

THE DRAGONFLIES AND DAMSELFLIES (ODONATA) OF THE HOLDEN ARBORETUM, LAKE AND GEAUGA COUNTIES, OHIO¹

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Thirty species of dragonflies (Anisoptera) and twenty species of damselflies (Zygoptera) were taken at the Holden Arboretum, Lake and Geauga Counties, Ohio, from 1963 through 1973. One additional species of dragonfly was sighted. Forty-eight of the arboretum's odonates frequent standing water habitats; only three were taken exclusively at stream sites. Certain species were also commonly associated with new pond habitats. Notes on the abundance and seasonal distribution for each species are given.

The Holden Arboretum's 2364 acres lie astride the county line between Lake and Geauga Counties in Northeastern Ohio. Lake County lies to the north, Geauga to the south of this boundary (fig. 1). Not all arboretum land is contiguous, but lies within a radius of 2.5 miles from an approximate geographic center. Arboretum land is gently rolling to precipitously hilly; elevations range from 750 to a few feet over 1200. About 60% of the arboretum is forested, 40% relatively open. The Chagrin River's eastern branch drains the entire area. Holden's soils are mostly clay in the uplands, sand and gravel in valleys and stream beds. Underlying rocks are Cleveland and Chagrin shales. Glaciers once covered the entire region.

A variety of lakes and ponds, all man-made, punctuate the landscape. The largest standing water body covers about six acres, the smallest is a temporary pond fifteen by thirty feet. These lakes and ponds are in various stages of succession; some contain little open water, others are almost completely open. Several unique opportunities were presented to study the effects of pond drainage and plant removal on odonate populations; a new pond was also created during the study. Streams were also explored. The arbo-

retum's streams arise from springs in upland areas and course rapidly through rugged, forested terrain over rock, sand, and gravel bottoms.

The primary aim of this study was to discover which species of adult dragonflies and damselflies were present within the arboretum's boundaries and which of the various habitats were occupied by these species. Secondly, I was interested

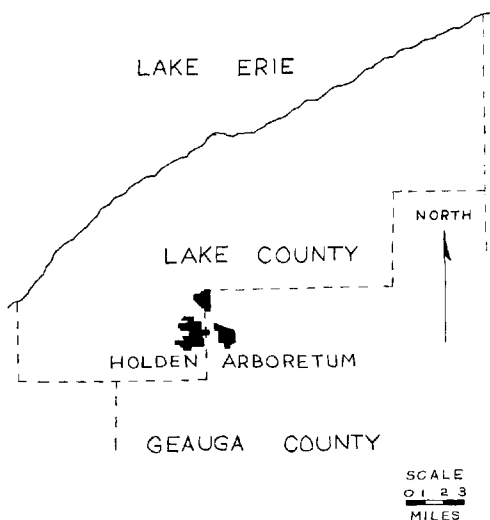


FIGURE 1. Map of Lake and Geauga Counties, Ohio, showing location of Holden Arboretum.

in the comparative numbers of the various species present, along with their seasonal distributions. Figure 2 shows major collecting sites at Holden.

Methods of study were quite elementary. Nets, modified slightly with longer than usual handles, cyanide jars, and field notebook were the major tools. Specimens were classified as soon after capture as feasible because of the rapid fading of odonate colors, coloration being so essential to dragonfly taxonomy. Keys from books by Garman (1917), Needham and Heywood (1929), and Needham and Westfall (1955) were used

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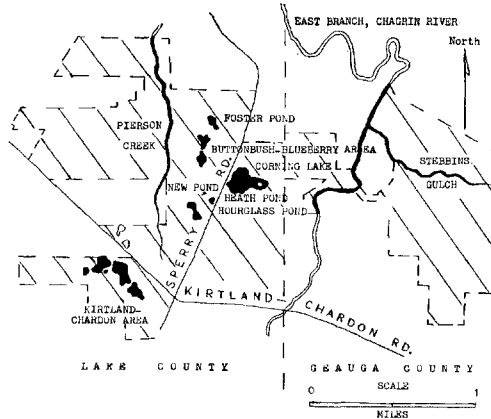


FIGURE 2. Map of Holden Arboretum, Lake and Geauga Counties, Ohio, showing locations of major odonate collecting sites (darkened).

to classify specimens, as were descriptions from Kellicott (1899). Several questionable materials were sent to Dr. D. J. Borror of The Ohio State University for confirmation.

Adult dragonflies and damselflies were taken throughout the flying season during the years 1963 through 1973.

Fifty different species of odonates, including thirty dragonflies and twenty damselflies, were taken at Holden Arboretum from 1963 through 1973. One species of dragonfly, *Anax longipes*, was sighted but not taken. Of these fifty-one species, forty-eight were collected at pond and lake habitats, but not exclusively. Five of the forty-eight were taken once at lotic sites: *Pachydiplax longipennis*, *Plathemis lydia*, *Sympetrum rubicundulum*, *Enallagma signatum*, and *Lestes rectangularis*. Only three odonates were taken exclusively at the arboretum's streams: *Boyeria* species, *Cordulegaster maculata*, and *Calopteryx maculata*.

Criteria for subsuming certain species as "common," "occasional," and "rare" are arbitrary but seemed to apply. If, during one collecting season, from four to ten or twelve individuals of a given species were sighted or taken, the label "occasional" seemed appropriate. "Common" meant well over this number, "rare" applied to three or less individuals taken during any one season. The annotated list contains information on

the relative abundance of each species. Numbers of odonates listed as common are thirty-four, three were occasional, and fourteen rare.

During the summer of 1970 a new pond was dug. The following summer Heath Pond, one of the established water bodies, was drained, old vegetation removed, and re-dug. Subsequent precipitation completely filled these ponds by the spring of 1972. An excellent opportunity to study odonate populations in the incipient stages of aquatic succession was thus given. Consistently associated with new pond habitats were six dragonflies: *Aeshna mutata*, *Anax junius*, *Epicordulia princeps*, *Gomphus exilis*, *Gomphus villosipes*. Of the damselflies, eight were taken consistently at new pond situations: *Enallagma antennatum*, *Enallagma aspersum*, *Enallagma civile*, *Enallagma signatum*, *Ischnura posita*, *Ischnura verticalis*, *Lestes eurinus*, and *Lestes rectangularis*. Odonates appearing just once at new pond sites were considered questionable: *Erythemis simplicicollis*, *Leucorrhinia intacta*, *Libellula luctuosa*, *Libellula pulchella*, *Pachydiplax longipennis*, *Perithemis tenera*, *Tetragoneuria cynosura*, *Enallagma cyathigerum*, and *Enallagma ebrium*. The continuing presence of damselflies of the genera *Enallagma* and *Ischnura* was interesting to note in these "pioneer" situations with minimal plant growth providing cover for both adults and nymphs. The presence of robust, aggressive darners and gomphines was not surprising however.

Seasonal data are given in the annotated list of species. The collecting season lasted from April through early November. First and last dates of capture (or sighting, in the cases of a few of the recognizable species on the wing), are recorded. Population peaks are also given as noted in the field. Seasonal data were compiled from the entire duration of the study rather than from any one season, except where only one individual of a rare species was taken.

An annotated list of all species of dragonflies and damselflies taken at Holden Arboretum from 1963 through 1973 follows. The list contains observations made in the field on some of the habits of these insects. Also included

are comments on habitats and distributions. Borror's (1937) number precedes the species name. Listing is alphabetic according to genera, after the appropriate suborder.

ANNOTATED LIST OF SPECIES

Anisoptera

- 37 *Aeshna mutata* Hagen. This handsome darner was not taken at the arboretum until 1972, when it appeared in occasional numbers. In 1973 it became very common. Appears to be an early summer species occurring mid-June to early July at both new and established ponds and lakes (12 June through 5 July with a mid-June population peak).
- *Aeshna tuberculifera* Walker. Restifo (1972) took this darner at the arboretum on 18 September 1971 and established a state record for the species. We took this essentially northern species in occasional numbers in 1970 as early as 15 August and as late as 4 October in 1972. It was flying with *Aeshna umbrosa* and *Aeshna verticalis* on 3 and 4 October 1972 at heights of from one to about twenty feet over an open field near a pond. Most of these darners had worn, ragged wings.
- 38 *Aeshna umbrosa* Walker. This common late summer, early fall darner was observed flying at twilight and taken 20 August 1972. Seasonal range: 20 August through 3 October.
- 39 *Aeshna verticalis* Hagen. A single male was taken 4 October 1972, flying with *Aeshna tuberculifera* and *Aeshna umbrosa*.
- 31 *Anax junius* (Drury). The familiar, ubiquitous green darner is one of the first dragonflies to appear (April) and last to disappear (October-November) at the arboretum. A swarm of green darners appeared at the Kirtland-Chardon lake and pond area on the afternoon of 15 September 1972, moving slowly westward at heights of from one to about one hundred feet. Other darners were present then, too, but not in such copious numbers as the green. Green darners in our collection were taken 26 April through 6 October, with peaks noted early through mid-September.
- 32 *Anax longipes* Hagen. Sightings only are recorded for this handsome, strong-flying, elusive species. Sightings were made at close range (but out of net range) on 29 June and 15 July 1965, and on 13 July 1972. Sightings were at Corning Lake, Foster and Heath Ponds, and at the Kirtland-Chardon area.
- 28 *Basiaesha janata* (Say). A small darner that suddenly appeared in common numbers toward the end of May, then disappeared in mid-June. An active species that courses the edges of the larger ponds. Common, from 21 May through 9 June.
- *Boyeria* species. Tkac (1973) observed adults and took nymphs at Stebbin's Gulch. Adults flew low over rock-bound pools in the gorge during mid-summer. Melissa Perry and I took nymphs at Pierson's Creek under the rocks of rapids. The immaturity of these nymphs precluded a more definitive classification. No adults of *Boyeria* have to date been taken.
- 55 *Celithemis elisa* (Hagen). An attractive, common species taken mid-June through mid-August; has an affinity for vegetation emergent from standing water and dry land. Makes occasional sallies over open waters. Taken from 30 May through 18 August, with a population peak noted mid-July.
- 56 *Celithemis eponina* (Drury). An attractive, rare species taken twice at Holden, once on 26 June 1957, and on 15 July 1965 at Corning Lake by Kathy Zamec.
- 42 *Cordulegaster maculata* Selys. Karen Jackson took one male of this attractive but unobtrusive species at Pierson's Creek on 27 May 1965. It was flying downstream in late afternoon.
- 49 *Epicordulia princeps* (Hagen). Flies well out from the shores of both established and new lakes and ponds. It is more readily taken over land, where it makes occasional sallies, but must be taken on the wing as it seldom rests. Active throughout most of the summer. Common; from 7 June through 6 September.
- 79 *Erythemis simplicicollis* (Say). Darts rapidly from perch to perch along the edges of weedy ponds throughout most of the summer. Common; 14 June through 18 September; one population peak noted 28 July.
- 9 *Gomphus exilis* Selys. Usually perches on or very near the ground; found along the shores of both new and established ponds from 30 May through 1 July. Common.
- 22 *Gomphus villosipes* Selys. Another common low-flying early-summer gomphine found in the vicinity of new and established ponds. 30 May through 13 July.
- 77 *Leucorrhinia intacta* (Hagen). One of our common early-appearing pond species. 21 May through 7 July; peak noted 14 June.
- 64 *Libellula luctuosa* Burmeister. One of the most common dragonflies at Holden. Found primarily at established lakes and ponds throughout the summer (21 May through 15 September). Population peaks occurred 17 July and 4 September.
- 66 *Libellula pulchella* Drury. This common dragonfly was found throughout the summer in a variety of standing-water habitats. Has an affinity for temporary, shallow waters; an especially adept flier. 16 June through 18 August.
- 68 *Libellula semifasciata* Burmeister. One male was taken at a temporary pond at the Kirtland-Chardon area 14 June 1970. It, too, was an adroit flier; rare.
- 78 *Pachydiplax longipennis* (Burmeister). A common, ubiquitous species taken at

- streams, lakes, and ponds. Prefers the weedy shallows of standing water sites. 7 June through 18 August; population peaks 9 June, 22 July.
- 80 *Pantala flavescens* (Fabricius). An excellent flier, taken in occasional numbers above fields near ponds and lakes in late summer, primarily. 10 June through 5 October.
- 81 *Pantala hymenaea* (Say). Rare; one female was taken 3 July 1971 at the Button-bush-Blueberry Pond area.
- 54 *Perithemis tenera* (Say). This petite, common species skims over the weedy shallows of established lakes and ponds; from 17 June through 6 September. Peaks noted 7, 14, 28 July, and 26 August.
- 65 *Plathemis lydia* (Drury). Another common, widespread species with a partiality for new pond sites. Perches on bare ground and rock surfaces. Found from 20 May through 28 July.
- 72 *Sympetrum obtrusum* (Hagen). Rare; just one male taken 15 August 1972 at Kirtland-Chardon.
- 73 *Sympetrum rubicundulum* (Say). A very common, widespread species found throughout the summer (18 June through 18 August).
- 74 *Sympetrum semicinctum* (Say). Rare; one male taken 15 September at the Kirtland-Chardon area.
- 76 *Sympetrum vicinum* (Hagen). A common late-summer and fall species. We seem to agree with Kellicott's (1899) field observations on the lateness of this species in autumn. 18 August through 8 November.
- 50 *Tetragoneuria cynosura* (Say). This late spring species (22 May through 23 June) was taken over all kinds of standing-water surfaces. Common.
- 83 *Tramea lacerata* Hagen. A strong flier, taken only occasionally over established, often shallow ponds. 7 June through 15 September.
- 84 *Tramea onusta* Hagen. Just two specimens of this attractive species were taken, a male 18 May 1965 and a female 12 September 1965, both at the Kirtland-Chardon area. Rare.
- Zygoptera*
- 106 *Amphiagrion saucium* (Burneister). All our specimens of this attractive little damselfly were taken 21 May through 21 June 1964 at the Kirtland-Chardon area; we've not seen or taken it since. Needham and Heywood (1929) report it never found far from small meadow streams and weedy, spring-fed marshes; we took it in similar surroundings, highly localized.
- 105 *Argia fumipennis violacea* (Hagen). A common damselfly present during most of the summer at Holden (17 June through 26 August). It seems to prefer open areas near pond margins.
- 87 *Colopteryx maculata* (Beauvois). The black-winged damselfly is common at Pierson's Creek, Stebbin's Gulch, and the Chargin River's east branch in early summer (18 June through 18 July). Shelagh Alexander took several with one flourish of her net at Pierson's Creek on 6 July 1973.
- 110 *Enallagma antennatum* (Say). This elegantly-colored damselfly is common in early summer (18 June through 1 July) at pond margins where vegetation grows rank and tall.
- 111 *Enallagma aspersum* (Hagen). Common at a newly-dug pond in 1972 from 15 June through 26 August. Found in association with its congener *Enallagma civile*.
- 114 *Enallagma civile* (Hagen). An attractive damselfly commonly found at new pond situations and at some established ponds where vegetation was sparse. It and *Enallagma aspersum* were most abundant in these "pioneer-like" situations. Dates run from 15 June through 29 August.
- 140 *Enallagma cyathigerum* (Charpentier). A single male was taken 21 June 1973 at New Pond. Price (1958) recorded it for Ohio.
- 117 *Enallagma ebrium* (Hagen). Appears to be a wide-ranging early-summer species (30 May through 29 June); common.
- 119 *Enallagma geminatum* Kellicott. All our specimens were collected at the Kirtland-Chardon pond sites in mid-summer (28 July through 15 August); common.
- 121 *Enallagma signatum* (Hagen). Common and ubiquitous species found in new pond situations, streams, and established waterbodies (12 June through 15 August).
- 122 *Enallagma traviatum* Selys. Rare; one male taken 6 July 1973 at the Kirtland-Chardon area.
- 123 *Enallagma vesperum* Calvert. Collected throughout the last portion of summer at established ponds and lakes, primarily. Common; taken from 5 July through 15 September.
- 124 *Ischnura posita* (Hagen). Unobtrusive, common; flies among weedy growth of pond margins, including new sites; early summer species (6 May through 13 July).
- 126 *Ischnura verticalis* (Say). Common, widespread; enjoys a long flight season (7 May through 6 September) in a variety of lake and pond sites. Prefers to be near vegetation, dense and tall, that borders standing waters. Also found in new pond situations.
- 93 *Lestes eurinus* Say. Seems to have an affinity for new pond habitats; common at such sites. 21 June through 13 July.
- 95 *Lestes inaequalis* Walsh. Appears a late-spring species at Holden; rare. 1 June through 17 June.
- 96 *Lestes reclangularis* Say. Found in a variety of habitats including newly-formed ponds; common, from 21 June through 18 July.
- 98 *Lestes unguiculatus* Hagen. Rare at Holden; taken at the Kirtland-Chardon lakes area from 23 June through 15 August.
- 99 *Lestes vigilax* Hagen. Another rare species taken in the tall weeds and shrubs of the Kirtland-Chardon area, from 26 June through 22 August.

108 *Nehalennia irene* (Hagen). This dainty, diminutive species was taken from 17 through 21 June at Hourglass Pond; common.

SUMMARY

Fifty odonates, 30 dragonflies (Anisoptera), and 20 damselflies (Zygoptera) were taken at Holden Arboretum from 1963 through 1973. One species, *Anax longipes*, was sighted. By families, this includes: 8 species of Aeshnidae, 1 of Cordulegasteridae, 2 of Gomphidae, 2 of Corduliidae, 18 of Libellulidae, 1 of Calopterygidae, 5 of Lestidae, and 14 of Coenagrionidae. All species taken were adult forms except *Boyeria*, which was taken in the nymphal stage.

On abundance, 34 odonates were considered common (over 10 or 12 taken per season), representing 66%. Only 3 (6%) were considered occasional (from 4 to 10 or 12 taken per season): *Aeshna tuberculifera*, *Pantala flavescens*, and *Tramea lacerata*. Listed as rare (3 or less taken per season) were: *Aeshna verticalis*, *Anax longipes*, *Celithemis eponina*, *Cordulegaster maculata*, *Libellula semifasciata*, *Pantala hymenaea*, *Sympetrum obrusum*, *Sympetrum semicinctum*, *Tramea onusta*, *Enallagma cyathigerum*, *Enallagma traviatum*, *Lestes inaequalis*, *Lestes unguiculatus*, and *Lestes vigilax* (14, or 28%). Single-specimen records, as a further breakdown of the rare category, exist for: *Aeshna verticalis*, *Cordulegaster maculata*, *Libellula semifasciata*, *Pantala hymenaea*, *Sympetrum obrusum*, *Sympetrum semicinctum*, *Enallagma cyathigerum*, and *Enallagma traviatum*. The most common dragonflies at Holden would probably include: *Anax junius*, *Libellula luctuosa*, *Celithemis elisa*, and *Sympetrum rubicundulum*. *Ischnura verticalis* would most likely prove the commonest damselfly, with *Argia fumipennis violacea* running a close second. A shift in population was noted for *Aeshna mutata*, which was not taken at the arboretum until 1972, during which year it was only occasional; in 1973 it became very common. *Amphiagrion saucium* was common within a local area in 1964, but has not been taken since.

As to habitat, a clear majority of Holden's odonates were taken at standing-water sites (48, or 94%). A few of this

number were also taken at stream sites. Taken exclusively at stream sites were just three odonates: *Boyeria* species, *Cordulegaster maculata*, and *Calopteryx maculata*. Consistently associated with new pond habitats were six dragonflies: *Aeshna mutata*, *Anax junius*, *Epicordulia princeps*, *Gomphus exilis*, *Gomphus villosipes*, and *Platthemis lydia*. Eight damselflies were taken consistently at new pond situations: *Enallagma antennatum*, *Enallagma aspersum*, *Enallagma civile*, *Enallagma signatum*, *Ischnura posita*, *Ischnura verticalis*, *Lestes eurinus*, and *Lestes rectangularis*. *Libellula pulchella*, of the dragonflies, frequented temporary pools of standing water. *Pantala flavescens* was observed and taken only above land surfaces, sometimes near, but never above water.

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