (Ves: Hym) Q: 850409 (1)
36. *Pyracantha angustifolia*
Cletus trigonus (Cor: Hem) 860525 (1); LYGAEIDAE3 (Lyg: Hem) 860525 (1); *Lycaena phlaeas* (Lyc: Lep) F: 860525 (1); DOLICHOPODIDAE4 (Dol: Dip) 860525 (1); *Pipiza inornata* (Syr: Dip) F: 860525 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 860525 (2); EPHYDRIDAE26 (Eph: Dip) 860525 (1); *Eucetonia pilifera* (Sca: Col) 850522 (1); *Oxycetonia jucunda* (Sca: Col) 850518 (2), 850522 (2), 860525 (6), 870516 (2); *Anthrenus verbasci* (Der: Col) 850522 (5); *Callosobruchus chinensis* (Bru: Col) 860525 (1); *Linotetis coeruleipennis* (Chr: Col) 860525 (1); *Nonartha cyaneum* (Chr: Col) 860525 (1); *Macrophya falsifica* (Ten: Hym) F: 860525 (1); *Lasioglossum (Evylaeus) japonicum* (Hal: Hym) F: 860525 (1); *Lasioglossum (Lasioglossum)* sp.6 (Hal: Hym) F: 860525 (1); *Panurginus crawfordi* (And: Hym) F: 870516 (1); *Bombus (Bombus) ignitus* (Api: Hym) Q: 850518 (1)
37. *Pyracantha crenulata*
Eristalis cerealis (Syr: Dip) M: 860525 (2); *Syrphus vitripennis* (Syr: Dip) F: 860525 (1); *Eucetonia pilifera* (Sca: Col) 860525 (1); *Oxycetonia jucunda* (Sca: Col) 860525 (1); *Arge similis* (Ari: Hym) M: 860525 (1); *Colletes* sp.1 (Col: Hym) M: 860525 (1); *Andrena (Andrena) benefica* (And: Hym) F: 860525 (1); *Andrena (Micrandrena) brassicae* (And: Hym) F: 860525 (1)
38. *Rosa borboniana*
Papilio xuthus (Pap: Lep) F: 860611 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 860602 (1); ANTHOMYIIDAE50 (Ant: Dip) F: 860602 (1); *Blitopertha conspurcata* (Sca: Col) 860525 (2), 860602 (1), 860611 (1); *Blitopertha orientalis* (Sca: Col) 850607 (1); *Oxycetonia jucunda* (Sca: Col) 850605 (1), 860525 (3), 860602 (4), 870528 (1); *Protaetia orientalis* (Sca: Col) 860525 (1), 860602 (1); *Trichius japonicus* (Sca: Col) 850605 (1); *Anthaxia proteus* (Bup: Col) 850605 (4), 860602 (6), 860611 (4); *Anthrenus verbasci* (Der: Col) 850607 (1), 860602 (1), 860611 (1); *Linotetis coeruleipennis* (Chr: Col) 860611 (1); *Linotetis coeruleipennis* (Chr: Col) 860611 (1); *Nonartha cyaneum* (Chr: Col) 850710 (5), 860525 (1), 860602 (1), 860611 (2); CURCULIONIDAE3 (Cur: Col) 860602 (1); *Formica japonica* (For: Hym) 860602 (1); *Lasioglossum (Evylaeus) japonicum* (Hal: Hym) F: 860602 (1); *Lasioglossum (Evylaeus) taniollellum* (Hal: Hym) F: 860602 (1); *Tetralonia nipponens* (Ant: Hym) F: 860611 (1)
39. *Spiraea blumei*
Cletus rusticus (Cor: Hem) 850501 (1); *Anthrenus verbasci* (Der: Col) 850501 (3), 850504 (7); *Mordellina* sp. (Mor: Col) 850504 (1); *Mordellistena* sp. (Mor: Col) 850501 (2), 850504 (2)
40. *Spiraea tossensis*
Anthrenus verbasci (Der: Col) 850509 (3), 850512 (8), 850516 (1); *Mordellistena* sp. (Mor: Col) 850509 (1)

41. *Spiraea cantoniensis*
Metasyrphus corollae (Syr: Dip) M: 870528 (1); *Lasioglossum* (*Evylaeus*) *japonicum* (Hal: Hym) F: 870528 (1); *Andrena* (*Simandrena*) *opacifovea* (And: Hym) F: 870528 (2)
42. *Spiraea thunbergii*
Bruchidius dorsalis (Bru: Col) 870408 (1); *Nonartha cyaneum* (Chr: Col) 870408 (5); *Nomada ginran* (Ant: Hym) M: 870408 (1)

SAXIFRAGACEAE

43. *Deutzia crenata*
Graphium sarpedon nipponum (Pap: Lep) M: 860602 (1); *Pieris rapae* (Pie: Lep) M: 860611 (1); *Ypthima argus* (Sat: Lep) F: 870528 (1); *Ivela auripes* (Lym: Lep) 860602 (1); BIBIONIDAE43 (Bib: Dip) 860611 (1); *Sphaerophoria macrogaster* (Syr: Dip) M: 860602 (1); *Sphaerophoria menthastris* (Syr: Dip) F: 860602 (1); *Eucetonia pilifera* (Sca: Col) 860602 (2); *Oxycetonia jucunda* (Sca: Col) 860602 (1); *Anthaxia proteus* (Bup: Col) 860602 (1); *Linotetis coeruleipennis* (Chr: Col) 860602 (1); *Formica japonica* (For: Hym) 860611 (9), 870528 (1); *Lasius niger* (For: Hym) 860611 (1); *Pristomyrmex punger* (For: Hym) 860611 (1); *Polistes jadwigae* (Ves: Hym) F: 860602 (1), 870528 (1); *Andrena* (*Calomelissa*) *protomias* (And: Hym) F: 860602 (7), M: 860602 (8), 860611 (1), 870528 (2); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 860602 (1), 870528 (1); *Ceratina flavipes* (Ant: Hym) M: 860602 (1); *Apis cerana japonica* (Api: Hym) W: 860602 (1)
44. *Deutzia gracilis*
Ypthima argus (Sat: Lep) F: 850512 (1)
45. *Deutzia scabra*
CHLOROPIDAE18 (Chl: Dip) 850526 (1); ANTHOMYIIDAE31 (Ant: Dip) F: 850522 (1); *Nipponovalgus angusticollis* (Sca: Col) 860602 (1); *Anthrenus verbasci* (Der: Col) 850504 (1), 850512 (2), 850516 (3), 850518 (5), 850522 (2), 860602 (18); *Aulacophora nigripennis* (Chr: Col) 850501 (3), 850504 (2), 850512 (1), 850516 (4), 850518 (8), 850522 (5), 850526 (2), 860525 (3); CURCULIONIDAE5 (Cur: Col) 850522 (1); *Formica japonica* (For: Hym) 860602 (13); *Pristomyrmex punger* (For: Hym) 860602 (1); *Lasioglossum* (*Evylaeus*) sp.18 (Hal: Hym) 850522 (1); *Lasioglossum* (*Evylaeus*) *taniolellum* (Hal: Hym) F: 860525 (1); *Andrena* (*Calomelissa*) *protomias* (And: Hym) F: 850518 (2), 850522 (3), 860525 (3), M: 860525 (1)
46. *Deutzia maximowicziana*
HELODIDAE1 (Hel: Col) 850512 (1); *Anthrenus verbasci* (Der: Col) 850512 (2)
47. *Hydrangea macrophylla*
Stenodynerus chinensis similimus (Ves: Hym) M: 870617 (1); *Halictus* (*Seladonia*) *aerarius* (Hal: Hym) F: 870617 (1); *Bombus* (*Bombus*) *hypocrita hypocrita* (Api: Hym) W: 870623 (1); *Apis cerana japonica* (Api: Hym) W: 870617 (1)
48. *Itea parviflora*
Eurystylus coelestialium (Mir: Hem) 860603 (4); LONCHOPTERIDAE2 (Lon: Dip) 860603 (1); *Melanostoma scalare* (Syr: Dip) F: 860603 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 860603 (1), M: 860603 (1); LAUXANIIDAE3 (Lau: Dip) 860603 (1); LAUXANIIDAE6 (Lau: Dip) 860603 (2); LONCHAEIDAE5 (Lon: Dip) 860603 (2); ANTHOMYIIDAE50 (Ant: Dip) F: 860603 (1); *Eucetonia pilifera* (Sca: Col) 860603 (2); *Oxycetonia jucunda* (Sca: Col) 860603 (1); *Anthrenus verbasci* (Der: Col) 860603 (2); *Mordellistena* sp. (*Mor*: Col) 860603 (5); *Stenodyras clavigera* (Cer: Col) 860603 (1); *Nonartha cyaneum* (Chr: Col) 860603 (1); *Vespa xanthoptera* (Ves: Hym) W: 860603 (1); *Lasioglossum* (*Evylaeus*) *taniolellum* (Hal: Hym) F: 860603 (1); *Lasioglossum* (*Lasioglossum*) *occidens* (Hal: Hym) F: 860603 (3); *Lasioglossum* (*Lasioglossum*) *proximatum* (Hal: Hym) F: 860603 (1); *Andrena* (*Calomelissa*)

protomias (And: Hym) M: 860603 (1); *Andrena* (*Simandrena*) *opacifovea opacifovea* (And: Hym) F: 860603 (1); *Apis cerana japonica* (Api: Hym) W: 860603 (5)

49. *Philadelphus coronarius*

Episyrrhus balteatus (Syr: Dip) F: 870528 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 860602 (1); *Lasius niger* (For: Hym) 860602 (1); *Pristomyrmex punger* (For: Hym) 860602 (1)

LEGUMINOSAE

50. *Astragalus sinicus*

SCIARIDAE8 (Sci: Dip) 860429 (1); ANTHOMYIIDAE31 (Ant: Dip) 860429 (1); ANTHOMYIIDAE33 (Ant: Dip) 860429 (1); *Osmia orientalis* (Meg: Hym) F: 860429 (1), 870422 (1); *Apis mellifera* (Api: Hym) W: 860429 (2)

51. *Cercis siliquastrum*

Xylocopa (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 870422 (1), 870430 (2)

52. *Cladrastis sikokiana*

Sphaerophoria menthastris (Syr: Dip) F: 860611 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 860611 (2)

53. *Desmodium podocarpum*

Byasa alcinous (Pap: Lep) F: 850930 (1)

54. *Indigofera tinctoria*

ORTHOPTERA11 (Ort: Ort) 870623 (1); CLUSIIDAE1 (Clu: Dip) 870626 (1); *Oracistrocerus drewseni drewseni* (Ves: Hym) F: 870630 (1); *Lasioglossum* (*Evylaeus*) sp.18 (Hal: Hym) F: 870626 (2); *Megachile kobensis* (Meg: Hym) F: 870623 (1), 870630 (1); *Megachile subalbata* (Meg: Hym) M: 870630 (1)

55. *Lespedeza thunbergii*

MIRIDAE25 (Mir: Hem) 870914 (1); CHRYSOMELIDAE9 (Chr: Col) 870914 (1); *Lasioglossum* (*Evylaeus*) sp.18 (Hal: Hym) F: 850912 (1); *Chalicodoma spissula* (Meg: Hym) 850626 (1), F: 870904 (1); *Megachile kobensis* (Meg: Hym) 850626 (2), F: 850619 (1), 850705 (2); *Megachile nipponica* (Meg: Hym) M: 860905 (2), 860911 (4), 870914 (2); *Megachile remota sakagamii* (Meg: Hym) F: 870904 (1), M: 850919 (1); *Megachile subalbata* (Meg: Hym) F: 860905 (1), 870904 (1), 870914 (1), M: 860905 (1); *Megachile tsurugensis* (Meg: Hym) M: 870904 (1); *Tetralonia mitsukurii* (Ant: Hym) F: 850919 (2), M: 850912 (2), 850919 (4), 870914 (2)

56. *Trifolium repens*

ARANEIDA33 (Ara: Ara) 860611 (1); *Everes argiades* (Lyc: Lep) M: 860701 (1); *Zizeeria maha* (Lyc: Lep) F: 860701 (2); *Paragus tibialis* (Syr: Dip) F: 860611 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 860611 (2), M: 860611 (1); *Formica japonica* (For: Hym) 860611 (1); *Campsomeris testaceipes* (Sco: Hym) F: 850830 (1); *Ceratina flavipes* (Ant: Hym) F: 860611 (8); *Bombus* (*Bombus*) *hypocrita hypocrita* (Api: Hym) Q: 850516 (1)

57. *Wisteria floribunda*

Xylocopa (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 850501 (5)

LYTHRACEAE

58. *Lythrum anceps*

Parnara guttata (Hes: Lep) F: 870826 (1), M: 870914 (1); *Pieris rapae* (Pie: Lep) F: 870929 (2), M: 850919 (1); *Megaspis zonata* (Syr: Dip) F: 870914 (1); ANTHOMYIIDAE50 (Ant: Dip) M: 870914 (1); *Oxycetonia jucunda* (Sca: Col) 870820 (1); *Popillia japonica* (Sca: Col) 870723 (1), 870725 (1); *Nonartha cyaneum* (Chr: Col) 860831 (2), 870723 (1); *Campsomeris grossa matsumurai* (Sco: Hym) F: 870826 (1), M: 860827 (1), 860831 (3), 860905 (2), 860911 (3),

870826 (1); *Campsomeris primatica* (Sco: Hym) M: 860926 (1); *Campsomeris testaceipes* (Sco: Hym) F: 850830 (2); *Stenodynerus chinensis simillimus* (Ves: Hym) M: 870921 (1); *Vespa xanthoptera* (Ves: Hym) W: 860926 (1); *Anthidium septemspinosum* (Meg: Hym) 850726 (2), 850821 (1), 860807 (2), 860810 (2), 860813 (2), 860818 (2), 860827 (1), 870815 (4), 870820 (1), F: 860813 (1), 860818 (1), M: 870723 (1); *Coelioxys yanonis* (Meg: Hym) F: 860926 (1); *Megachile nipponica* (Meg: Hym) M: 860905 (1); *Megachile subalbata* (Meg: Hym) F: 870826 (1); *Megachile tsurugensis* (Meg: Hym) M: 860911 (1); *Bombus (Bombus) ignitus* (Api: Hym) W: 860827 (1); *Apis cerana japonica* (Api: Hym) W: 860831 (2); *Apis mellifera* (Api: Hym) W: 860905 (2)

THYMELAEACEAE

59. *Edgeworthia chrysantha*

Mordellistena sp. (Mor: Col) 870416 (6); *Asclera nigrocya* (Oed: Col) 850409 (1), 870416 (2); *Nomada ginran* (Ant: Hym) M: 870408 (1)

CORNACEAE

60. *Aucuba japonica*

TACHINIDAE11 (Tac: Dip) F: 850419 (1)

61. *Swida macrophylla*

Graphium sarpedon nipponum (Pap: Lep) M: 860525 (1); *Ypthima argus* (Sat: Lep) M: 860525 (1); MYCETOPHILIDAE7 (Myc: Dip) 870616 (1); *Syricta pipiens* (Syr: Dip) M: 870616 (1); TEPHRITIDAE6 (Tep: Dip) 870616 (1); ULIDIIDAE1 (Uli: Dip) 850615 (1); AGROMYZIDAE3 (Agr: Dip) 860525 (1); AGROMYZIDAE4 (Agr: Dip) 860525 (1); EPHYDRIDAE1 (Eph: Dip) 850615 (1); EPHYDRIDAE15 (Eph: Dip) 850614 (3); ANTHOMYIIDAE50 (Ant: Dip) 850615 (1), F: 850614 (1), 850619 (1); CALLIPHORIDAE4 (Cal: Dip) M: 860525 (1); *Eusphalerum parallelum* (Sta: Col) 850614 (1); *Eucetonia pilifera* (Sca: Col) 860525 (4); *Oxycetonia jucunda* (Sca: Col) 850614 (1), 850615 (2), 860525 (2); *Anthrenus verbasci* (Der: Col) 860525 (10), 870616 (1); PHALACRIDAE1 (Pha: Col) 850614 (1); *Arge similis* (Ari: Hym) 850619 (1); BRACONIDAE33 (Bra: Hym) 850614 (1); *Oracistrocerus drewseni drewseni* (Ves: Hym) 850615 (1); *Vespa xanthoptera* (Ves: Hym) 850615 (1); *Ectemnius (Hypocrabro) rubicola* (Sph: Hym) M: 860525 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) 860525 (1), F: 850615 (1), 870616 (1); *Andrena (Simandrena) yamamotoi* (And: Hym) F: 860525 (1); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (Ant: Hym) 850615 (3); *Apis cerana japonica* (Api: Hym) W: 850614 (3), 850615 (1), 870616 (1)

62. *Swida stolonifera*

NEUROPTERA3 (Neu: Neu) 860602 (1); *Anthrenus verbasci* (Der: Col) 850531 (4), 850605 (5), 850614 (3), 860602 (12); *Nonartha cyaneum* (Chr: Col) F: 850817 (1); *Apis mellifera* (Api: Hym) W: 850531 (1), 850605 (1)

ELAEAGNACEAE

63. *Elaeagnus multiflora*

Tetralonia nipponens (Ant: Hym) M: 860424 (2); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (Ant: Hym) F: 860424 (1); *Apis mellifera* (Api: Hym) W: 860424 (4)

CELASTRACEAE

64. *Euonymus fortunei*

Anthrenus verbasci (Der: Col) 850531 (4)

AQUIFOLIACEAE65. *Ilex serrata*

Formica japonica (For: Hym) 860611 (1); *Lasioglossum* (*Lasioglossum*) *occidens* (Hal: Hym) F: 860611 (1)

EUPHORBIACEAE66. *Securinega suffruticosa*

EPHYDRIDAE8 (Eph: Dip) 870617 (1); ANTHOMYIIDAE50 (Ant: Dip) F: 870617 (1), M: 870617 (1); *Andrena japonica* (And: Hym) F: 870617 (1); *Apis cerana japonica* (Api: Hym) W: 870617 (15); *Apis mellifera* (Api: Hym) W: 870617 (1)

VITACEAE67. *Cayratia japonica*

ARANEIDA32 (Ara: Ara) 870904 (1); *Graphium sarpedon nipponum* (Pap: Lep) M: 870725 (1); TACHINIDAE19 (Tac: Dip) 870904 (1); *Oxycetonia jucunda* (Sca: Col) 870904 (1); *Popillia japonica* (Sca: Col) 850803 (2); *Callosobruchus chinensis* (Bru: Col) 870904 (1); *Arge similis* (Ari: Hym) M: 870820 (1); BRACONIDAE7 (Bra: Hym) F: 870904 (1); *Polistes jadwigae* (Ves: Hym) 850724 (1), F: 860719 (1), 870820 (1); *Polistes mandarinus* (Ves: Hym) 850719 (2), 850724 (1), 850726 (1), 850817 (1), F: 860701 (1), 860719 (1); *Polistes snelleni* (Ves: Hym) 850626 (1), F: 860701 (1); *Vespa analis insularis* (Ves: Hym) 850710 (1), Q: 870904 (1); *Vespa xanthoptera* (Ves: Hym) 850710 (1), 850724 (1), W: 860719 (2), 860723 (2), 870815 (1), 870820 (1), 870914 (1); *Cerceris japonica* (Sph: Hym) M: 850726 (1), 850807 (1); *Sphex diabolicus flammitrichus* (Sph: Hym) F: 870815 (1), M: 870904 (1); *Lasioglossum* (*Lasioglossum*) *scitulum* (Hal: Hym) M: 850807 (1); *Lasioglossum* (*Lasioglossum*) *scitulum* (Hal: Hym) M: 860723 (1); *Apis cerana japonica* (Api: Hym) W: 850726 (2), 870815 (2), 870820 (1), 870904 (3); *Apis mellifera* (Api: Hym) W: 870914 (1)

HIPPOCASTANACEAE68. *Aesculus carnea*

Philopota nigroaenea (Acr: Dip) M: 850501 (3); *Episyrphus balteatus* (Syr: Dip) F: 850501 (1), 850512 (1); CALLIPHORIDAE7 (Cal: Dip) F: 860525 (1); *Lasioglossum* (*Evylaeus*) *japonicum* (Hal: Hym) F: 850509 (1), 860525 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 850509 (3); *Bombus* (*Pyrobombus*) *ardens* (Api: Hym) Q: 850504 (1), W: 850504 (1), 850512 (1)

ANACARDIACEAE69. *Rhus javanica*

Parnara guttata (Hes: Lep) M: 850919 (1); *Graphium sarpedon nipponum* (Pap: Lep) F: 850919 (1); CALLIPHORIDAE5 (Cal: Dip) M: 850919 (2); *Vespa xanthoptera* (Ves: Hym) 850919 (3), W: 860911 (2); *Apis cerana japonica* (Api: Hym) W: 850919 (1)

70. *Rhus sylvestris*

MIRIDAE4 (Mir: Hem) 860526 (1); ANTHOMYIIDAE1 (Ant: Dip) M: 860526 (1); CALLIPHORIDAE1 (Cal: Dip) M: 860526 (1); CALLIPHORIDAE10 (Cal: Dip) F: 860526 (1); SARCOPHAGIDAE16 (Sar: Dip) M: 860526 (1); *Phyllopertha irregularis* (Sca: Col) 860526 (1); *Agrypnus binodulus* (Ela: Col) 860526 (1); *Anthrenus verbasci* (Der: Col) 860526 (5); *Carpophilus chalybeus* (Nit: Col) 860526 (1); *Mordellistena* sp. (Mor: Col) 860526 (9);

*ICHNEUMONIDAE*79 (*Ich: Hym*) F: 860526 (1); *Camponotus japonicus* (*For: Hym*) 860526 (2); *Vespa xanthoptera* (*Ves: Hym*) Q: 860526 (1); *Apis cerana japonica* (*Api: Hym*) W: 860526 (2)

RUTACEAE

71. *Citrus tachibana*

Papilio xuthus (*Pap: Lep*) 850516 (1); *Blitopertha conspurcata* (*Sca: Col*) 850522 (1); *Eucetonia pilifera* (*Sca: Col*) 860525 (1); *Oxycetonia jucunda* (*Sca: Col*) 850522 (1); *Anthrenus verbasci* (*Der: Col*) 860602 (2); *Lasius niger* (*For: Hym*) 860602 (1); *Pristomyrmex punger* (*For: Hym*) 860602 (3); *Osmia imaii* (*Meg: Hym*) F: 850516 (1); *Tetralonia nipponens* (*Ant: Hym*) F: 850516 (1); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (*Ant: Hym*) 850516 (2); *Bombus (Bombus) hypocrita hypocrita* (*Api: Hym*) Q: 850518 (1), 850522 (2); *Bombus (Bombus) ignitus* (*Api: Hym*) Q: 850518 (1); *Bombus (Pyrobombus) ardens* (*Api: Hym*) Q: 850522 (1)

OXALIDACEAE

72. *Oxalis corniculata*

Lasioglossum (Evylaeus) sp.18 (*Hal: Hym*) F: 870605 (1)

73. *Oxalis corymbosa*

*ARANEIDA*11 (*Ara: Ara*) 860603 (1); *ORTHOPTERA*12 (*Ort: Ort*) 860603 (1); *Pieris rapae* (*Pie: Lep*) F: 860712 (1), 860719 (1); *Philopota nigroaenea* (*Acr: Dip*) M: 870506 (1); *PIPUNCULIDAE*2 (*Pip: Dip*) 860603 (1); *TEPHRITIDAE*8 (*Tep: Dip*) 860603 (1); *Lasioglossum (Evylaeus) sp.18* (*Hal: Hym*) F: 860603 (1); *Tetralonia nipponens* (*Ant: Hym*) F: 850509 (1); *Ceratina flavipes* (*Ant: Hym*) F: 860603 (1)

ARALIACEAE

74. *Fatsia japonica*

*MYCETOPHILIDAE*7 (*Myc: Dip*) 861120 (2); *DROSOPHILIDAE*6 (*Dro: Dip*) 861120 (1); *Vespula flaviceps lewisi* (*Ves: Hym*) Q: 861120 (1)

UMBELLIFERAE

75. *Torilis japonica*

Sphaerophoria macrogaster (*Syr: Dip*) F: 850509 (1)

LOGANIACEAE

76. *Buddleia davidii*

Xylocopa (Alloxylocopa) appendiculata circumvolan (*Ant: Hym*) 850817 (1), 850828 (1), 860807 (1)

OLEACEAE

77. *Forsythia suspensa*

Pachyprotasis sp. (*Ten: Hym*) 850409 (2); *CHALCIDIDAE*1 (*Cha: Hym*) F: 850409 (1)

78. *Fraxinus griffithii*

Polistes jadwigae (*Ves: Hym*) F: 860719 (1); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (*Ant: Hym*) 860719 (1)

79. *Ligustrum japonicum*

Dybowskyia reticulata (*Pen: Hem*) 860611 (2); *Eristalis cerealis* (*Syr: Dip*)

- M: 860611 (1); LAUXANIIDAE17 (Lau: Dip) 860611 (1); ANTHOMYIIDAE 38 (Ant: Dip) F: 860611 (1); CALLIPHORIDAE8 (Cal: Dip) M: 860611 (1); *Anomala albopilosa* (Sca: Col) 860611 (1); *Eucetonia pilifera* (Sca: Col) 860611 (4); *Chlorophorus japonicus* (Cer: Col) 860611 (1); *Lasioglossum* (*Carinate Evylaeus*) *duplex* (Hal: Hym) F: 860611 (1); *Lasioglossum* (*Lasioglossum*) *mutilum* (Hal: Hym) F: 860611 (1); *Lasioglossum* (*Lasioglossum*) *occidens* (Hal: Hym) F: 860611 (2); *Megachile tsurugensis* (Meg: Hym) F: 860611 (2); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 860611 (1); *Ceratina flavipes* (Ant: Hym) F: 860611 (1); *Apis cerana japonica* (Api: Hym) W: 860611 (2); *Apis mellifera* (Api: Hym) W: 860611 (1)
80. *Ligustrum obtusifolium*
Graphium sarpedon nipponum (Pap: Lep) F: 850522 (1); *Episyrphus balteatus* (Syr: Dip) F: 870528 (3), M: 870528 (1); *Vollucella tabanoides* (Syr: Dip) M: 870528 (1); *Gymnosoma rotundatum* (Pha: Dip) 870528 (1); *Polistes jadwigae* (Ves: Hym) F: 870528 (1); *Vespa xanthoptera* (Ves: Hym) Q: 870528 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 850522 (3), 850526 (5), 870528 (1), 870605 (1); *Bombus* (*Bombus*) *hypocrita hypocrita* (Api: Hym) Q: 850522 (2), 850526 (1), W: 870528 (1); *Bombus* (*Bombus*) *ignitus* (Api: Hym) Q: 850522 (2), 850526 (1), 850531 (1), W: 870528 (1); *Apis mellifera* (Api: Hym) W: 850526 (1)
81. *Syringa vulgaris*
Eurystylus coelestialium (Mir: Hem) 860526 (2); TETTIGELLIDAE4 (Tet: Hem) 860526 (1); *Oxycetonia jucunda* (Sca: Col) 860526 (2); *Anthrenus verbasci* (Der: Col) 860526 (22); *Carpophilus chalybeus* (Nit: Col) 860526 (2); NITIDULIDAE9 (Nit: Col) 860526 (1); *Mordellistena* sp. (*Mor: Col*) 860526 (15); *Bruchidius dorsalis* (Bru: Col) 860526 (1); *Nonartha cyaneum* (Chr: Col) 860526 (1)

CONVOLVULACEAE

82. *Calystegia japonica*
Metasyrphus nintens (Syr: Dip) M: 870528 (1)

POLEMONIACEAE

83. *Phlox subulata*
Papilio xuthus (Pap: Lep) M: 850501 (1)

VERBENACEAE

84. *Callicarpa japonica*
Protaetia orientalis (Sca: Col) 860704 (1)
85. *Clerodendron trichotomum*
Chalicodoma disjunctiformis (Meg: Hym) F: 850817 (1)
86. *Vitex cannabifolia*
Sastragala scutellata (Pen: Hem) 850720 (1); *Eurystylus coelestialium* (Mir: Hem) 870707 (2), 870710 (1); MIRIDAE25 (Mir: Hem) 860911 (1); SESIIDAE 1 (Ses: Lep) 850705 (1); *Papilio xuthus* (Pap: Lep) F: 850903 (1); *Papilix protenor demetrius* (Pap: Lep) F: 860719 (1), M: 860723 (1); *Pieris rapae* (Pie: Lep) M: 860723 (2); CERATOPOGONIDAE5 (Cer: Dip) 870707 (1); DOLICHOPODIDAE2 (Dol: Dip) 850719 (1); *Megaspis zonata* (Syr: Dip) F: 861014 (1); *Syricta pipiens* (Syr: Dip) M: 850720 (1); LONCHAEIDAE7 (Lon: Dip) 870801 (1); DROSOPHILIDAE4 (Dro: Dip) 860807 (1); EPHYDRIDAE1 (Eph: Dip) 870707 (1); EPHYDRIDAE18 (Eph: Dip) 850719 (1); EPHYDRIDAE9 (Eph: Dip) 870801 (2); CANACEIDAE4 (Can: Dip) 870801 (1); CHLOROPIDAE 19 (Chl: Dip) 850719 (3); CHLOROPIDAE23 (Chl: Dip) 850719 (1); ANTHO-

MYIIDAE50 (Ant: Dip) 870806 (1), F: 860717 (1), 860730 (8), 870806 (5), M: 860730 (2), 870806 (1); Oxycetonia jucunda (Sca: Col) 850814 (1), 850828 (1), 850903 (1), 850919 (1), 870921 (2); Protaetia orientalis (Sca: Col) 850912 (1); Anthrenus verbasci (Der: Col) 850720 (1); NITIDULIDAE13 (Nit: Col) 860719 (1); Bruchidius urbanus (Bru: Col) 860730 (1); Callosobruchus chinensis (Bru: Col) 870801 (1); Nonartha cyaneum (Chr: Col) 850705 (1), 850719 (1), 860719 (2), 860723 (1), 870707 (1); BRACONIDAE35 (Bra: Hym) F: 860723 (1); CHRYSIDIDAE1 (Chr: Hym) F: 860926 (1); Campsomeris grossa matsumurai (Sco: Hym) M: 860831 (1), 870814 (1); Campsomeris primatica (Sco: Hym) M: 860926 (1), 870707 (1); Scolia historionica japonica (Sco: Hym) F: 850731 (1), M: 870806 (1); Scolia oculata (Sco: Hym) F: 850705 (1), 860719 (1), M: 870630 (1); Anterhynchium flavomarginatum micado (Ves: Hym) M: 860719 (1); Eumenes decorata (Ves: Hym) 850720 (1); Eumenes rubronotatus (Ves: Hym) M: 850731 (1); Polistes jadwigae (Ves: Hym) F: 870630 (1), 870820 (1); Vespa analis insularis (Ves: Hym) 850912 (1); Vespa xanthoptera (Ves: Hym) 850719 (1), W: 860712 (1); Ammophila clavus (Sph: Hym) 850802 (1); Cerceris albofasciata (Sph: Hym) M: 850719 (3), 860807 (1), 860818 (1); Cerceris japonica (Sph: Hym) M: 860719 (1), 860807 (1), 860827 (1); Halictus (Seladonia) aerarius (Hal: Hym) F: 850705 (1); Lasioglossum (Lasioglossum) mutilum (Hal: Hym) M: 870806 (1); Lasioglossum (Lasioglossum) occidens (Hal: Hym) 860719 (1), 860802 (1), 870820 (2), F: 860730 (1), M: 850719 (1), 860723 (1), 860818 (1), 861014 (1), 870723 (1), 870820 (1); Andrena (Calomelissa) protomias (And: Hym) M: 860717 (1); Anthidium septemspinosa (Meg: Hym) 850731 (2), 850802 (2), 850807 (3), 850814 (1), 850821 (1), 860717 (2), 860719 (3), 860723 (1), 860730 (3), 860807 (5), 860813 (5), 860818 (4), 860827 (1), 860905 (1), 870707 (4), 870710 (6), 870723 (3), 870806 (3), 870814 (1), 870820 (1); Chalicodoma disjunctiformis (Meg: Hym) 860813 (1), 860818 (1), 860831 (2), 860905 (3), F: 850828 (1), 850830 (2), 850912 (2), 850919 (2), 860818 (1), 860926 (1), M: 850821 (1); Chalicodoma sculpturalis (Meg: Hym) F: 860926 (1), 861004 (1), 861014 (1), M: 860712 (1), 860723 (1), 860807 (3), 861004 (1), 861014 (1), 870801 (1); Chalicodoma spissula (Meg: Hym) F: 850705 (1), 850719 (3), 850731 (5), 850814 (1), 850821 (3), 860723 (4), 860730 (8), 860807 (4), 860813 (6), 860827 (6), 870630 (1), 870723 (3), 870801 (4), 870806 (3), 870814 (7), 870820 (2), 870826 (1), M: 850705 (1), 850719 (1), 850731 (1), 860719 (2), 860723 (3), 860730 (2), 860807 (2), 870707 (1), 870710 (1), 870723 (2), 870801 (2); Coelioxys fenestrata (Meg: Hym) M: 860831 (1), 870707 (1); Euapis basalis (Meg: Hym) 860905 (1), 861004 (1), 870707 (1), F: 861004 (1), M: 870707 (1); Megachile kobensis (Meg: Hym) F: 860712 (1), 860717 (1), 860719 (1), 860723 (2), 860730 (1), 870806 (1), M: 860730 (1), 870723 (1); Megachile nipponica (Meg: Hym) M: 860717 (1), 870630 (1); Megachile pseudomonticola (Meg: Hym) M: 870806 (1); Megachile remota sakagamii (Meg: Hym) F: 861014 (1); Megachile subalbata (Meg: Hym) F: 850903 (1), 860905 (1), M: 850821 (1), 860723 (1), 870820 (1), 870826 (1); Megachile tsurugensis (Meg: Hym) F: 861014 (1), M: 860717 (1), 860723 (1), 860926 (1); Xyllocopa (Alloxylocopa) appendiculata circumvolan (Ant: Hym) 850705 (1), 850719 (2), 850903 (1), 850912 (3), 850919 (5), 860827 (1), 860831 (1), 860905 (3), 860911 (1), 860926 (1), 861004 (1), 861014 (2), 870630 (1), 870921 (3), 871007 (1); Ceratina flavipes (Ant: Hym) 870826 (1), F: 850719 (2), 850807 (1), 870723 (1), 870806 (1), 870814 (2), 870826 (1); Ceratina japonica (Ant: Hym) F: 850719 (1); Bombus (Bombus) ignitus (Api: Hym) Q: 850828 (1), 860905 (1); Apis cerana japonica (Api: Hym) W: 850719 (2), 860712 (1), 860717 (3); Apis mellifera (Api: Hym) W: 850828 (1), 860717 (4)

SCROPHULARIACEAE

87. *Veronicastrum sibiricum*

- Parnara guttata* (Hes: Lep) F: 860911 (1); *Megaspis zonata* (Syr: Dip) F: 860822 (1); *Campsomeris annulata* (Sco: Hym) M: 860831 (1); *Campsomeris grossa matsumurai* (Sco: Hym) M: 860822 (2), 860831 (5), 860911 (1); *Campsomeris primatica* (Sco: Hym) M: 860911 (1); *Campsomeris testaceipes* (Sco: Hym) F: 850830 (1), 850903 (2); *Scolia oculata* (Sco: Hym) F: 860911 (1); *Colletes* sp.2 (Col: Hym) M: 860911 (1); *Hylaeus nippon* (Col: Hym) M: 860911 (1)
88. *Veronica persica*
Sphaerophoria macrogaster (Syr: Dip) 860412 (1)

BIGNONIACEAE

89. *Campsis grandiflora*
Lasius niger (For: Hym) 860719 (1); *Pristomyrmex punger* (For: Hym) 860719 (4)

ACANTHACEAE

90. *Justicia procumbens*
Eurema hecabe (Pie: Lep) F: 861027 (3), M: 861014 (1); *Pieris melete* (Pie: Lep) M: 851002 (1); *Zizeeria maha* (Lyc: Lep) F: 851002 (1), 870826 (2); *Helophilus virgatus* (Syr: Dip) F: 861020 (1); CALLIPHORIDAE5 (Cal: Dip) F: 861020 (2); *Campsomeris grossa matsumurai* (Sco: Hym) M: 861014 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) 861014 (1), F: 851002 (1), 861014 (1); *Bombus (Diversobombus) diversus diversus* (Api: Hym) W: 861014 (1); *Apis cerana japonica* (Api: Hym) W: 851014 (2)

RUBIACEAE

91. *Paederia scandens*
Lasioglossum (Evylaeus) taniolellum (Hal: Hym) F: 850810 (1)
92. *Serissa japonica*
Tetralonia nipponens (Ant: Hym) F: 850522 (1)

CAPRIFOLIACEAE

93. *Abelia grandiflora*
Sphaerophoria macrogaster (Syr: Dip) F: 860603 (1), M: 860603 (5); *Sphaerophoria menthastri* (Syr: Dip) M: 860603 (1); TEPHRITIDAE4 (Tep: Dip) 860603 (1); DROSOPHILIDAE3 (Dro: Dip) 860603 (1)
94. *Abelia spathulata*
Parnara guttata (Hes: Lep) M: 850720 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) F: 850726 (3), 850803 (2), 850810 (1), 850817 (2)
95. *Lonicera morrowii*
Philopota nigroaenea (Acr: Dip) M: 850504 (1); *Eucetonia pilifera* (Sca: Col) 850504 (1); *Lasioglossum (Lasioglossum) scitulum* (Hal: Hym) F: 850504 (1); *Andrena (Simandrena) yamamotoi* (And: Hym) F: 870506 (1); *Osmia imaii* (Meg: Hym) F: 850504 (1); *Anthophora pilipes villosula* (Ant: Hym) F: 850504 (2); *Tetralonia nipponens* (Ant: Hym) M: 850504 (1), 860430 (1); *Xylocopa (Alloxylocopa) appendiculata circumvolan* (Ant: Hym) 850504 (1)
96. *Viburnum dilatatum*
Episyrphus balteatus (Syr: Dip) F: 870528 (1), M: 870528 (1); *Eristalis cerealis* (Syr: Dip) M: 870528 (1); ANTHOMYIIDAE50 (Ant: Dip) F: 870528 (1); *Osmia imaii* (Meg: Hym) F: 860525 (1)
97. *Viburnum erosum*
TEPHRITIDAE10 (Tep: Dip) 860526 (1); *Mordellina* sp. (Mor: Col) 860526

- (1); *Mordellistena* sp. (Mor: Col) 860526 (5); *Athalia japonica* (Ten: Hym) F: 860526 (1); *Andrena* (*Simandrena*) *opacifovea opacifovea* (And: Hym) F: 860526 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 860526 (1)
98. *Viburnum suspensum*
Anthophora pilipes villosula (Ant: Hym) M: 860421 (1); *Nomada ginran* (Ant: Hym) F: 860421 (1)
99. *Weigela hortensis*
 NEUROPTERA3 (Neu: Neu) 860525 (1); *Philopota nigroaenea* (Acr: Dip) M: 860525 (1); ANTHOMYIIDAE10 (Ant: Dip) M: 860525 (1); *Tiphia* sp. (*Tip: Hym*) F: 860525 (1); *Lasioglossum* (*Lasioglossum*) *proximatum* (Hal: Hym) F: 860525 (2); *Ceratina flavipes* (Ant: Hym) F: 860525 (1), 860602 (1)

COMPOSITAE

100. *Aster ageratoides*
Eristalis cerealis (Syr: Dip) F: 850919 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 850912 (1); *Oxycetonia jucunda* (Sca: Col) 860926 (4); *Campsomeris grossa matsumurai* (Sco: Hym) F: 850919 (1)
101. *Baccharis trimera*
 ARANEIDA24 (Ara: Ara) 860926 (1); ARANEIDA4 (Ara: Ara) 860926 (1); LYGAEIDAE3 (Lyg: Hem) 860926 (2); *Ypthima argus* (Sat: Lep) M: 860926 (1); NOCTUIDAE1 (Noc: Lep) 860926 (1); *Eristalis cerealis* (Syr: Dip) F: 851002 (1), 861004 (1); *Helophilus virgatus* (Syr: Dip) F: 861004 (1); ANTHOMYIIDAE50 (Ant: Dip) F: 851002 (4), 860926 (5), 861004 (1), 870929 (1), M: 860926 (1), 870929 (1); TACHINIDAE24 (Tac: Dip) F: 860926 (1); TACHINIDAE50 (Tac: Dip) F: 860926 (1); CALLIPHORIDAE5 (Cal: Dip) F: 860926 (1), M: 860926 (1); SARCOPHAGIDAE1 (Sar: Dip) 860926 (2), 861004 (1); SARCOPHAGIDAE2 (Sar: Dip) 860926 (1); *Aulacophora nigripennis* (Chr: Col) 851002 (1); *Nonartha cyaneum* (Chr: Col) 870929 (1); *Arge similis* (Ari: Hym) 851002 (1), M: 860926 (1); *Campsomeris primatica* (Sco: Hym) M: 860926 (1); *Lasioglossum* (*Lasioglossum*) *occidens* (Hal: Hym) 860926 (2), 870929 (1), F: 851002 (2), 870929 (1); *Ceratina flavipes* (Ant: Hym) F: 860926 (1); *Apis cerana japonica* (Api: Hym) W: 861004 (1)
102. *Cirsium nipponica*
Parnara guttata (Hes: Lep) F: 870914 (1); *Nonartha cyaneum* (Chr: Col) 870914 (1); *Polistes jadwigae* (Ves: Hym) F: 870914 (1); *Lasioglossum* (*Lasioglossum*) *occidens* (Hal: Hym) M: 870914 (1); *Megachile subalbata* (Meg: Hym) F: 870914 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 870914 (1); *Ceratina japonica* (Ant: Hym) F: 870914 (1)
103. *Coreopsis basalis*
Lasioglossum (*Lasioglossum*) *occidens* (Hal: Hym) 870605 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 870528 (1); *Ceratina flavipes* (Ant: Hym) F: 870605 (1)
104. *Ixeris debilis*
 ARANEIDA5 (Ara: Ara) 870516 (1); *Stenodynerus frauenfeldi* (Ves: Hym) M: 870516 (1)
105. *Ixeris dentata*
Metasyrphus nintens (Syr: Dip) M: 870528 (1); *Andrena* (*Chlorandrena*) *Knuthi* (And: Hym) F: 870528 (1)
106. *Stenactis annuus*
 PHALANGIDA1 (Pha: Pha) 860603 (1); ARANEIDA1 (Ara: Ara) 860603 (1); ARANEIDA12 (Ara: Ara) 870904 (2), 870914 (2); ARANEIDA13 (Ara: Ara) 860603 (2); ARANEIDA14 (Ara: Ara) 860603 (1); ARANEIDA15 (Ara: Ara) 860603 (1); ARANEIDA16 (Ara: Ara) 870904 (1), 870914 (1); ARANEIDA17 (Ara: Ara) 870904 (1); ARANEIDA2 (Ara: Ara) 860603 (1), 870914 (1);

- ARANEIDA25 (Ara: Ara) 870904 (1); ARANEIDA26 (Ara: Ara) 870914 (1); ARANEIDA29 (Ara: Ara) 870914 (1); ARANEIDA30 (Ara: Ara) 870914 (1); ARANEIDA31 (Ara: Ara) 870914 (1); ARANEIDA38 (Ara: Ara) 870914 (1); ORTHOPTERA8 (Ort: Ort) 860603 (1); *Leptocorixa corbetti* (Cor: Hem) 870914 (1); *Nysius* sp. (Lyg: Hem) 860603 (4); LYGAEIDAE3 (Lyg: Hem) 850626 (1), 860526 (2), 860603 (1), 870904 (5), 870914 (9); ANTHOCORIDAE1 (Ant: Hem) 870904 (1); MIRIDAE27 (Mir: Hem) 870914 (1); TETTIGELLIDAE4 (Tet: Hem) 860526 (3); TRICHOPTERA7 (Tri: Tri) 860603 (1); *Graphium sarpedon nipponum* (Pap: Lep) F: 870528 (1); *Pieris rapae* (Pie: Lep) F: 850710 (1), 860712 (1); *Lycaena phlaeas* (Lyc: Lep) M: 870914 (2); *Zizeeria maha* (Lyc: Lep) M: 850710 (1); *Ypthima argus* (Sat: Lep) f: 860515 (1); SOLVIDAE1 (Sol: Dip) 870623 (1); DOLICHOPODIDAE2 (Dol: Dip) 860603 (1); DOLICHOPODIDAE4 (Dol: Dip) 860526 (1), 860603 (1), 860626 (1); *Episyrphus balteatus* (Syr: Dip) 860515 (1); *Eristalis cerealis* (Syr: Dip) F: 850710 (1), M: 860603 (1); *Eristalomyia tenax* (Syr: Dip) F: 850626 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 860526 (1), 860603 (4), 860704 (1), 870528 (1), 870605 (1), M: 850710 (1), 860603 (8), 860701 (1), 870605 (1); *syrilla pipiens* (Syr: Dip) M: 870710 (1); LAUXANIIDAE1 (Lau: Dip) 860603 (1); DROSOPHILIDAE12 (Dro: Dip) 870707 (1); EPHYDRIDAE12 (Eph: Dip) 850710 (1); EPHYDRIDAE13 (Eph: Dip) 850710 (1); CHLOROPIDAE2 (Chl: Dip) F: 850626 (1); CLUSIIDAE1 (Clu: Dip) 860603 (1); ANTHOMYIIDAE36 (Ant: Dip) 860603 (1); ANTHOMYIIDAE39 (Ant: Dip) F: 870623 (1); ANTHOMYIIDAE50 (Ant: Dip) F: 870914 (1); TACHINIDAE17 (Tac: Dip) F: 860526 (1); TACHINIDAE36 (Tac: Dip) F: 850626 (1); *Gymnosoma rotundatum* (Pha: Dip) 870506 (1); SARCOPHAGIDAE2 (Sar: Dip) 860603 (1); *Oxycetonia jucunda* (Sca: Col) 870904 (5), 870914 (3); *Anthrenus verbasci* (Der: Col) 860515 (6), 860526 (4), 860603 (3), 870528 (2); *Dere thoracica* (Cer: Col) 860603 (1); *Bruchidius urbanus* (Bru: Col) 870904 (1); *Nonartha cyaneum* (Chr: Col) 870914 (1); *Brachymeria fiskei* (Cha: Hym) M: 870914 (1); *Lasius niger* (For: Hym) 860526 (1); *Pristomyrmex punger* (For: Hym) 860603 (2); *Stenodynerus tokyanus tokyanus* (Ves: Hym) 850619 (1); *Cerceris japonica* (Sph: Hym) M: 860626 (1); *Halictus (Seladonia) aerarius* (Hal: Hym) M: 870707 (1); *Lasioglossum (Evylaeus) japonicum* (Hal: Hym) F: 850619 (1); *Lasioglossum (Evylaeus) sp.18* (Hal: Hym) F: 860603 (3), 870506 (1); *Lasioglossum (Evylaeus) sibiriacum* (Hal: Hym) F: 850626 (1), 850710 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) 860701 (1), 870506 (1), 870516 (1), F: 850509 (2); *Andrena (Chlorandrena) Knuthi* (And: Hym) F: 860603 (1); *Megachile nipponica* (Meg: Hym) M: 870528 (1); *Ceratina flavipes* (Ant: Hym) F: 870528 (2), 870707 (1), M: 870506 (4); *Nomada sheppardana okubira* (Ant: Hym) M: 870707 (1)
107. *Taraxacum japonicum*
DOLICHOPODIDAE4 (Dol: Dip) 860526 (1); *Sphaerophoria macrogaster* (Syr: Dip) F: 860526 (4), M: 850425 (1); *Sphaerophoria menthastri* (Syr: Dip) M: 850426 (1), 860526 (1); EPHYDRIDAE11 (Eph: Dip) 860526 (1); CHLOROPIDAE4 (Chl: Dip) 860526 (1); ANTHOMYIIDAE21 (Ant: Dip) F: 860526 (1); *Halictus (Seladonia) aerarius* (Hal: Hym) F: 850529 (1); *Lasioglossum (Lasioglossum) occidens* (Hal: Hym) F: 850425 (1); *Andrena (Chlorandrena) Knuthi* (And: Hym) F: 860526 (9), 860603 (2), 870506 (1), 870516 (1); *Tetralonia nipponensis* (Ant: Hym) M: 860429 (2); *Ceratina flavipes* (Ant: Hym) F: 860526 (1), 870516 (1), M: 850425 (2); *Ceratina iwatai* (Ant: Hym) F: 870416 (1), M: 870416 (1)

COMMELINACEAE

108. *Pollia japonica*
Pristomyrmex punger (For: Hym) 860719 (1); *Lasioglossum (Lasioglossum)*

- occidens* (Hal: Hym) F: 850810 (1), 860802 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 860802 (1); *Bombus* (*Diversobombus*) *diversus diversus* (Api: Hym) W: 860802 (2)
109. *Tradescantia ohiensis*
Lasioglossum (*Carinate Evylaeus*) *duplex* (Hal: Hym) F: 850607 (1); *Lasioglossum* (*Evylaeus*) *japonicum* (Hal: Hym) F: 850529 (1); *Bombus* (*Bombus*) *hypocrita hypocrita* (Api: Hym) W: 850607 (1); *Bombus* (*Pyrobombus*) *ardens* (Api: Hym) M: 850614 (1), W: 850518 (1), 850526 (1), 850531 (1), 850607 (1); *Apis cerana japonica* (Api: Hym) W: 850614 (1)

IRIDACEAE

110. *Iris japonica*
 SCATOPHAGIDAE1 (Sca: Dip) 850419 (1)
111. *Iris pseudacorus*
Melanostoma scalare (Syr: Dip) F: 860526 (1); *Lasioglossum* (*Lasioglossum*) *occidens* (Hal: Hym) F: 870516 (1); *Xylocopa* (*Alloxylocopa*) *appendiculata circumvolan* (Ant: Hym) 850516 (2); *Nomada japonica* (Ant: Hym) F: 850516 (1); *Apis mellifera* (Api: Hym) W: 850518 (1), 860526 (3)

LILIACEAE

112. *Liriope platyphylla*
Nonartha cyaneum (Chr: Col) 870904 (2); *Lasioglossum* (*Evylaeus*) *japonicum* (Hal: Hym) F: 870904 (2); *Bombus* (*Bombus*) *ignitus* (Api: Hym) Q: 870904 (1)

ORCHIDACEAE

113. *Spiranthes sinensis*
Pieris rapae (Pie: Lep) 850704 (1), F: 850710 (1), 860719 (2), M: 850710 (1); *Ypthima argus* (Sat: Lep) F: 860712 (1), 860719 (1); *Anthidium septemspinosum* (Meg: Hym) 860719 (1)

Appendix 2.

Plants visited by each identified insect species. Each record is arranged in the following order: plant species name, sex and caste (F - female, M- male, Q - queen, W - worker, if indistinguishable, no code is added), date in the form of year + month + day, and the number of insect individuals in parenthesis. Plants are arranged in the order of Table 2. Insect families are arranged in the order of Table 3. Insects in same families are alphabetized.

HEMIPTERA PENTATOMIDAE

- Dybowskyia reticulata*
Ligustrum japonicum, 860611 (2)
Sastragala scutellata
Vitex cannabifolia, 850720 (1)

COREIDAE

- Cletus rusticus*
Spiraea blumei, 850501 (1)
Cletus trigonus
Pyracantha angustifolia, 860525 (1)
Leptocorixa corbetti
Stenactis annuus, 870914 (1)

MIRIDAE

- Eurystylus coelestialium*
Itea parviflora, 860603 (4); *Syringa vulgaris*, 860526 (2); *Vitex cannabifolia*, 870707 (2), 870710 (1)

LEPIDOPTERA

HESPERIDAE

- Parnara guttata*
Persicaria thunbergii, 851007 (1), M: 850930 (2), 851002 (2); *Photinia glabra*, M: 870929 (1); *Lythrum anceps*, F: 870826 (1), M: 870914 (1); *Rhus javanica*, M: 850919 (1); *Veronicastrum sibiricum*, F: 860911 (1); *Abelia spathulata*, M: 850720 (1); *Cirsium nipponica*, F: 870914 (1)

PAPILIONIDAE

- Byasa alcinous*
Desmodium podocarpum, F: 850930 (1)
Graphium sarpedon nipponum
Persicaria thunbergii, F: 851007 (1); *Deutzia crenata*, M: 860602 (1); *Swida macrophylla*, M: 860525 (1); *Cayratia japonica*, M: 870725 (1); *Rhus javanica*, F: 850919 (1); *Ligustrum obtusifolium*, F: 850522 (1); *Stenactis annuus*, F: 870528 (1)
Papilio xuthus
Rhododendron oomurasaki, M: 850504 (1), 860430 (1), 860507 (1), 860512 (1); *Rosa borboniana*, F: 860611 (1); *Citrus tachibana*, 850516 (1); *Phlox subulata*, M: 850501 (1); *Vitex cannabifolia*, F: 850903 (1)
Papilio protenor demetrius

Rhododendron oomurasaki, F: 850501 (1); *Vitex cannabifolia*, F: 860719 (1), M: 860723 (1)

PIERIDAE

Anthocris scolymus

Ranunculus silerifolius, M: 850425 (1)

Eurema hecabe

Persicaria thunbergii, 851002 (1), F: 851014 (1), 851021 (1), 861020 (1), M: 851007 (1); *Prunus spachiana*, 850409 (1); *Justicia procumbens*, F: 861027 (3), M: 861014 (1)

Pieris melete

Persicaria thunbergii, M: 851002 (1); *Justicia procumbens*, M: 851002 (1)

Pieris rapae

Persicaria thunbergii, M: 851014 (2); *Deutzia crenata*, M: 860611 (1); *Lythrum anceps*, F: 870929 (2), M: 850919 (1); *Oxalis corymbosa*, F: 860712 (1), 860719 (1); *Vitex cannabifolia*, M: 860723 (2); *Stenactis annuus*, F: 850710 (1), 860712 (1); *Spiranthes sinensis*, 850704 (1), F: 850710 (1), 860719 (2), M: 850710 (1)

LYCAENIDAE

Everes argiades

Trifolium repens, M: 860701 (1)

Lycaena phlaeas

Pyracantha angustifolia, F: 860525 (1); *Stenactis annuus*, M: 870914 (2)

Zizeeria maha

Persicaria thunbergii, F: 851018 (1), 851031 (1), M: 861020 (1), 861027 (1); *Trifolium repens*, F: 860701 (2); *Justicia procumbens*, F: 851002 (1), 870826 (2); *Stenactis annuus*, M: 850710 (1)

Libythea celtis

Prunus spachiana, 850409 (1)

SATYRIDAE

Ypthima argus

Deutzia crenata, F: 870528 (1); *Deutzia gracilis*, F: 850512 (1); *Swida macrophylla*, M: 860525 (1); *Baccharis trimera*, M: 860926 (1); *Stenactis annuus*, f: 860515 (1); *Spiranthes sinensis*, F: 860712 (1), 860719 (1)

LYMANTRIIDAE

Ivela auripes

Deutzia crenata, 860602 (1)

DIPTERA

BOMBYLIIDAE

Bombylius major

Enkianthus perulatus, 860424 (1); *Rhododendron oomurasaki*, 860512 (1); *Malus halliana*, F: 850425 (1)

ACROCERIDAE

Philopota nigroaenea

Rhododendron mucronata, M: 870430 (1), 870506 (2); *Rhododendron oomurasaki*, 850509 (1); *Malus halliana*, F: 850425 (1), 850426 (1); *Aesculus carnea*, M: 850501 (3); *Oxalis corymbosa*, M: 870506 (1); *Lonicera morrowii*, M: 850504 (1); *Weigela hortensis*, M: 860525 (1)

SYRPHIDAE

Cheilosia sp.7

Persicaria thunbergii, F: 861004 (1); *Persicaria yokusaiana*, M: 851002 (1)

Didea fasciata

Persicaria thunbergii, F: 861014 (1)

Episyrphus balteatus

Besella rubra, F: 860525 (1); *Persicaria thunbergii*, M: 851018 (1), 871019 (1), 871023 (1); *Hypericum patulum*, F: 870528 (1); *Kerria japonica*, F: 850605 (1); *Prunus spachiana*, F: 850409 (1); *Philadelphus coronarius*, F: 870528 (1); *Aesculus carnea*, F: 850501 (1), 850512 (1); *Ligustrum obtusifolium*, F: 870528 (3), M: 870528 (1); *Viburnum dilatatum*, F: 870528 (1), M: 870528 (1); *Stenactis annuus*, 860515 (1)

Eristalis cerealis

Berberis thunbergii, 860421 (2); *Mahonia japonica*, M: 850419 (1); *Persicaria thunbergii*, F: 850930 (1), 851002 (1), 851007 (2), 851021 (1), 851028 (1), 871007 (1), M: 851002 (1), 851014 (1), 851018 (1), 851021 (1), 851024 (2), 851028 (1), 861004 (2), 871007 (1), 871019 (1); *Tilia Miqueliana*, M: 850614 (1); *Prunus spachiana*, M: 850409 (1); *Pyracantha crenulata*, M: 860525 (2); *Ligustrum japonicum*, M: 860611 (1); *Viburnum dilatatum*, M: 870528 (1); *Aster ageratoides*, F: 850919 (1); *Baccharis trimera*, F: 851002 (1), 861004 (1); *Stenactis annuus*, F: 850710 (1), M: 860603 (1)

Eristalomyia tenax

Stenactis annuus, F: 850626 (1)

Helophilus virgatus

Tilia Miqueliana, M: 850614 (1); *Prunus tomentosa*, M: 850409 (1); *Prunus spachiana*, F: 850409 (1); *Justicia procumbens*, F: 861020 (1); *Baccharis trimera*, F: 861004 (1)

Lathrophthalmus ocularis

Persicaria thunbergii, M: 851014 (1)

Megaspis zonata

Lythrum anceps, F: 870914 (1); *Vitex cannabifolia*, F: 861014 (1); *Veronicastrum sibiricum*, F: 860822 (1)

Melanostoma scalare

Persicaria thunbergii, F: 851018 (1), 851024 (1); *Itea parviflora*, F: 860603 (1); *Iris pseudacorus*, F: 860526 (1)

Metasyrphus corollae

Spiraea cantoniensis, M: 870528 (1)

Metasyrphus nintens

Calystegia japonica, M: 870528 (1); *Ixeris dentata*, M: 870528 (1)

Paragus tibialis

Trifolium repens, F: 860611 (1)

Pipiza inornata

Pyracantha angustifolia, F: 860525 (1)

Pseudomerdon takasagoensis

Persicaria thunbergii, M: 850930 (1)

Sphaerophoria macrogaster

Persicaria thunbergii, M: 851007 (1); *Photinia glabra*, M: 860526 (1); *Pyracantha angustifolia*, F: 860525 (2); *Rosa borboniana*, F: 860602 (1); *Deutzia crenata*, M: 860602 (1); *Itea parviflora*, F: 860603 (1), M: 860603 (1); *Philadelphus coronarius*, F: 860602 (1); *Trifolium repens*, F: 860611 (2), M: 860611 (1);

- Torilis japonica*, F: 850509 (1); *Veronica persica*, 860412 (1); *Abelia grandiflora*, F: 860603 (1), M: 860603 (5); *Aster ageratoides*, F: 850912 (1); *Stenactis annuus*, F: 860526 (1), 860603 (4), 860704 (1), 870528 (1), 870605 (1), M: 850710 (1), 860603 (8), 860701 (1), 870605 (1); *Taraxacum japonicum*, F: 860526 (4), M: 850425 (1)
- Sphaerophoria menthastri*
Deutzia crenata, F: 860602 (1); *Cladrastis sikokiana*, F: 860611 (1); *Abelia grandiflora*, M: 860603 (1); *Taraxacum japonicum*, M: 850426 (1), 860526 (1)
- Syricta pipiens*
Swida macrophylla, M: 870616 (1); *Vitex cannabifolia*, M: 850720 (1); *Stenactis annuus*, M: 870710 (1)
- Syrphus japonica*
Camellia sasanqua, F: 851031 (1)
- Syrphus vitripennis*
Pyracantha crenulata, F: 860525 (1)
- Vollucella tabanoides*
Ligustrum obtusifolium, M: 870528 (1)

COLEOPTERA STAPHYLINIDAE

- Eusphalerum parallelum*
Swida macrophylla, 850614 (1)

SCARABAEIDAE

- Anomala albopilosa*
Ligustrum japonicum, 860611 (1)
- Blitopertha conspurcata*
Rosa borboniana, 860525 (2), 860602 (1), 860611 (1); *Citrus tachibana*, 850522 (1)
- Blitopertha orientalis*
Rosa borboniana, 850607 (1)
- Eucetonia pilifera*
Stewartia monadelphica, 860611 (1); *Malus halliana*, 850425 (1); *Pyracantha angustifolia*, 850522 (1); *Pyracantha crenulata*, 860525 (1); *Deutzia crenata*, 860602 (2); *Itea parviflora*, 860603 (2); *Swida macrophylla*, 860525 (4); *Citrus tachibana*, 860525 (1); *Ligustrum japonicum*, 860611 (4); *Lonicera morrowii*, 850504 (1)
- Nipponovalgus angusticollis*
Deutzia scabra, 860602 (1)
- Oxycetonia jucunda*
Rhododendron oomurasaki, 850501 (1); *Pyracantha angustifolia*, 850518 (2), 850522 (2), 860525 (6), 870516 (2); *Pyracantha crenulata*, 860525 (1); *Rosa borboniana*, 850605 (1), 860525 (3), 860602 (4), 870528 (1); *Deutzia crenata*, 860602 (1); *Itea parviflora*, 860603 (1); *Lythrum anceps*, 870820 (1); *Swida macrophylla*, 850614 (1), 850615 (2), 860525 (2); *Cayratia japonica*, 870904 (1); *Citrus tachibana*, 850522 (1); *Syringa vulgaris*, 860526 (2); *Vitex cannabifolia*, 850814 (1), 850828 (1), 850903 (1), 850919 (1), 870921 (2); *Aster ageratoides*, 860926 (4); *Stenactis annuus*, 870904 (5), 870914 (3)
- Phyllopertha irregularis*
Rhus sylvestris, 860526 (1)
- Popillia japonica*
Lythrum anceps, 870723 (1), 870725 (1); *Cayratia japonica*, 850803 (2)
- Protaetia orientalis*
Rosa borboniana, 860525 (1), 860602 (1); *Callicarpa japonica*, 860704 (1);

- Vitex cannabifolia*, 850912 (1)
Trichius japonicus
Rosa borboniana, 850605 (1)
Agrypnus binodulus
Rhus sylvestris, 860526 (1)
Anthaxia proteus
Rosa borboniana, 850605 (4), 860602 (6), 860611 (4); *Deutzia crenata*, 860602 (1)

DERMESTIDAE

- Anthrenus verbasci*
Cinnamomum camphora, 850526 (1); *Besella rubra*, 860525 (5), 860602 (42); *Photinia glabra*, 860526 (93); *Pyracantha angustifolia*, 850522 (5); *Rosa borboniana*, 850607 (1), 860602 (1), 860611 (1); *Spiraea blumei*, 850501 (3), 850504 (7); *Spiraea tossensis*, 850509 (3), 850512 (8), 850516 (1); *Deutzia scabra*, 850504 (1), 850512 (2), 850516 (3), 850518 (5), 850522 (2), 860602 (18); *Deutzia maximowicziana*, 850512 (2); *Itea parviflora*, 860603 (2); *Swida macrophylla*, 860525 (10), 870616 (1); *Swida stolonifera*, 850531 (4), 850605 (5), 850614 (3), 860602 (12); *Euonymus fortunei*, 850531 (4); *Rhus sylvestris*, 860526 (5); *Citrus tachibana*, 860602 (2); *Syringa vulgaris*, 860526 (22); *Vitex cannabifolia*, 850720 (1); *Stenactis annuus*, 860515 (6), 860526 (4), 860603 (3), 870528 (2)
Dermestes haemorrhoidalis
Cinnamomum camphora, 850526 (1); *Photinia glabra*, 860526 (3)

MELYRIDAE

- Dasytes vulgaris*
Malus halliana, 850425 (1)

NITIDULIDAE

- Carpophilus chalybeus*
Rhus sylvestris, 860526 (1); *Syringa vulgaris*, 860526 (2)

OEDEMERIDAE

- Asclera nigrocya*
Edgeworthia chrysantha, 850409 (1), 870416 (2)

CERAMBYCIDAE

- Chlorophorus japonicus*
Ligustrum japonicum, 860611 (1)
Dere thoracica
Stenactis annuus, 860603 (1)
Stenodryas clavigera
Itea parviflora, 860603 (1)

BRUCHIDAE

- Bruchidius dorsalis*
Spiraea thunbergii, 870408 (1); *Syringa vulgaris*, 860526 (1)
Bruchidius urbanus
Vitex cannabifolia, 860730 (1); *Stenactis annuus*, 870904 (1)
Callosobruchus chinensis

Pyracantha angustifolia, 860525 (1); *Cayratia japonica*, 870904 (1); *Vitex cannabifolia*, 870801 (1)

CHRYSOMELIDAE

Aulacophora nigripennis

Deutzia scabra, 850501 (3), 850504 (2), 850512 (1), 850516 (4), 850518 (8), 850522 (5), 850526 (2), 860525 (3); *Baccharis trimera*, 851002 (1)

Linoetis coeruleipennis

Rosa borboniana, 860611 (1)

Linotetis coeruleipennis

Pyracantha angustifolia, 860525 (1); *Rosa borboniana*, 860611 (1); *Deutzia crenata*, 860602 (1)

Nonartha cyaneum

Nandina domestica, 850626 (1); *Besella rubra*, 860602 (1); *Hibiscus syriacus*, 850719 (2), 850720 (1); *Prunus tomentosa*, 850409 (1); *Pyracantha angustifolia*, 860525 (1); *Rosa borboniana*, 850710 (5), 860525 (1), 860602 (1), 860611 (2); *Itea parviflora*, 860603 (1); *Spiraea thunbergii*, 870408 (5); *Lythrum anceps*, 860831 (2), 870723 (1); *Swida stolonifera*, F: 850817 (1); *Syringa vulgaris*, 860526 (1); *Vitex cannabifolia*, 850705 (1), 850719 (1), 860719 (2), 860723 (1), 870707 (1); *Baccharis trimera*, 870929 (1); *Cirsium nipponica*, 870914 (1); *Stenactis annuus*, 870914 (1); *Liriope platyphylla*, 870904 (2)

HEMENOPTERA TENTHREDINIDAE

Athalia japonica

Cardamine regeliana, F: 870416 (1); *Viburnum erosum*, F: 860526 (1)

Loderus insulicola

Prunus spachiana, 850409 (13), 850419 (3)

Macrophya falsifica

Besella rubra, F: 860525 (1); *Pyracantha angustifolia*, F: 860525 (1)

Pachyprotasis sp.

Forsythia suspensa, 850409 (2)

Prionophorus nigricans

Prunus spachiana, M: 870416 (5)

Strogylogaster onocleae

Stellaria media, F: 860412 (1)

ARGIDAE

Arge similis

Rhododendron oomurasaki, 850426 (1); *Pyracantha crenulata*, M: 860525 (1); *Swida macrophylla*, 850619 (1); *Cayratia japonica*, M: 870820 (1); *Baccharis trimera*, 851002 (1), M: 860926 (1)

CHALCIDIDAE

Brachymeria fiskei

Stenactis annuus, M: 870914 (1)

TIPHIDAE

Tiphia sp.

Persicaria yokusaiana, F: 851002 (1); *Weigela hortensis*, F: 860525 (1)

FORMICIDAE*Camponotus japonicus**Photinia glabra*, 860526 (2); *Rhus sylvestris*, 860526 (2)*Formica japonica**Besella rubra*, 860602 (5); *Photinia glabra*, 860526 (1); *Rosa borboniana*, 860602 (1); *Deutzia crenata*, 860611 (9), 870528 (1); *Deutzia scabra*, 860602 (13); *Trifolium repens*, 860611 (1); *Ilex serrata*, 860611 (1)*Lasius niger**Deutzia crenata*, 860611 (1); *Philadelphus coronarius*, 860602 (1); *Citrus tachibana*, 860602 (1); *Campsis grandiflora*, 860719 (1); *Stenactis annuus*, 860526 (1)*Pristomyrmex punger**Deutzia crenata*, 860611 (1); *Deutzia scabra*, 860602 (1); *Philadelphus coronarius*, 860602 (1); *Citrus tachibana*, 860602 (3); *Campsis grandiflora*, 860719 (4); *Stenactis annuus*, 860603 (2); *Polia japonica*, 860719 (1)**SCOLIIDAE***Campsomeris annulata**Veronicastrum sibiricum*, M: 860831 (1)*Campsomeris grossa matsumurai**Lythrum anceps*, F: 870826 (1), M: 860827 (1), 860831 (3), 860905 (2), 860911 (3), 870826 (1); *Vitex cannabifolia*, M: 860831 (1), 870814 (1); *Veronicastrum sibiricum*, M: 860822 (2), 860831 (5), 860911 (1); *Justicia procumbens*, M: 861014 (1); *Aster ageratoides*, F: 850919 (1)*Campsomeris primatica**Persicaria thunbergii*, M: 861014 (1); *Lythrum anceps*, M: 860926 (1); *Vitex cannabifolia*, M: 860926 (1), 870707 (1); *Veronicastrum sibiricum*, M: 860911 (1); *Baccharis trimera*, M: 860926 (1)*Campsomeris testaceipes**Trifolium repens*, F: 850830 (1); *Lythrum anceps*, F: 850830 (2); *Veronicastrum sibiricum*, F: 850830 (1), 850903 (2)*Scolia historionica japonica**Vitex cannabifolia*, F: 850731 (1), M: 870806 (1)*Scolia oculata**Tilia Miqueliana*, M: 870617 (1); *Vitex cannabifolia*, F: 850705 (1), 860719 (1), M: 870630 (1); *Veronicastrum sibiricum*, F: 860911 (1)**POMPILIDAE***Cyphononyx dorsalis**Lyonia ovalifolia*, F: 870725 (1)**EUMENIDAE***Anterhynchium flavomarginatum micado**Lyonia ovalifolia*, F: 870725 (1); *Vitex cannabifolia*, M: 860719 (1)*Eumenes decorata**Vitex cannabifolia*, 850720 (1)*Eumenes rubronotatus**Vitex cannabifolia*, M: 850731 (1)*Oracistrocerus drewseni drewseni**Tilia japonica*, F: 870623 (1); *Indigofera tinctoria*, F: 870630 (1); *Swida macrophylla*, 850615 (1)*Stenodynerus chinensis simillimus**Hydrangea macrophylla*, M: 870617 (1); *Lythrum anceps*, M: 870921 (1)

Stenodynerus frauenfeldi

Rhododendron oomurasaki, F: 860430 (1), 860512 (1); *Ixeris debilis*, M: 870516 (1)

Stenodynerus tokyanus tokyanus

Stenactis annuus, 850619 (1)

VESPIDAE*Polistes jadwigae*

Deutzia crenata, F: 860602 (1), 870528 (1); *Cayratia japonica*, 850724 (1), F: 860719 (1), 870820 (1); *Fraxinus griffithii*, F: 860719 (1); *Ligustrum obtusifolium*, F: 870528 (1); *Vitex cannabifolia*, F: 870630 (1), 870820 (1); *Cirsium nipponica*, F: 870914 (1)

Polistes mandarinus

Stewartia monadelpha, F: 860611 (1); *Prunus spachiana*, Q: 850409 (1); *Cayratia japonica*, 850719 (2), 850724 (1), 850726 (1), 850817 (1), F: 860701 (1), 860719 (1)

Polistes rothneyi iwatai

Stewartia monadelpha, F: 860611 (1)

Polistes snelleni

Cayratia japonica, 850626 (1), F: 860701 (1)

Vespa analis insularis

Persicaria thunbergii, Q: 861004 (1); *Cayratia japonica*, 850710 (1), Q: 870904 (1); *Vitex cannabifolia*, 850912 (1)

Vespa xanthoptera

Mahonia japonica, Q: 850419 (1); *Stewartia monadelpha*, W: 860611 (1); *Tilia Miqueliana*, 850614 (1); *Vaccinium oldhami*, Q: 850518 (1); *Itea parviflora*, W: 860603 (1); *Lythrum anceps*, W: 860926 (1); *Swida macrophylla*, 850615 (1); *Cayratia japonica*, 850710 (1), 850724 (1), W: 860719 (2), 860723 (2), 870815 (1), 870820 (1), 870914 (1); *Rhus javanica*, 850919 (3), W: 860911 (2); *Rhus sylvestris*, Q: 860526 (1); *Ligustrum obtusifolium*, Q: 870528 (1); *Vitex cannabifolia*, 850719 (1), W: 860712 (1)

Vespula flaviceps lewisi

Fatsia japonica, Q: 861120 (1)

SPHECIDAE*Ammophila clavus*

Vitex cannabifolia, 850802 (1)

Cerceris albofasciata

Vitex cannabifolia, M: 850719 (3), 860807 (1), 860818 (1)

Cerceris japonica

Cayratia japonica, M: 850726 (1), 850807 (1); *Vitex cannabifolia*, M: 860719 (1), 860807 (1), 860827 (1); *Stenactis annuus*, M: 860626 (1)

Ectemnius (Hypocrabro) rubicola

Swida macrophylla, M: 860525 (1)

Sphex diabolicus flammitrichus

Cayratia japonica, F: 870815 (1), M: 870904 (1)

COLLETIDAE**Colletinae***Colletes* sp.1

Pyracantha crenulata, M: 860525 (1)

Colletes sp.2

Veronicastrum sibiricum, M: 860911 (1)

Hylaeinae*Hylaeus floralis**Persicaria thunbergii*, M: 850930 (1)*Hylaeus nippon**Veronicastrum sibiricum*, M: 860911 (1)**HALICTINAE***Halictus (Seladonia) aerarius**Hydrangea macrophylla*, F: 870617 (1); *Vitex cannabifolia*, F: 850705 (1);*Stenactis annuus*, M: 870707 (1); *Taraxacum japonicum*, F: 850529 (1)*Lasioglossum* (carinate *Evylaeus*) *duplex**Camellia japonica*, F: 870416 (1); *Ligustrum japonicum*, F: 860611 (1);*Tradescantia ohimensis*, F: 850607 (1)*Lasioglossum* (carinaless *Evylaeus*) *japonicum**Nandina domestica*, F: 850626 (1); *Stewartia monadelphica*, F: 860611 (1);*Pyracantha angustifolia*, F: 860525 (1); *Rosa borboniana*, F: 860602 (1);*Spiraea cantoniensis*, F: 870528 (1); *Aesculus carnea*, F: 850509 (1), 860525(1); *Stenactis annuus*, F: 850619 (1); *Tradescantia ohimensis*, F: 850529 (1);*Liriope platyphylla*, F: 870904 (2)*Lasioglossum* (carinaless *Evylaeus*) sp.18*Rhododendron oomurasaki*, F: 860429 (1); *Deutzia scabra*, 850522 (1);*Indigofera tinctoria*, F: 870626 (2); *Oxalis corniculata*, F: 870605 (1); *Oxalis**corymbosa*, F: 860603 (1); *Lespedeza thunbergii*, F: 850912 (1); *Stenactis**annuus*, F: 860603 (3), 870506 (1)*Lasioglossum* (carinaless *Evylaeus*) *tanirolellum**Phytolacca americana*, F: 850810 (1); *Rosa borboniana*, F: 860602 (1); *Deutzia**scabra*, F: 860525 (1); *Itea parviflora*, F: 860603 (1); *Paederia scandens*,

F: 850810 (1)

Lasioglossum (carinate *Evylaeus*) *baleicum**Rhododendron oomurasaki*, F: 860429 (1)*Lasioglossum* (carinate *Evylaeus*) *sibiricum**Stenactis annuus*, F: 850626 (1), 850710 (1)*Lasioglossum* (*Lasioglossum*) *exiliceps**Berberis thunbergii*, F: 860424 (1)*Lasioglossum* (*Lasioglossum*) *mutilum**Ligustrum japonicum*, F: 860611 (1); *Vitex cannabifolia*, M: 870806 (1)*Lasioglossum* (*Lasioglossum*) *occidens**Persicaria yokusaitana*, F: 851002 (1); *Tilia japonica*, F: 870623 (2); *Tilia**Miqueliana*, 870617 (1), F: 870617 (1); *Hibiscus syriacus*, F: 850719 (1); *Itea**parviflora*, F: 860603 (3); *Swida macrophylla*, 860525 (1), F: 850615 (1), 870616(1); *Ilex serrata*, F: 860611 (1); *Cayratia japonica*, M: 850807 (1); *Ligustrum**japonicum*, F: 860611 (2); *Vitex cannabifolia*, 860719 (1), 860802 (1), 870820

(2), F: 860730 (1), M: 850719 (1), 860723 (1), 860818 (1), 861014 (1), 870723

(1), 870820 (1); *Justicia procumbens*, 861014 (1), F: 851002 (1), 861014 (1);*Abelia spathulata*, F: 850726 (3), 850803 (2), 850810 (1), 850817 (2); *Baccharis**trimera*, 860926 (2), 870929 (1), F: 851002 (2), 870929 (1); *Cirsium nipponica*,M: 870914 (1); *Coreopsis basalis*, 870605 (1); *Stenactis annuus*, 860701 (1),870506 (1), 870516 (1), F: 850509 (2); *Taraxacum japonicum*, F: 850425 (1);*Pollia japonica*, F: 850810 (1), 860802 (1); *Iris pseudacorus*, F: 870516 (1)*Lasioglossum* (*Lasioglossum*) *proximatum**Itea parviflora*, F: 860603 (1); *Weigela hortensis*, F: 860525 (2)*Lasioglossum* (*Lasioglossum*) *scitulum**Cayratia japonica*, M: 860723 (1); *Lonicera morrowii*, F: 850504 (1)*Lasioglossum* (*Lasioglossum*) sp.6*Pyracantha angustifolia*, F: 860525 (1)

ANDRENIDAE**Andreninae**

Andrena (Andrena) benefica

Pyracantha crenulata, F: 860525 (1)

Andrena (Calomelissa) protomias

Deutzia crenata, F: 860602 (7), M: 860602 (8), 860611 (1), 870528 (2); *Deutzia scabra*, F: 850518 (2), 850522 (3), 860525 (3), M: 860525 (1); *Itea parviflora*, M: 860603 (1); *Vitex cannabifolia*, M: 860717 (1)

Andrena (Chlorandrena) Knuthi

Ixeris dentata, F: 870528 (1); *Stenactis annuus*, F: 860603 (1); *Taraxacum japonicum*, F: 860526 (9), 860603 (2), 870506 (1), 870516 (1)

Andrena (Micrandrena) brassicae

Pyracantha crenulata, F: 860525 (1)

Andrena (Micrandrena) komachi

Stellaria media, M: 860412 (2)

Andrena (Mitsukuriella) japonica

Tilia Miqueliana, F: 870617 (1); *Securinega suffruticosa*, F: 870617 (1)

Andrena (Simandrena) opacifovea opacifovea

Ulmus davidiana, F: 850518 (1); *Itea parviflora*, F: 860603 (1); *Spiraea cantoniensis*, F: 870528 (2); *Viburnum erosum*, F: 860526 (1)

Andrena (Simandrena) yamamotoi

Swida macrophylla, F: 860525 (1); *Lonicera morrowii*, F: 870506 (1)

Panurginae

Panurginus crawfordi

Malus halliana, F: 850426 (1); *Pyracantha angustifolia*, F: 870516 (1)

MEGACHILIDAE**Lithurginae**

Lithurgus collaris

Hibiscus syriacus, F: 850719 (1)

Megachilinae

Anthidium septemspinosum

Lythrum anceps, 850726 (2), 850821 (1), 860807 (2), 860810 (2), 860813 (2), 860818 (2), 860827 (1), 870815 (4), 870820 (1), F: 860813 (1), 860818 (1), M: 870723 (1); *Vitex cannabifolia*, 850731 (2), 850802 (2), 850807 (3), 850814 (1), 850821 (1), 860717 (2), 860719 (3), 860723 (1), 860730 (3), 860807 (5), 860813 (5), 860818 (4), 860827 (1), 860905 (1), 870707 (4), 870710 (6), 870723 (3), 870806 (3), 870814 (1), 870820 (1); *Spiranthes sinensis*, 860719 (1)

Chalicodoma disjunctiformis

Clerodendron trichotomum, F: 850817 (1); *Vitex cannabifolia*, 860813 (1), 860818 (1), 860831 (2), 860905 (3), F: 850828 (1), 850830 (2), 850912 (2), 850919 (2), 860818 (1), 860926 (1), M: 850821 (1)

Chalicodoma sculpturalis

Vitex cannabifolia, F: 860926 (1), 861004 (1), 861014 (1), M: 860712 (1), 860723 (1), 860807 (3), 861004 (1), 861014 (1), 870801 (1)

Chalicodoma spissula

Vitex cannabifolia, F: 850705 (1), 850719 (3), 850731 (5), 850814 (1), 850821 (3), 860723 (4), 860730 (8), 860807 (4), 860813 (6), 860827 (6), 870630 (1), 870723 (3), 870801 (4), 870806 (3), 870814 (7), 870820 (2), 870826 (1), M: 850705 (1), 850719 (1), 850731 (1), 860719 (2), 860723 (3), 860730 (2), 860807 (2), 870707 (1), 870710 (1), 870723 (2), 870801 (2); *Lespedeza thunbergii*, 850626 (1), F: 870904

(1)

*Coelioxys fenestrata**Vitex cannabifolia*, M: 860831 (1), 870707 (1)*Coelioxys yanonis**Lythrum anceps*, F: 860926 (1)*Euapis basalis**Vitex cannabifolia*, 860905 (1), 861004 (1), 870707 (1), F: 861004 (1), M: 870707 (1)*Megachile kobensis**Indigofera tinctoria*, F: 870623 (1), 870630 (1); *Vitex cannabifolia*, F: 860712 (1), 860717 (1), 860719 (1), 860723 (2), 860730 (1), 870806 (1), M: 860730 (1), 870723 (1); *Lespedeza thunbergii*, 850626 (2), F: 850619 (1), 850705 (2)*Megachile nipponica**Lythrum anceps*, M: 860905 (1); *Vitex cannabifolia*, M: 860717 (1), 870630 (1); *Lespedeza thunbergii*, M: 860905 (2), 860911 (4), 870914 (2); *Stenactis annuus*, M: 870528 (1)*Megachile pseudomonticola**Vitex cannabifolia*, M: 870806 (1)*Megachile remota sakagami**Vitex cannabifolia*, F: 861014 (1); *Lespedeza thunbergii*, F: 870904 (1), M: 850919 (1)*Megachile subalbuta**Indigofera tinctoria*, M: 870630 (1); *Lythrum anceps*, F: 870826 (1); *Vitex cannabifolia*, F: 850903 (1), 860905 (1), M: 850821 (1), 860723 (1), 870820 (1), 870826 (1); *Lespedeza thunbergii*, F: 860905 (1), 870904 (1), 870914 (1), M: 860905 (1); *Cirsium nipponica*, F: 870914 (1)*Megachile tsurugensis**Stewartia monadelphica*, F: 860611 (1); *Rhododendron oomurasaki*, F: 850501 (1); *Lythrum anceps*, M: 860911 (1); *Ligustrum japonicum*, F: 860611 (2); *Vitex cannabifolia*, F: 861014 (1), M: 860717 (1), 860723 (1), 860926 (1); *Lespedeza thunbergii*, M: 870904 (1)*Osmia imaii**Citrus tachibana*, F: 850516 (1); *Lonicera morrowii*, F: 850504 (1); *Viburnum dilatatum*, F: 860525 (1)*Osmia orientalis**Astragalus sinicus*, F: 860429 (1), 870422 (1)*Osmia taurus**Mahonia japonica*, M: 850419 (1)**ANTHOPHORIDAE****Anthophorinae***Anthophora pilipes villosula**Rhododendron oomurasaki*, F: 850425 (1); *Lonicera morrowii*, F: 850504 (2); *Viburnum suspensum*, M: 860421 (1)*Tetralonia mitsukurii**Lespedeza thunbergii*, F: 850919 (2), M: 850912 (2), 850919 (4), 870914 (2)*Tetralonia nipponensis**Viola mandshurica*, F: 850426 (1); *Enkianthus perulatus*, M: 860424 (5), 870430 (1); *Rhododendron mucronata*, 870430 (3), F: 870430 (1), M: 870506 (1); *Rhododendron oomurasaki*, F: 850504 (1), 860507 (1), M: 850425 (3), 850426 (2), 850501 (2), 850504 (2), 860429 (6), 860430 (3), 860507 (3), 860512 (1); *Rosa borboniana*, F: 860611 (1); *Elaeagnus multiflora*, M: 860424 (2); *Citrus tachibana*, F: 850516 (1); *Oxalis corymbosa*, F: 850509 (1); *Serissa japonica*, F: 850522 (1); *Lonicera morrowii*, M: 850504 (1), 860430 (1); *Taraxacum japonicum*, M: 860429 (2)

Xylocopinae*Xylocopa (Alloxylocopa) appendiculata circumvolan*

Nandina domestica, 870707 (1); *Stewartia monadelphica*, 850615 (2), 860611 (1); *Tilia japonica*, 870617 (3); *Tilia Miqueliana*, 850614 (2), 850615 (1), 850705 (4), 870617 (2); *Pieris japonica*, F: 860430 (1); *Rhododendron macrosepalum*, 850518 (1); *Rhododendron oomurasaki*, 850425 (1), 850426 (1), 850501 (3), 850504 (3), 850512 (3); *Deutzia crenata*, 860602 (1), 870528 (1); *Cercis siliquastrum*, 870422 (1), 870430 (2); *Cladrastis sikokiana*, 860611 (2); *Wisteria floribunda*, 850501 (5); *Swida macrophylla*, 850615 (3); *Elaeagnus multiflora*, F: 860424 (1); *Aesculus carnea*, 850509 (3); *Citrus tachibana*, 850516 (2); *Buddleia davidii*, 850817 (1), 850828 (1), 860807 (1); *Fraxinus griffithii*, 860719 (1); *Ligustrum japonicum*, 860611 (1); *Ligustrum obtusifolium*, 850522 (3), 850526 (5), 870528 (1), 870605 (1); *Vitex cannabifolia*, 850705 (1), 850719 (2), 850903 (1), 850912 (3), 850919 (5), 860827 (1), 860831 (1), 860905 (3), 860911 (1), 860926 (1), 861004 (1), 861014 (2), 870630 (1), 870921 (3), 871007 (1); *Lonicera morrowii*, 850504 (1); *Viburnum erosum*, 860526 (1); *Cirsium nipponica*, 870914 (1); *Coreopsis basalis*, 870528 (1); *Polia japonica*, 860802 (1); *Iris pseudacorus*, 850516 (2)

Ceratina esakii

Rorippa indica, F: 850529 (1)

Ceratina flavipes

Kerria japonica, M: 850426 (1); *Deutzia crenata*, M: 860602 (1); *Trifolium repens*, F: 860611 (8); *Oxalis corymbosa*, F: 860603 (1); *Ligustrum japonicum*, F: 860611 (1); *Vitex cannabifolia*, 870826 (1), F: 850719 (2), 850807 (1), 870723 (1), 870806 (1), 870814 (2), 870826 (1); *Weigela hortensis*, F: 860525 (1), 860602 (1); *Baccharis trimera*, F: 860926 (1); *Coreopsis basalis*, F: 870605 (1); *Stenactis annuus*, F: 870528 (2), 870707 (1), M: 870506 (4); *Taraxacum japonicum*, F: 860526 (1), 870516 (1), M: 850425 (2)

Ceratina iwatai

Taraxacum japonicum, F: 870416 (1), M: 870416 (1)

Ceratina japonica

Vitex cannabifolia, F: 850719 (1); *Cirsium nipponica*, F: 870914 (1)

Nomadinae*Nomada ginran*

Spiraea thunbergii, M: 870408 (1); *Edgeworthia chrysantha*, M: 870408 (1); *Viburnum suspensum*, F: 860421 (1)

Nomada japonica

Iris pseudacorus, F: 850516 (1)

Nomada shepparadana okubira

Stenactis annuus, M: 870707 (1)

APIDAE**Bombinae***Bombus (Bombus) hypocrita hypocrita*

Rhododendron macrosepalum, Q: 850512 (1); *Rhododendron oomurasaki*, Q: 850426 (1), 850501 (1), 850504 (1), 850509 (1), 850516 (1); *Hydrangea macrophylla*, W: 870623 (1); *Trifolium repens*, Q: 850516 (1); *Citrus tachibana*, Q: 850518 (1), 850522 (2); *Ligustrum obtusifolium*, Q: 850522 (2), 850526 (1), W: 870528 (1); *Tradescantia ohienensis*, W: 850607 (1)

Bombus (Bombus) ignitus

Nandina domestica, Q: 850710 (1); *Tilia japonica*, W: 870623 (1); *Rhododendron oomurasaki*, Q: 850426 (2), 850501 (1), 850504 (1); *Pyracantha angustifolia*, Q: 850518 (1); *Lythrum anceps*, W: 860827 (1); *Citrus tachibana*, Q: 850518

(1); *Ligustrum obtusifolium*, Q: 850522 (2), 850526 (1), 850531 (1), W: 870528 (1); *Vitex cannabifolia*, Q: 850828 (1), 860905 (1); *Liriope platyphylla*, Q: 870904 (1)

Bombus (Diversobombus) diversus diversus

Justicia procumbens, W: 861014 (1); *Polia japonica*, W: 860802 (2)

Bombus (Pyrobombus) ardens ardens

Stewartia monadelphica, W: 850615 (1), 860611 (3); *Tilia japonica*, W: 870617 (2), 870623 (1); *Tilia Miqueliana*, Q: 850614 (1), 850615 (1), W: 850619 (1); *Rhododendron oomurasaki*, Q: 850501 (4), 850504 (1), 850512 (1); *Vaccinium oldhami*, W: 850518 (1); *Aesculus carnea*, Q: 850504 (1), W: 850504 (1), 850512 (1); *Citrus tachibana*, Q: 850522 (1); *Tradescantia ohimensis*, M: 850614 (1), W: 850518 (1), 850526 (1), 850531 (1), 850607 (1)

Apinae

Apis cerana japonica

Mahonia japonica, W: 850419 (3); *Persicaria thunbergii*, W: 850930 (3), 851007 (6), 851014 (1), 851018 (2), 851021 (1), 851028 (1); *Camellia sasanqua*, W: 851031 (3); *Tilia japonica*, W: 870617 (1); *Tilia Miqueliana*, W: 850614 (1), 850615 (1), 850619 (4), 870617 (1); *Ulmus davidiana*, W: 850518 (1); *Idesia polycarpa*, W: 860526 (2); *Rhododendron mucronata*, W: 870506 (1); *Rhododendron oomurasaki*, W: 850501 (1), 850509 (2), 850512 (1), 860507 (3), 860512 (1); *Deutzia crenata*, W: 860602 (1); *Hydrangea macrophylla*, W: 870617 (1); *Itea parviflora*, W: 860603 (5); *Lythrum anceps*, W: 860831 (2); *Swida macrophylla*, W: 850614 (3), 850615 (1), 870616 (1); *Securinega suffruticosa*, W: 870617 (15); *Cayratia japonica*, W: 850726 (2), 870815 (2), 870820 (1), 870904 (3); *Rhus javanica*, W: 850919 (1); *Rhus sylvestris*, W: 860526 (2); *Ligustrum japonicum*, W: 860611 (2); *Vitex cannabifolia*, W: 850719 (2), 860712 (1), 860717 (3); *Justicia procumbens*, W: 851014 (2); *Baccharis trimera*, W: 861004 (1); *Tradescantia ohimensis*, W: 850614 (1)

Apis mellifera

Berberis thunbergii, W: 860424 (1); *Persicaria thunbergii*, W: 861027 (1); *Tilia Miqueliana*, W: 850619 (6); *Pieris japonica*, W: 860429 (8), 860430 (5); *Rhododendron oomurasaki*, W: 850425 (2), 850509 (1); *Astragalus sinicus*, W: 860429 (2); *Lythrum anceps*, W: 860905 (2); *Swida stolonifera*, W: 850531 (1), 850605 (1); *Elaeagnus multiflora*, W: 860424 (4); *Securinega suffruticosa*, W: 870617 (1); *Cayratia japonica*, W: 870914 (1); *Ligustrum japonicum*, W: 860611 (1); *Ligustrum obtusifolium*, W: 850526 (1); *Vitex cannabifolia*, W: 850828 (1), 860717 (4); *Iris pseudacorus*, W: 850518 (1), 860526 (3)