NOTES ON COLLECTING SYRPHID FLIES
(Diptera: Syrphidae)\textsuperscript{1}

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Syrphid flies can be collected in many kinds of habitats—some where they feed at flowers, some in places where they oviposit, and others in places where they hover in sunlight or rest on foliage. Many species are restricted in their distribution to particular types of habitats, such as grassy fields, open woods, bogs, or stream margins. Some are found only in mountainous areas, others in deserts, and still others in swampy areas. In collecting for syrphids the old adage holds well that if one wishes to find unusual species he should visit unusual places.

Some of the factors which determine what syrphids can be collected are season, geographic area, habitat, time of day, temperature, wind conditions, and availability of food and satisfactory oviposition sites. For example, the distribution of a plant whose flowers are favored by syrphids often does not coincide with the distribution of a particular species of syrphid, or a plant which otherwise might be an excellent host does not bloom at the same time that certain species of syrphids are present. Many species of syrphids feed only at certain times of the day. They are most evident on calm, warm, sunny days. Few of them fly at temperatures below 60° F.

Host Plants of Syrphid Flies

Most syrphids can be collected best at the flowers they frequent. The flowers which provide the best collecting vary from one area to another, and a given flower may differ in value for collecting syrphids in different places. The flowers of redbud (\textit{Cercis canadensis} L.) attracted large numbers of syrphids of several species at Gainesville, Florida, but yielded only occasional syrphids at Oxford, Mississippi, and practically none at several places in Ohio. Two species of wild plum (\textit{Prunus americana} Marsh. and \textit{Prunus angustifolia} Marsh.) were present in all these areas; in north Florida wild plum was a fairly good host.

\textsuperscript{1} Names of plants are those used in the new Gray's Manual of Botany (Fernald, 1950); for those Florida plants not included in Gray's Manual, Small's \textit{Manual of the Southeastern Flora} (1933) is followed.
plant; in Mississippi it was decidedly the best, but in parts of Ohio it yielded only the common species, attracting Hymenoptera mostly. Williston (1886) recorded that patches of elder (Sambucus L.) in bloom will always be sure to reward the patience of the collector. Curran (1924) wrote that he found not more than a dozen species on elder, most of them common, and he considered it to be a poor host plant. In various places in Florida I failed to find more than an occasional syrphid on elder, although syrphids were abundant in areas where the plant was in bloom. I made similar observations in Georgia, Mississippi, and Ohio, but on July 4, near Richwood, West Virginia, I collected a large number of syrphids on elder (Sambucus pubens Michx.). Mountain hydrangea (Hydrangea arborescens L.), blooming in the same area, produced many more specimens of a greater number of species, but I obtained several species on elder which I failed to take on the hydrangea where the two plants were less than twenty feet apart. This points up the importance of checking possible host plants many times in many places until experience shows them to be unattractive to syrphids.

A few species of syrphids exhibit high host specificity. Rhingia nasica Say visits almost exclusively the spotted flowers of pale touch-me-not (Impatiens pallida Nutt.). Most syrphids feed at many kinds of plants, although some feed mainly at flowers of plants within a particular family.

Several collectors have recorded that syrphid flies are found chiefly upon white flowers, only a few species commonly visiting blooms of other colors. While white and yellow flowers often attract large numbers of syrphids, the plants which attract the largest numbers of syrphid flies in some areas are those with inconspicuous greenish or yellowish green flowers. Spicebush (Lindera benzoin [L.]) yielded a good variety and large numbers of syrphids in early spring collecting in Ohio. Arborvitae bloom near Atlanta, Georgia, yielded many Syrphus and Metasyrphus in early spring. Filmy angelica (Angelica curtisii Buckl.) was visited by hundreds of Stenosyrphus cinctellus (Zett.) near Cranberry Glades, West Virginia, during a drizzling rain in mid August. At the same time many other species in the same area were attracted chiefly to the white flowers of cowbane (Oxypolis rigidior [L.]), which was growing in large patches in a sphagnum-cranberry bog. Only a few Stenosyrphus cinctellus (Zett.) visited the flowers of cowbane. The greenish flowers of poison sumac (Rhus vernix L.) and other sumac (Rhus spp.) attract
many Syrphidae, Stratiomyiidae, and Conopidae. The clusters of tiny green flowers of poisonwood (*Metopium toxiferum* [L.]), on the Florida islands from Key Largo to Key West, in March and April, yielded large numbers of *Baccha notata* Loew and *Allograpta cubana* Curran, two species of syrphids described from Cuba which once were believed to be rare in Florida. Other specimens of these species were taken at the inconspicuous greenish yellow flowers of *Trema mollis* (Humb. & Bonpl.) in the same area. It is often especially helpful, when collecting syrphids against predominantly green background, to station oneself so that syrphids hovering or flying about the flowers are silhouetted against the sky. Some of the *Baccha* are almost impossible to detect and catch otherwise, and are often overlooked entirely. I failed to take a single specimen of the elusive *Baccha cubana* Hull during numerous collecting visits to Highlands Hammock State Park, Florida, until I learned this trick. The first time that I tried stooping low and looking upward through the vegetation, within half an hour I had taken a dozen specimens of this beautiful and seemingly rare syrphid.

Spanish needle (*Bidens bipinnata* L.), a common roadside herb throughout the peninsular Florida, blooms sporadically at all seasons and produces small flowers with white petals and a yellow center. This plant is the best syrphid fly host in Florida. Dahoon holly (*Ilex cassine* L.) is an excellent host in March and April for many uncommon Syrphidae in Florida hammocks. The bright yellow bloom of *Flaveria linearis* Lag. is the best host of *Ornidia obesa* (Fab.), *Volucella nigra* Greene, and several species of *Eristalis* in the Florida keys. Other good host plants in Florida include Carolina laurel cherry (*Prunus caroliniana* [Mill.]), gallberry (*Ilex glabra* [L.]), *Osmia odorata* (L.), *Trema mollis* (Humb. & Bonpl.), poisonwood (*Metopium toxiferum* [L.]), marsh willow (*Salix longipes* Shuttlow.), Mexican sunflower (*Heliopsis helianthoides* [L.]), titi (*Cyrilla parvifolia* Raf.), wild plum (*Prunus* spp.), mango (*Mangifera indica* L.), avocado (*Persea persea* [L.]), sporadic citrus bloom, and a variety of tropical fruit trees and shrubs. During two years at Gainesville, Florida, I experienced fair collecting at blooms of pear (*Pyrus communis* L.) from early October into the first week of November.²

²This fall bloom is abnormal and is due to shedding of foliage in late summer, caused by a fungus disease (*Fabraea maculata* [Lerb.]) known as leaf spot. Pear blooms in the spring.
Good syrphid host plants in mountainous areas include New Jersey tea (Ceanothus americanus L.), pogoda cornel (Cornus alternifolia L.), silky dogwood (Cornus amomum Mill.), mountain hydrangea (Hydrangea arborescens L.), sugar maple (Acer saccharum Marsh.), mountain maple (Acer spicatum Lam.), winterberry (Ilex verticillata [L.]), juneberry (Amelanchier spp.), sumac (Rhus spp.), hawthorn (Crataegus spp.), raspberry and blackberry (Rubus spp.), aster (Aster spp.), goldenrod (Solidago spp.), spirea (Spiraea spp.), and several species of wild plum and wild cherry (Prunus spp.). Most of these plants also offer good collecting where they occur at low elevations.

Wild plum thickets, especially where they occur on the edges of woods, offer excellent syrphid collecting throughout most of the Southeastern States. Several species of wild plum which occur typically in open woods yield many unusual syrphids. Collecting near Oxford, Mississippi, at a single woodland plum in an open sunny spot in a wood resulted in the capture of several additions to the list for that state. Other plants in the genus Prunus are among the best syrphid hosts, particularly wild black cherry (Prunus serotina Ehrh.) and choke cherry (Prunus virginiana L.), which attract many early-flying species. Blossoms of cultivated plum (Prunus domestica L.), cherry (Prunus spp.), apricot (Prunus armeniaca L.), apple (Pyrus malus L.) are all good host plants for syrphids, especially where one or a few trees occur near a woods. Phillips (1933) listed 21 species of syrphids which he collected on apple blossoms in western New York. Peach bloom (Prunus persica [L.]) does not appear to be attractive, although I have taken a few syrphids at peach bloom. Curran (1924) recorded similar data.

During the last few days of March and the early part of April, while the weather is still crisp, large hairy Criorhina can be taken at willow bloom (Salix spp.), and are seldom seen at any other time of the year. Flowering dogwood (Cornus florida L.) is fairly good sometimes, but usually it blooms in such quantity that the syrphids attracted to it are scattered over too large an area, and they often alight on blossoms completely out of reach from the ground, thus making this plant a poor one for collecting. Occasionally an isolated tree with low branches yields fair collections.

Sassafras (Sassafras albidum [Nutt.]) in woods, fields, and along roadsides is a good syrphid host in spring. Fields of wild
parsnip (*Pastinaca sativa* L.), cow parsnip (*Heracleum maximum* Bartr.), and wild carrot (*Daucus carota* L.) yield enormous numbers of common species of syrphids, and occasionally uncommon species.

Grasses (Gramineae), plantain (*Plantago* spp.), and dandelion (*Taraxacum* spp.), when in bloom, are visited by many species of *Mesograpta* and *Platychelus*, where they are readily collected by general sweeping with a net.

Other collectors have recorded collection of Syrphidae at a wide variety of host plants. Curran (1924) listed basswood (*Tilia*), marsh marigold (*Osmorrhiza claytoni* [Michx.]), swamp rose (*Rosa carolina* L.), strawberry (*Fragaria*), and cultivated gooseberry (*Grossularia*) among the syrphid hosts. Bembower (1911) collected syrphids on flowers of sweet scented water lily (*Nymphaea odorata* L.), large yellow water lily (*Nuphar advena* [Ait.]), American water lotus (*Nelumbo lutea* [Willd.]), swamp rose (*Rosa carolina* L.), buttonbush (*Cephalanthus occidentalis* L.), Canada thistle (*Cirsium arvense* [L.]), clasping leaved dogbane (*Apocynum sibiricum* Jacq.), trumpet creeper (*Campsis radicans* [L.]), wild bergamot (*Monarda fistulosa* L.), and pickerel weed (*Pontederia cordata* L.). Hamilton (1890) recorded that *Eristalis tenax* (L.) was primarily responsible for the pollination of chrysanthemums in greenhouses. Metcalf (1913) wrote that adults of *Mesograpta polita* (Say), *Eristalis vinetorum* (Fab.) and *Baccha fuscipennis* Say were observed by Ashmead feeding on the pollen of cotton blossoms. Several authors have recorded *Mesograpta polita* (Say) adults, as well as their larvae, feeding on pollen of corn. Robertson (1921) reported collection of *Xylota chalybea* Wd. on flowers of *Hydrophyllum appendiculatum* Michx., *Viburnum rafinesquianum* Schultes, *Rosa carolina* L. and *Rosa setigera* Michx. Some authors had written previously that *Xylota chalybea* Wd. does not visit flowers.

Metcalf (1913) wrote that he found it worth while when collecting to visit flowers of the common milkweed (*Asclepias* sp.). Large numbers of the weaker bodied syrphids become permanently trapped by the pollinia of the milkweed flowers. It is usually the legs of the flies which become entangled. Metcalf wrote that he had found as many as twenty individuals trapped on a single flower cluster. Osburn (1920) described in detail the manner in which flowers of dogbane (*Apocynum androsaemi-
folium L.) trapped hundreds of *Mesograpta marginata* (Say), catching these small syrphids by their proboscises.

The value of a flowering plant as a host for syrphids generally depends largely on its location. One of the best situations is a wild plum thicket or an isolated pear tree near the edge of woods, exposed to open sunlight but protected from high winds. Another excellent collecting spot is at flowers of cowbane in an acid bog. At such a bog, Cranberry Glades, West Virginia, I took 85 species in a total of five days of collecting.

**OTHER PLACES TO COLLECT SYRPHIDAE**

Some species of Syrphidae may be collected best at places where the females oviposit, hence a knowledge of the larval types and larval habitats is important if one is to be a good collector. Aphidophagous species can be taken about most crops, orchards, weeds, and other places where aphid colonies occur. These include many species of *Mesograpta*, *Sphaerophoria*, *Syrophus*, *Didea*, *Baccha*, *Pipiza*, *Paragus*, *Melanostoma* and *Platycheirus*. Some syrphids oviposit in sap flowing from injured or diseased trees, including many species of *Polybiomyia*, *Cerioidea*, *Tenthredomyia*, *Xylota*, *Brachyopa*, *Myiolepta*, *Eumyiolepta*, *Chrysotoxum* and *Ferdinandea*. Other syrphids oviposit in rotting logs, or in decaying places in trees, including many species of *Mallota*, *Spilomyia*, *Sphecomyia*, *Brachypalpus*, *Myiolepta*, *Chrysotoxum*, *Xylota* and *Temnostoma*.

Myrmecophilous syrphids of the genus *Microdon* are usually found not far from the nests of ants in which their larvae develop. They are weak fliers, flying near the ground and sunning themselves upon leaves or in long grass, especially along creek bottoms and in swamps and bogs. *Melanostoma* and *Platycheirus* are found most frequently near swamps, streams, or moist places. Many species, especially *Pipiza*, occur in large numbers hovering in the air where rays of sunlight shine through openings in moist woods. Many species of *Pipiza*, *Cheilosia*, *Temnostoma* and *Xylota* rest on sunny leaves, especially along creek bottoms. Some species of *Volucella* and *Ornidia*, notably *Volucella barei* Curran and *Ornidia obesa* (Fab.), characteristically rest on the underside of leaves. Species of *Eristalis* and *Helophilus*, whose larvae develop in polluted liquid or semiliquid media, often occur in fair numbers along the margins of quiet streams and pools, resting on rocks and low hanging foliage. *Baccha* are most commonly taken hovering in the air, only now
and then resting lightly upon a sunny leaf or flower, and often are difficult to detect.

Many species of syrphids can be collected at windows behind which they become trapped. I have found this the best place to collect the robust Mallota during late spring and summer. Hull (1948) listed 18 species of syrphids which he collected in Mississippi on windows.

Few syrphids are attracted to lights at night. A notable exception to this, however, is Volucella vesicularia Curran. All of the specimens of this species which I have taken were attracted to lights, and several other authors have recorded similar collections. Volucella vesicularia Curran is of special interest for another reason—it completely lacks the spurious vein which is characteristic of the Syrphidae.

CONCLUSIONS

The places to collect Syrphidae which are discussed here are by no means the only good places. Syrphids can be found in almost any locality and in widely diversified habitats. Most of them feed at flowers, incidentally serving as important agents in the pollination of those plants. Only a few of the flowering plants which have provided good syrphid collecting are mentioned, for syrphids feed on a greater variety of flowers than do honey bees. The syrphid collector should find many syrphids on the flowers of the plants discussed, but he should investigate other flowers, visit many habitats, and collect at different seasons in the same places. He should remember that many species of insects which are scarce some seasons or some years may be abundant in others.

LITERATURE CITED


The highly useful Pictured-Key Nature Series, edited by Dr. H. E. Jaques, has added the spider book to its growing list of publications. This most recent of the series by Dr. and Mrs. Kaston has been written with the intent of making it possible for anyone to identify many of the more common forms occurring in the United States. In all, the keys make it possible to identify 190 genera and 271 species of spiders.

There are sections on spider food, courtship, habitats, anatomy, and sexual differences, as well as on their habitats and additional references for the more serious student of the group. Characteristics useful for identification have been illustrated, and for each species there is a brief characterization and a statement about its habitat and distribution.

The figures are exceptionally well done and the use of the index as an illustrated glossary is an important aid and short cut for the novice. Employing photo-offset makes it possible to profusely illustrate a book in which illustrations are essential and yet sell it at a reasonable price.—L. B.