

On the Constancy of Insects in their Visits to Flowers.

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A VERY large amount of attention has been paid during recent years to the habits of insects in visiting flowers with reference to the fertilization of the latter. One point, evidently of importance, seems to require further elucidation, viz. the extent to which, on the same visit, insects confine their visits to the same plant-species. I know of no modern recorded observations which either confirm or refute the statement made by Aristotle:—"During each flight the Bee does not settle upon flowers of different kinds, but flies, as it were, from violet to violet, and touches no other species till it returns to the hive"*.

In my own observations, which require to be supplemented by other independent ones, I chose in all cases as points of observation spots where a considerable number of different flowers grew in profusion and intermixed, so that the insects had abundant opportunity of changing their diet if so disposed. In recording the number of flowers of the same kind visited by an insect in the same flight, I always mean flowers at such a distance from one another that the insect has had to use its wings in getting to each. Wherever the flowers grew in so close an inflorescence that it could crawl from one flower to another without using its wings, as in the Compositæ, Dipsacaceæ, and Umbelliferae, the clovers, and many Labiatae, such an inflorescence is here treated as a single flower. I have thought it best to record briefly every observation made on the subject, in order that there may be no suspicion of their having been chosen for a special object.

Obs. 1. NEAR ROSS, HEREFORDSHIRE, Aug. 3rd, 1880. Flowers growing close together:—*Rubus fruticosus*, *Senecio Jacobæa*, *Hypericum perforatum*, *H. montanum*, *Erythræa Centaurium*, *Trifolium procumbens*, *Calamintha Clinopodium*, *Malva moschata*, *Arctium Lappa*, *Teucrium Scorodonia*, *Torilis Anthriscus*. The Meadow-brown Butterfly (*Hipparchia Janira*) visited the bramble alone 7 times in succession.

* Aristotle, 'History of Animals,' Book ix. cap. 27, sect. 7 (Bohn's translation).

2. NEAR ROSS, HEREFORDSHIRE, Aug. 3rd, 1880. *Hipparchia Janira*: *Senecio Jacobæa*, 2 visits; *Hypericum perforatum*, 1.
3. ———*. ———*: *Senecio Jacobæa*, 4 times; *Leontodon autumnalis*, 1.
4. ———. *Bombus* sp.: *Malva moschata* only, 15 visits.
5. ———. ———: *Malva moschata* only, 11 visits. In both the last cases a number of different flowers were passed over in the intervals of alighting on the flowers of the mallow.
6. ———. ———: *Arctium Lappa*, 7; *Rubus fruticosus*, 6; distinctly refusing *Senecio Jacobæa* when intermixed with them.
7. NEAR TENBY, Aug. 11th, 1880. *Senecio Jacobæa*, *Lotus corniculatus*, *Centaurea Scabiosa*, *C. nigra*, *Daucus Carota*, *Ononis arvensis*, *Galium verum*, *Achillæa Millefolium*, *Echium vulgare*, *Convolvulus arvensis*, *Salvia Verbenaca*. The small Tortoise-shell Butterfly (*Vanessa Urticæ*) lighted many times on *Senecio Jacobæa*, passing over many other flowers, and covering in its flight a considerable area.
8. ———. *Bombus* sp.: *Centaurea Scabiosa* only, 8 visits.
9. ———. ———: *Centaurea nigra* only, 7.
10. ———. ———: *Ononis arvensis*, 14 times; *Convolvulus arvensis*, 2; *Ononis arvensis* again, 1; *Lotus corniculatus*, 2.
11. ———, Aug. 12th, 1880. *Centaurea Scabiosa*, *C. nigra*, *Senecio Jacobæa*, *Trifolium pratense*, *Armeria vulgaris*, *Scabiosa succisa*, *Daucus Carota*, *Achillæa Millefolium*, *Pimpinella Saxifraga*, *Convolvulus arvensis*, *Stachys Betonica*. The Painted Lady Butterfly (*Cynthia Cardui*) visited *Centaurea nigra* 5 times; *C. Scabiosa*, 1.
12. ———. *Cynthia Cardui*: *Centaurea Scabiosa*, 1; *C. nigra*, 2.
13. ———. ———: *C. nigra*, 2; *C. Scabiosa*, 1; *C. nigra*, 6; *C. Scabiosa*, 1. This Butterfly, of which considerable numbers were seen, appeared to confine its attention entirely to the two species of knapweed, though frequently making long flights between each settlement, and apparently passing indifferently from one of these species to the other.
14. ———. Bee (*Apis mellifica*): *Scabiosa succisa*, 1 visit; *Centaurea Scabiosa*, 9; passing over many other species.
15. MANORBEER, PEMBROKESHIRE, Aug. 23rd, 1880. *Scabiosa arvensis*, *Centaurea nigra*, *C. Scabiosa*, *Agrimonia Eupatoria*, *Pru-*
- * To save space and repetition of names short lines have been introduced, the one referring to the place, the other to the insect—viz. the same as that preceding where mentioned in full.

nella vulgaris, *Crepis virens*, *Achillea Millefolium*, *Stachys Betonica*, *Daucus Carota*, *Chrysanthemum Leucanthemum*, *Trifolium pratense*. The Large White Butterfly (*Pieris Brassicæ*) visited *Centaurea nigra* 3 times; *Stachys Betonica*, 1.

16. MANORBEER, PEMBROKESHIRE, Aug. 23rd, 1880. The common Blue Butterfly (*Polyommatus Alexis*): *Stachys Betonica*, 1; *Trifolium pratense*, 1; *Lotus corniculatus*, 1; *Anthyllis Vulneraria*, 1; *Centaurea nigra*, 1; *Lotus corniculatus*, 1.

17. ——. The small White Butterfly (*Pieris Rapæ*): *Scabiosa arvensis*, 1; *Centaurea nigra*, 7; *Prunella vulgaris*, 1; *Centaurea nigra*, 1; *Prunella vulgaris*, 1; *Centaurea nigra*, 3.

18. ——. —: *Scabiosa arvensis*, 2; *Centaurea nigra*, 6.

19. ——. Bee (*Apis mellifica*): *Centaurea nigra*, 4 visits; passing over many other flowers.

20. —, Aug. 24th, 1880. *Centaurea nigra*, *Daucus Carota*, *Convolvulus arvensis*, *Euphrasia officinalis*, *Senecio Jacobæa*, *Leontodon autumnalis*, *Lotus corniculatus*, *Spiranthes autumnalis*, *Agri- monia Eupatoria*, *Rubus fruticosus*, *Eupatorium cannabinum*, *Potentilla reptans*. *Bombus* sp. visited *Centaurea nigra* 13 times in succession, travelling considerable distances.

21. —. *Polyommatus Alexis* settled twice on *Lotus corniculatus* at a considerable distance apart, arresting its flight over, but never settling on, other yellow flowers.

22. —, Aug. 24th, 1880. *Trifolium pratense*, *Convolvulus arvensis*, *Bartsia Odontites*, *Cerastium glomeratum*, *Centaurea nigra*, *Rubus fruticosus*, *Prunella vulgaris*, *Lotus corniculatus*. *Syrphus clypeata*: *Convolvulus arvensis*, 2; *Cerastium glomeratum*, 3; *Convolvulus arvensis*, 5; *Cerastium glomeratum*, 1; *Convolvulus arvensis*, 1. When driven away, always returning to the bindweed.

23. —. *Pieris Rapæ*: *Bartsia Odontites*, 7; *Centaurea nigra*, 1; *Bartsia Odontites*, 1.

24. —. *Polyommatus Alexis*: *Lotus corniculatus*, 2; precisely repeating no. 21.

25. KEW, May 14th, 1881. *Nepeta Glechoma*, *Ranunculus bulbosus*, *Taraxacum officinale*, *Lamium album*, *Pyrus Malus*. *Bombus* sp. was seen to visit the ground-ivy 93 times in succession, without touching any other flower.

26. —. *Bombus* sp.: Visited the ground-ivy 25 times in succession, without touching any other flower.

27. —. —: *Taraxacum officinale*, *Pyrus Malus*, *Cardamine pratensis*, *Bellis perennis*, *Plantago lanceolata*, *Anthriscus*

sylvestris, *Rumex acetosa*, *Saxifraga granulata*. Confined its attention entirely to the dandelion; but the number of visits was not counted.

28. KEW, May 14th, 1881. *Apis mellifica*: The apple 5, without visiting any other flower.

29. —. *Bombus* sp.: *Pyrus Malus* only, 14.

30. "THE KNOLL," AMBLESIDE, Aug. 5th, 1881. *Melampyrum pratense*, *Hypericum pulchrum*, *Stachys Betonica*, *Potentilla Tormentilla*, *Spiræa Ulmaria*, *Rubus fruticosus*. *Bombus* sp.: *Melampyrum pratense* only, 9 visits.

31. —. *Bombus* sp.: *Stachys Betonica* only, 6 visits. This Bee was captured and the pollen on its hind legs examined under the microscope. It was to all appearance of one kind only, corresponding to that of *Stachys Betonica*.

32. —. —: *Stachys Betonica*, 6.

33. —. —: *Stachys Betonica*, 10.

34. —. —: *Stachys Betonica*, 6.

35. —. —: *Stachys Betonica*, 10.

36. —. *Syrphus clypeata*: *Potentilla Tormentilla*, 8.

37. LOW WOOD, WINDERMERE, Aug. 11th, 1881. *Centaurea nigra*, *Serratula tinctoria*, *Spiræa Ulmaria*, *Geranium sylvaticum*, *Poterium officinale*, *Achillæa Ptarmica*, *Campanula rotundifolia*, *Linaria vulgaris*, *Euphrasia officinalis*, *Stachys Betonica*, *S. palustris*, *Lythrum Salicaria*. *Bombus* sp.: *Stachys palustris*, 2; *Centaurea nigra*, 2.

38. —. *Bombus* sp.: *Centaurea nigra*, 1; *Serratula tinctoria*, 3; *Centaurea nigra*, 12.

39. —. —: *Stachys Betonica*, 3; *Centaurea nigra*, 1.

40. —. —: *Serratula tinctoria*, 2.

41. —. —: *Centaurea nigra*, 12; *Serratula tinctoria*, 3; *Centaurea nigra*, 3. This Bee confined its attention to these two species, although passing over a large number of other flowers.

42. —, Aug. 12th, 1881. *Pieris Rapæ*, ♂: *Geranium sylvaticum*, 2; *Centaurea nigra*, 2, at a great distance from one another; *Achillæa Ptarmica*, 1.

43. —. —: *Stachys Betonica*, 11, passing over all other flowers.

44. —. —: *Stachys Betonica*, 20, obviously rejecting both the *Centaurea* and *Serratula*. These two last Bees were both captured and the pollen attached to their legs examined, when it was again found to be all of one kind, corresponding

to that of the betony, elliptical, smooth, with longitudinal furrows.

45. LOW WOOD, WINDERMERE, Aug. 12th, 1881. *Apis mellifica*: *Serratula tinctoria* only, 24, constantly rejecting *Centaurea nigra*. This Bee was also captured and the pollen adhering to its legs examined. It proved to consist entirely, or nearly so, of the pollen of the *Serratula*, which is very characteristic, white, shortly oval, with blunt spines; while that of the *Centaurea nigra* has a smooth extine.

46. —. *Eristalis tenax*: *Centaurea nigra*, 1; *Spiræa Ulmaria*, 2; *Centaurea nigra*, 2.

47. —. —: *Centaurea nigra*, 1; *Serratula tinctoria*, 2; *Stachys Betonica*, 1; *Serratula tinctoria*, 1.

48. —. *Pieris Rapæ*, ♂: *Achillea Ptarmica*, 1; *Serratula tinctoria*, 1; *Spiræa Ulmaria*, 1.

49. —. —: *Serratula tinctoria*, 1; *Centaurea nigra*, 4; constantly settling meanwhile on leaves.

50. —. —: *Stachys palustris* only, 23.

51. THE FERRY, WINDERMERE, Aug. 15th, 1881. *Spiræa Ulmaria*, *Centaurea nigra*, *Lythrum Salicaria*, *Prunella vulgaris*, *Thalictrum flavum*, *Valeriana officinalis*, *Lychnis flos-cuculi*, *Stachys palustris*, *Scabiosa succisa*. *Bombus* sp.: *Scabiosa succisa*, 1; *Lythrum Salicaria*, 5; *Prunella vulgaris*, 1; *Lythrum Salicaria*, 1.

52. —. *Bombus* sp.: *Centaurea nigra*, 1; *Scabiosa succisa*, 5; *Valeriana officinalis*, 1; *Centaurea nigra*, 2.

53. —. —: *Stachys palustris*, 3, at great distances from one another.

54. —. —: *Lythrum Salicaria*, 4, at great distances from one another.

55. —. *Syrphus clypeata*: *Spiræa Ulmaria*, 6; *Valeriana officinalis*, 1; when removed from the meadowsweet, always returning to it.

56. "THE KNOLL," AMBLESIDE. *Rubus fruticosus*, *Stachys Betonica*, *Achillea Millefolium*, *Campanula rotundifolia*, *Teucrium Scorodonia*, *Hypericum humifusum*, *Rumex Acetosella*, *Centaurea nigra*. *Apis mellifica* abundantly visiting the bramble, and when disturbed always returning to it, obviously declining *Achillea Millefolium* and *Stachys Betonica*.

57. —. *Eristalis tenax* was visiting *Achillea Millefolium* only. This was captured, and the contents of its abdomen exa-

mined under the microscope. It was found to consist of an enormous quantity of pollen-grains, of which by far the larger part corresponded to that of the milfoil—small, bright yellow, nearly spherical, and spined. This was mixed with a much smaller quantity of two other kinds; one was not recognized; the other, of which there were only a few grains, was apparently that of *Epilobium montanum*, a plant not growing in the immediate vicinity.

58. "THE KNOLL," AMBLESIDE. *Syrphus clypeata* passed indifferently from *Achillæa Millefolium* to *Stachys Betonica*. The mass of pollen-grains in its abdomen, examined in the same way, appeared to be of two kinds only, corresponding to the pollen of these two plants.

59. —. *Pieris Rapæ*, ♀ : *Rubus fruticosus*, 1; *Achillæa Millefolium*, 2.

60. —. *Bombus* sp.: *Rubus fruticosus*, 2; *Stachys Betonica*, 1; *Rubus fruticosus*, 2; *Teucrium Scorodonia*, 7.

61. —, Aug. 21st, 1881. *Potentilla Tormentilla*, *Melampyrum pratense*, *Hieracium sylvaticum*, *Solidago virgaurea*, *Calluna vulgaris*, *Galeopsis Tetrahit*, *Rubus fruticosus*, *Geranium Robertianum*, *Stachys Betonica*. A small Wood-Bee visited *Potentilla Tormentilla* only; the pollen on its legs was examined, and appeared to belong to that flower exclusively.

62. —. *Bombus* sp.: *Rubus fruticosus*, *Galeopsis Tetrahit* (white), *Corydalis claviculata*, growing completely intermixed. Several Humble-Bees belonging to different species confined their visits entirely to the bramble.

63. CONISHEAD PRIORY, NEAR ULVERSTON, Aug. 22nd, 1881. *Heracleum Sphondylium*, in great profusion, both white and pink, intermixed with smaller quantities of *Centaurea nigra*, *Trifolium pratense*, and *Senecio Jacobæa*. Large numbers of *Eristalis tenax* were hovering and settling on the *Heracleum Sphondylium*, irrespective of colour, and on nothing else. The abdomen of two specimens captured was loaded with the pollen of this flower only.

64. —. *Bombus* sp. visiting *Centaurea nigra* only, refusing *Trifolium pratense*.

65. —. —. Visiting both *Centaurea nigra* and *Trifolium pratense*.

66. —. —. Was watched visiting foxgloves, *Digitalis purpurea*, of which there were about an equal number, white and pink. It entered 16 flowers in succession, without visiting any

other species meanwhile (although to find them it had to fly considerable distances), and these were indifferently white and pink.

The 66 observations above recorded refer to three orders only of insects,—the Rhopalocera among Lepidoptera, the Syrphidæ among Diptera, and the Apidæ among Hymenoptera. As far as they go, they would appear to indicate very different degrees of constancy in regard to the species of flowers visited in the different groups.

The 18 observations on Butterflies refer to 6 species:—*Pieris Brassicæ* and *P. Rapæ*, *Polyommatus Alexis*, *Cynthia Cardui*, *Hipparchia Janira*, and *Vanessa Urticæ*. Of these, the two Whites and the Blue (Obs. nos. 15, 16, 17, 18, 21, 23, 24, 42, 48, 49, 59) appear to visit different species of flowers in succession without scruple, and in several cases quite regardless of colour, the *Alexis* paying in one instance 5 successive visits to 5 different flowers of different colours. But in two other cases the same Butterfly showed a marked preference for *Lotus corniculatus*, and was attracted also by other yellow flowers. *Vanessa Urticæ* was observed only once (Obs. no. 7), and then confining its visits to *Senecio Jacobææ*. Three observations (Nos. 1, 2, 3) were made on *Janira*: in one instance it was visiting the bramble only; in the two others two different flowers, all yellow. In three observations on *Cynthia Cardui* (Nos. 11, 12, 13) this brilliant Butterfly was confining its attentions entirely to the two common species of *Centaurea*, which it was visiting indifferently. On the whole, Butterflies appear to manifest but a small degree of constancy in visiting flowers; the great majority of those on which they were seen to settle were either yellow or pink; and when beginning with one of these colours, there seemed a marked tendency to adhere to it. From the very long flights of Butterflies, and their constantly settling on foreign objects, such as grass, the trunks of trees, the bare ground, &c., it may be doubted whether they perform nearly so large a part in the fertilization of flowers as other orders of insects.

Of the Syrphidæ or Hover-flies, two species only were the subject of observation, both very common, *Eristalis tenax* and *Syrphus clypeata*. These insects are large consumers of pollen, and therefore in several cases they were captured, and the contents of the abdomen examined, in order, where possible, to recognize the pollen-grains

on which they fed. Four observations (Nos. 46, 47, 57, 63) were made on *Eristalis tenax*. In two of them it showed but little constancy; in the third it confined itself to a single flower (*Heracleum Sphondylium*), the flowers of which were both white and pink: and the abdomen was found to be loaded with the pollen of this flower only. In the fourth case it was also visiting a single flower (*Achillæa Millefolium*), and almost the whole of the pollen in the abdomen appeared to be of this kind, intermixed with a few grains of two other species. *Syrphus clypeata* was also observed four times (Nos. 22, 36, 55, 58); in one case only was it constant in its visits to a single flower. The pollen-grains in the abdomen were in one instance examined, and found to consist of two kinds in about equal quantities, belonging to widely separated natural orders, the Compositæ and Labiatae. Although the Syrphidæ are constantly hovering over and settling on flowers, their function of conveying pollen is probably small compared to that of the Hymenoptera, their object in visiting the flowers being not to carry away the pollen, but to consume it.

By far the majority of my observations (40) were made on the visits of Apidæ, and the greater number of these (33) on various species of *Bombus* or Humble-Bee; and here I regret that ignorance of the specific distinctions in this difficult genus detracts materially from the value of what I observed. In four instances (Nos. 10, 51, 52, 60) was a Humble-Bee observed to visit as many as three distinct species of flower on the same visit, and to a large extent irrespective of colour. In six instances (Nos. 6, 37, 38, 39, 41, 65) the number of species visited while the insect was kept in sight was two; and in all these instances the colour of the two flowers was nearly the same. In twenty-three instances (Nos. 4, 5, 8, 9, 20, 25, 26, 29, 30, 31, 32, 33, 34, 35, 40, 43, 44, 50, 53, 54, 62, 64, 66) the Bee confined itself, while kept within observation, to a single species; but these plants were, in the different instances, of the most various kinds and colours, some shade of pink largely predominating, but we have also blue, yellow, and white. The largest number of consecutive visits observed was—to the apple 14, *Malva moschata* 15, *Stachys Betonica* 20, *Stachys palustris* 23, *Nepeta Glechoma* 25, and, again, *Nepeta Glechoma* (obs. No. 25) as many as 93 consecutive visits. As the details of these observations will show, there can be no doubt about this constancy being purposed, the flowers in question in all cases growing intermixed with others, and the Bee fre-

quently traversing considerable distances in order not to mix its pollen. In two cases (Nos. 31 and 44) the pollen attached to the hind legs was examined, and found to be of one kind only, corresponding to that of the flower on which it was captured. It was quite obvious that at the same spot different Bees of the same species were visiting different flowers. Obs. no. 66 is particularly interesting as showing that the insect, however, is not attracted by colour only. At a spot where there were both white and pink foxgloves, a large Humble-Bee was watched to pay 16 successive visits to the flowers of this plant, indifferently white and purple, passing over in its flights many other kinds of flowers and flying considerable distances.

A single observation (No. 61) was made on an unknown species of Wood-Bee. It was visiting one species only (*Potentilla Tormentilla*) on a woody knoll, where there was a large number of others; the number of separate visits was not counted, but was very large. The pollen on the legs appeared to be of this one kind only.

The common Hive-Bee (*Apis mellifica*) was observed six times (Nos. 14, 19, 27, 28, 45, 56). On one of these occasions only (No. 14) did it visit two different flowers while kept in sight, paying one visit to the blue *Scabiosa succisa*, and then nine in succession to the pink *Centaurea Scabiosa*; in all the others it was absolutely constant to one flower. In four of these instances the flower visited was pink or some shade of red, viz., *Centaurea nigra* 4 visits, the apple 5, *Serratula tinctoria* 24, and the bramble a large number, but not counted. Obs. No. 45 is very interesting. The Bee paid 24 consecutive visits to *Serratula tinctoria*, obviously rejecting *Centaurea nigra*, which is not unlike it in general appearance and nearly the same colour. This individual was captured and the pollen on its legs examined, when it proved to consist entirely, or nearly so, of that of the *Serratula*, which is of a very characteristic form, and very different from that of the *Centaurea*. In the remaining instance (No. 27) the flower visited was yellow, viz. the Dandelion; the number of visits was not counted, but was very large.

In accordance with a plan suggested by my friend Mr. Robert Miller Christy, who has been pursuing the same line of observation in greater detail than I am able to do, and with great success, I append a Table indicating the number of visits paid while the insect was kept under observation in the sixty-six different cases,

the number of species among which the visits were distributed, and the colours of the flowers, which I have divided into four groups, viz.:—R, red, pink, or purple; B, blue or violet; Y, yellow or orange; W, white.

The number of observations I have been able to make is probably not sufficient to determine any general law with regard to the constancy of insects in visiting flowers. As far as the results go, they may be stated as follows:—

The different classes of insects show very great difference in this respect. Butterflies show but little constancy, except in a few instances; but they would appear to be guided to a certain extent by a preference for particular colours. The Diptera exhibit greater constancy, though by no means absolute. A much greater degree of constancy is manifested by the Apidæ; and this becomes all but absolute in the Hive-Bee. It is an interesting circumstance that this constancy appears to increase in proportion to the part performed by the insects in carrying pollen from flower to flower. A much larger number of observations is, however, needed in order to determine with certainty any general law; and especially a careful microscopic examination of the pollen attached to the proboscis, mandibles, legs, and underside of the abdomen and thorax.

As regards preference for particular colours, the Lepidoptera paid, while under observation, 70 visits to red or pink flowers, 5 to blue, 15 to yellow, 5 to white; the Diptera 9 to red or pink, 8 to yellow, 20 to white; the Hymenoptera 303 to red or pink, 126 to blue, 11 to yellow, 17 to white.

LEPIDOPTERA.

Obs. No.	Name.	No. of species visited.	No. of visits paid and colour of flower.
15.	Pieris Brassicæ	2	R 3, R 1.
17.	Pieris Rapæ	3	B 1, R 7, B 1, R 1, B 1, R 3.
18.	„	2	B 2, R 6.
23.	„	2	R 7, R 1, R 1.
42.	„	3	R 2, R 2, W 1.
48.	„	3	W 1, R 1, W 1.
49.	„	2	R 1, R 4.
59.	„	2	R 1, W 2.
16.	Polyommatus Alexis... ..	5	R 1, R 1, Y 1, Y 1, R 1, Y 1.
21.	„	1	Y 2.
24.	„	1	Y 2.
1.	Hipparchia Janira	1	R 7.
2.	„	2	Y 2, Y 1.
3.	„	2	Y 4, Y 1.
7.	Vanessa Urticæ.....	1	Y (not counted).

Obs. No.	Name.	No. of species visited.	No. of visits paid and colour of flower.
11.	<i>Cynthia Cardui</i>	2	R 5, R 1.
12.	„	2	R 1, R 2.
13.	„	2	R 2, R 1, R 6, R 1.

DIPTERA.

46.	<i>Eristalix tenax</i>	2	R 1, W 2, R 2.
47.	„	3	R 1, R 2, R 1, R 1.
57.	„	1	W (not counted).
63.	„	1	R and W (same species, not counted).
22.	<i>Syrphus clypeata</i>	2	W 2, W 3, W 5, W 1, W 1.
36.	„	1	Y 8.
55.	„	2	W 6, R 1.
58.	„	2	W, R (not counted).

HYMENOPTERA.

4.	<i>Bombus</i> sp.	1	R 15.
5.	„	1	R 11.
6.	„	2	R 7, R 6.
8.	„	1	R 8.
9.	„	1	R 7.
10.	„	3	R 14, W 2, R 1, Y 2.
20.	„	1	R 13.
25.	„	1	B 93.
26.	„	1	B 25.
29.	„	1	R 14.
30.	„	1	Y 9.
31.	„	1	R 6.
32.	„	1	R 6.
33.	„	1	R 10.
34.	„	1	R 6.
35.	„	1	R 10.
37.	„	2	R 2, R 2.
38.	„	2	R 3, R 12.
39.	„	2	R 3, R 1.
40.	„	1	R 2.
41.	„	2	R 12, R 3, R 3.
43.	„	1	R 11.
44.	„	1	R 20.
50.	„	1	R 23.
51.	„	3	B 1, R 5, B 1, R 1.
52.	„	3	R 1, B 5, R 1, R 2.
53.	„	1	R 3.
54.	„	1	R 4.
60.	„	3	R 2, R 1, R 2, W 7.
62.	„	1	R (not counted).
64.	„	1	R (not counted).
65.	„	2	R, R (not counted).
66.	„	1	R and W 16 (same species).
61.	Wood-bee	1	Y (not counted).
14.	<i>Apis mellifica</i>	2	B 1, R 9.
19.	„	1	R 4.
27.	„	1	Y (not counted).
28.	„	1	R 5.
45.	„	1	R 24.
56.	„	1	R (not counted).



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