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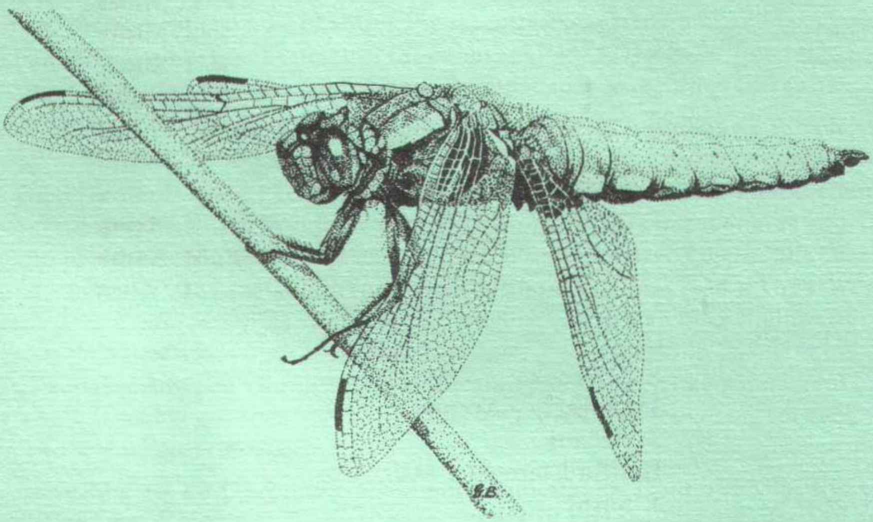

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member of the Societas Internationalis Odonatologica

The *Journal of the British Dragonfly Society*, normally published twice a year, contains articles on Odonata that have been recorded from the United Kingdom. The aims of the British Dragonfly Society (B.D.S.) are to promote and encourage the study and conservation of Odonata and their natural habitats, especially in the United Kingdom. The B.D.S. is a member of the Societas Internationalis Odonatologica (S.I.O.).

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Front cover illustration of *Libellula depressa* by Gill Brook.

Predation of *Enallagma cyathigerum* (Charpentier) by the Grey Wagtail *(Motacilla cinerea* Tunstall)

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The Common Blue Damselfly *(Enallagma cyathigerum)* is one of the most widely distributed of Odonata in Oxfordshire; since 1980 it has been recorded from at least 19% of the tetrads (2km squares) in the county (Campbell, 1988) and doubtless remains to be found in quite a few more. High densities can occur in lacustrine habitats. At an artificial lake of about 2ha recently excavated on mixed farmland, at Wykham near Banbury in the north of the county (SP452377), I have found the species to be by far the most abundant odonate. The other species recorded there since 1987 are *Coenagrion puella, Ischnura elegans, Anax imperator, Orthetrum cancellatum* and *Sympetrum striolatum.*

On 11th June 1989, I recorded what proved to be the annual maximum of *E. cyathigerum* on the lake at Wykham; over 200 *in tandem* pairs were counted and, from the ratio of pairs to unattached males, I estimated a total of over 5,000 adults over and around the water. At the southern margin of the lake I observed a Grey Wagtail collecting *E. cyathigerum* as food for its fledglings by flycatching flights over the water. It then flew 450m back to its nest area at Upper Grove Mill; on one occasion it made 7 aerial sorties and on another 20 before doing so. After it had gone I went to the spot where it had been feeding and found several male damselfly corpses each with some of their wings removed.

According to bird breeding atlas work undertaken from 1985-88, the Grey Wagtail has been recorded from 10% of tetrads in Oxfordshire (A. Heryet, pers. comm.). It is a riverine species, but breeds annually in the vicinity of the lake. In 1989 there were 3 breeding pairs on a 1.2km stretch of Sor Brook, a tributary of the River Cherwell, with pairs nesting at Upper Grove Mill, Bodicote Mill and Lower Grove Mill; in 1988 there was only one pair, whose home range included all 3 mills (pers. obs.). Each year flycatching was used by Grey Wagtails to supplement their diet with an additional aerial component in May and June when feeding young.

Adult Zygoptera are predated by a number of birds including wagtails (Askew, 1988). However, in spite of numerous visits to the lake, I have not seen this behaviour in the Grey Wagtail before or since. The majority of feeding sites of the Grey Wagtail in the Banbury area in the breeding season are riverine and not on standing water (Brownett, 1989) and *E. cyathigerum* has not previously been recorded as food of the species in the Western Palaearctic; the only groups of Odonata previously mentioned as being represented in the diet are Calopterygidae and Cordulegasteridae (Cramp, 1988). These prey items, a larva of *Cordulegaster boltonii* and dismembered wings of *Calopteryx virgo*, were reported at New Forest nest sites by Tyler (1972). The only odonates found on Sor Brook within the wagtails' home ranges were *Calopteryx splendens* and *E. cyathigerum*, the latter only to a limited extent, and I have logged many flycatching attempts by parent birds at riverine feeding sites without recording a single damselfly capture, let alone finding them specifically targeted as on the lake. I would suggest that the behaviour I have described was prompted by the occurrence of very large numbers of damselflies coinciding with the post-fledging period of this particular pair of wagtails, and the birds' feeding more at non-riverine sites because of the higher wagtail density in 1989. This was probably a one-off opportunist event like that recorded by Cross (1987) involving *Libellula depressa* and the Pied Wagtail (*Motacilla alba*).

References

Askew, R. R. 1988. *The dragonflies of Europe*. Harley Books, Colchester. 291 pp.

Brownett, A. 1989. Annual breeding season survey. *Annual Report of the Banbury Ornithological Society* **1988**: 40-43.

Campbell, J. M. 1988. *An atlas of Oxfordshire dragonflies*. Oxfordshire County Council, Oxford. 39pp.

Cramp, S. 1988. *Handbook of the birds of Europe* the Middle East and North Africa. Volume 5. Oxford University Press, Oxford. 1063pp.

Cross, I. C. 1987. A feeding strategy of a Pied Wagtail (*Motacilla alba yarellii* L.) on *Libellula depressa* L. *Journal of the British Dragonfly Society* 3(2): 36-37.

Tyler, S. J. 1972. Breeding biology of the Grey Wagtail. *Bird Study* 19(2): 69-80.

The flight period of *Ischnura pumilio* (Charpentier) in Britain and Ireland

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Introduction

Ischnura pumilio has a highly restricted distribution in Britain and Ireland compared with its widespread close relative, *I. elegans*, and is generally considered to have a much shorter flight season (Hammond, 1983). This paper analyses the flight season of *I. pumilio* using records from the Biological Records Centre database generated through the Odonata Recording Scheme up to the end of 1987.

Flight season

Of the total number of records of *I. pumilio* on the BRC database, 388 contain the exact dates when the insect was seen on the wing in Britain and Ireland. The distribution of these sightings is shown in Figure 1. The species shows the typical pattern of a highly synchronised emergence, generally starting in early June, reaching a peak of abundance in early July, and showing a gradual decline in numbers until the last records in early September. The latest records all relate to Hampshire where insects have been seen on the wing until 17 September (a record from the now extinct colony at Fleet Pond from 1949).

This pattern of abundance is in contrast to the more common *I. elegans*, which shows a build up in numbers from late May, peaking in mid-July and showing a slower decline into September. In most years, insects are readily recorded well into that month. In Wales, over 68% of all dated records of *I. pumilio* came from the period 20 June - 30 July, contrasting just over half those of *I. elegans* (Fox, 1987). A similar pattern is evident in south-west England (Cornwall, Devon, Dorset, Somerset, Wiltshire, Gloucestershire, Worcestershire and Herefordshire; Figure 2), where 63% of all *pumilio* records occurred in this period compared with 52% of all *elegans*.

Habitat differences

I. pumilio exhibits very specialised habitat requirements in Britain, a feature of its ecology which has doubtless contributed to its rarity (Fox, 1987; 1989). An analysis of the flight duration in different habitats was carried out, but there was no obvious differences between the populations using mineral extraction sites, streams and pools (Figure 3).

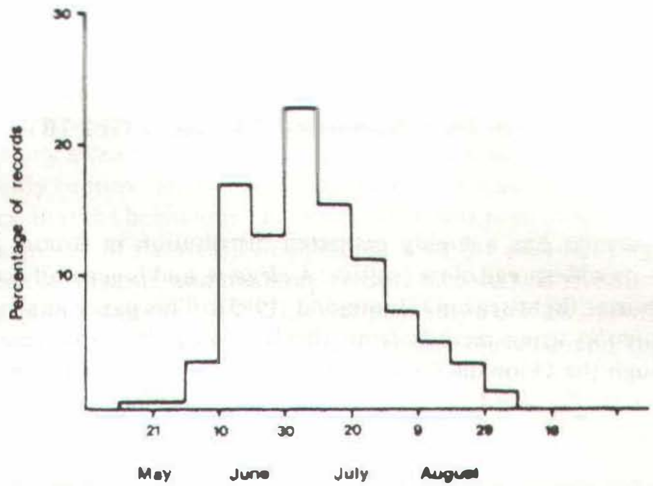

Figure 1. Flight period of *Ischnura pumilio* in Britain and Ireland by ten day periods commencing 1 May (BRC data up to and including 1987; n=388).

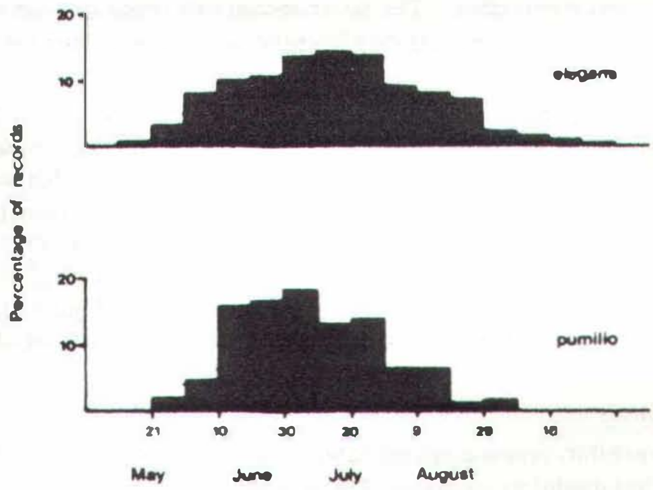

Figure 2. Flight period of *Ischnura pumilio* in south-west England by ten day periods commencing 1 May (BRC data up to and including 1987; n=105). The same information is presented for *I. elegans* for comparison (n=801).

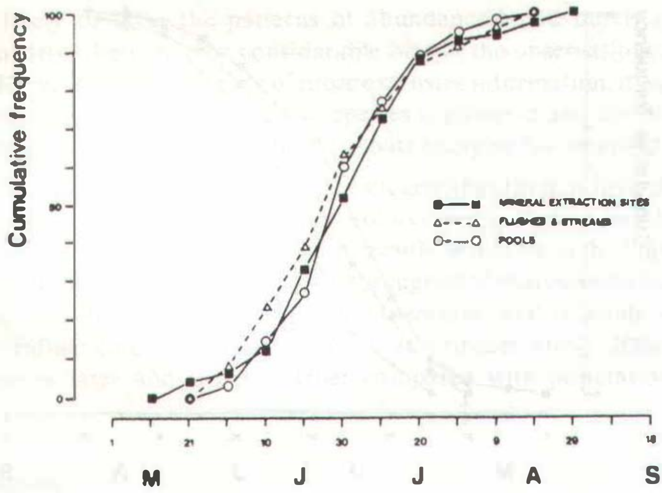

Figure 3. Cumulative percentage frequency of *Ischnura pumilio* records broken down by habitat (BRC data up to and including 1987). Mineral extraction sites include gravel pits, clay pits, chalk pits and stone quarries.

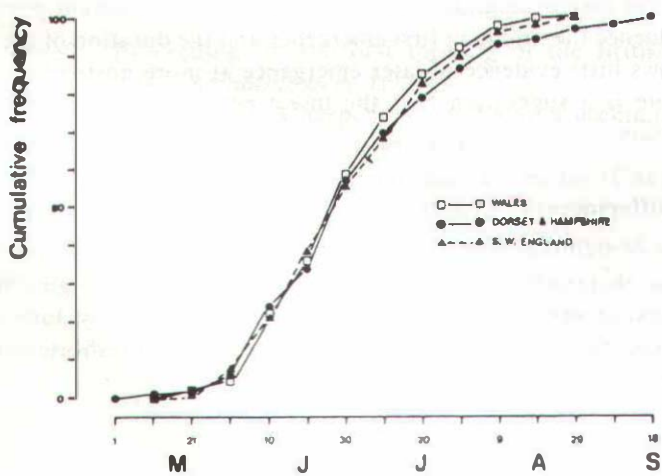

Figure 4. Cumulative percentage frequency of *Ischnura pumilio* records broken down by geographical areas (BRC data up to and including 1987).

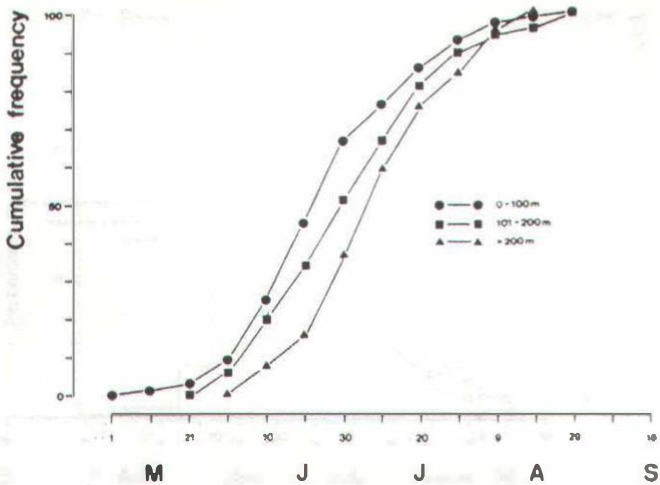

Figure 5. Cumulative percentage frequency of *Ischnura pumilio* records broken down by altitude (BRC data up to and including 1987).

Geographical differences

Clearly the meteorological conditions prevailing in different parts of its range may also influence the timing of first emergence and the duration of the flight period. Figure 4 shows little evidence of later emergence at more northerly areas in Wales, although there is a suggestion that the insect persists on the wing rather later in southern Britain.

Altitudinal differences

Analysis of sightings which are dated and which include data on the altitude of each site shows that the flying period is later at highest altitudes (Figure 5). The species emerges earliest at sites at low altitude, appearing only in early June at sites above 200m above sea level. At high altitude, the season is also foreshortened, with insects persisting longer at sites below 200m.

Discussion

Analysis of BRC data relating to *pumilio* shows that, compared with its more abundant relative *I. elegans*, emergence commences later and the flying season is completed earlier. Such analysis is fraught with theoretical problems, since the rarity of *pumilio* is likely to skew the patterns of abundance based purely on reported sightings. Similarly, there may be considerable bias in the observations of either or both species. However, in the absence of more extensive information, it would appear that the pattern of emergence of these two species is different and the shorter flying season of the rarer insect has undoubtedly led to its being under-recorded in the past.

Although sample sizes are small, records suggest that there is little difference in the flight season of *I. pumilio* in different parts of its range in Britain and that there are no detectable differences based on the data presently available in the flight season of insects using different habitats. Chelmick (1980) suggested that *pumilio* was restricted in its distribution within Britain by winter temperature, and it would appear that temperature is influencing its emergence, since at altitudes above 200m, the flight period commences later and is over earlier compared with populations at lower altitudes.

Acknowledgements

This analysis could never have been achieved without the dedicated work of all the people who have contributed records to the Odonata Recording Scheme of the Biological Records Centre. Brian Eversham at BRC gave considerable help and encouragement. Many thanks to you all.

References

Chelmick, D. 1980. Proceedings of the first meeting of the British dragonfly recorders. *Notulae Odonatologicae* 1:92-95.

Fox, A. D. 1987. *Ischnura pumilio* (Charpentier) in Wales: a preliminary review. *Journal of the British Dragonfly Society* 3: 32-36.

Fox, A. D. 1989. *Ischnura pumilio* (Coenagriidae: Odonata) (Charpentier) — wandering opportunist? *Entomologist's Record* 101: 25-26.

Hammond, C. O. 1983. *The Dragonflies of Great Britain and Ireland.* 2nd Edition (revised by R. Merritt). Harley, Colchester.

The rescue service provided by male *Enallagma cyathigerum* (Charpentier) for females after oviposition

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Introduction

The males of many species of damselflies guard their mates after copulation by remaining *in tandem* with them during oviposition. Females are thereby defended against harassment by other males: they may also benefit from an increased ability to detect predators (4 eyes are better than 2) and, when flying between oviposition sites, males may contribute power for flight and to the control of steering. Males of some *Enallagma* spp., provide an additional service to females by rescuing them from the water surface after oviposition (Miller, 1982; Fincke, 1986).

Female *Enallagma cyathigerum* (Charp.) commonly oviposit under water and males normally release them from tandem at the start of oviposition as they crawl down plant stems or leaves (Robert, 1958). Continued tandem is not necessary since other males do not attempt to catch submerged females. After a prolonged bout of oviposition, females climb or more usually float up to the surface, often at some distance from where they descended. Males congregrate over likely oviposition sites and attempt to rescue floating females by grabbing them *in tandem* and then either flying with them or towing them to the shore, after which they attempt to copulate with them. Some observations on this behaviour and on its success rate are described here.

Observation site

I have observed many *Enallagma cyathigerum* (Charp.) every year since 1980 at a large gravel pit near Wolvercote (Oxfordshire). The detailed observations reported here were made between 1300 and 1700h on July 2nd and 5th, 1989, which were warm sunny days (25-27°C), and on July 6th, 1989, a cloudy by equally warm (27°C) day. Numerous damselflies flew over submerged patches of *Elodea canadensis* Michx. and *Potamogeton pectinatus* L. Observations were made over a patch of *E. canadensis* ca 3m x 2m, separated by 2.5m of open water from the lake margin which is fringed with *Sparganium erectum* L. A few stalks of *E. canadensis* reached the surface and provided females with supports on which to climb down onto the patches of weed.

Results

The descent of ovipositing females

Pairs flew out *in tandem* to the patch of weed after copulation where they landed on stalks and leaves at the surface. After selecting a suitable site, the female quickly climbed down into the water pulling the male with her. He normally released his grip when only his thorax and head were above the surface. Such pairs commonly attracted single males which attempted to grasp the female with their legs. On three occasions a second male was seen to grab a submerging female by her abdomen. When this happened both the first and the second male were pulled under by the female, releasing their grips only when they were 5-10cm below the surface (Fig. 1). On one occasion a third male was also pulled down. Thus when harassment is severe, males may remain *in tandem* with females after submergence.

The ascent of females to the surface after oviposition

An ovipositing female clambered about on submerged plants sometimes for more than one hour (Robert, 1958). Finally she would release her hold and float up to the

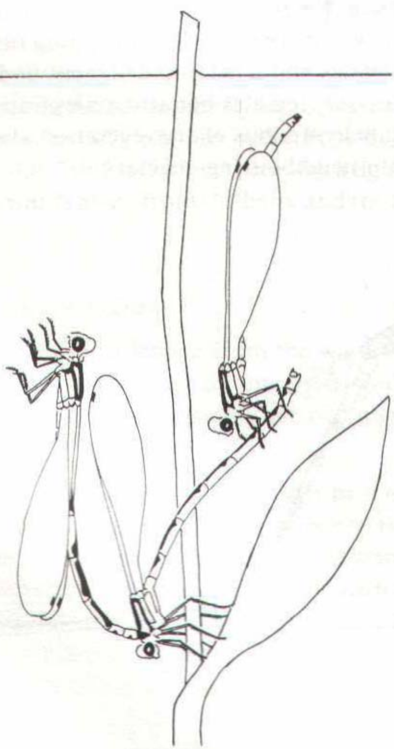

Figure 1. A female *E. cyathigerum* has climbed down a stalk to oviposit with one male still in tandem and another gripping her abdomen.

surface,
increased her visibility and attracted nearby males which sometimes aligned themselves over a female before she reached the surface. At the surface a female usually lay on one side occasionally flexing her abdomen, her pale lateral
making her readily visible.
to surface after oviposition flew off unaided.
caught on the bank, held under water for 10s and then allowed to float up, all were immediately able to fly off from the surface. Thus
female's
or because she is too weak.

Male responses to surfacing females

Fifty to one hundred single males patrolled over the patch of *Elodea* for much of the time between 1400 and 1600h, the numbers dropping off later in the day. Males were very responsive to females and female-like objects, and they orientated towards and attempted to grasp not only females but also males trapped on the surface.
dead or dying fish floating belly-up, bits of dry vegetation of appropriate size and even floating exuviae blow from neighbouring vegetation.

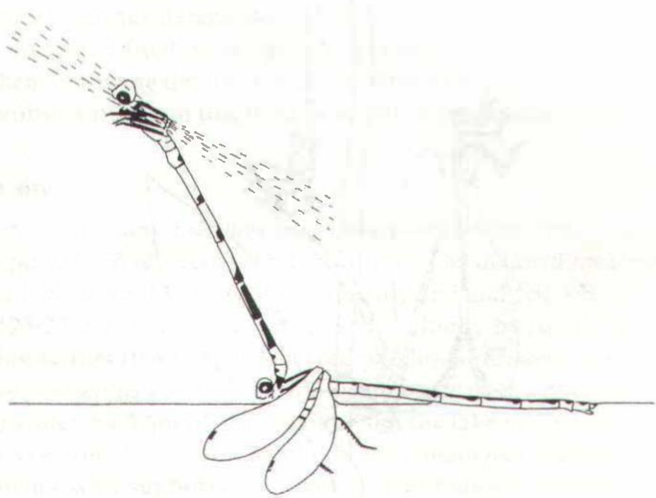

Figure 2. A male *E. cyathigerum* attempting to rescue a female from the water surface by flying upwards. The female assists by flapping her wings on the

A female floating at the surface attracted several males which attempted to form a tandem with her. As soon as one male succeeded he flew upwards at an angle of about 80° to the horizontal, attempting to pull the female from the water (Fig. 2). He first turned her dorsal side up and then sometimes was able to lift her almost immediately into the air whereupon the pair flew off *in tandem*. More usually, however, the male had to make repeated attempts, which lasted for up to 55s, and he was then only sometimes successful. On July 5th, I observed 77 rescue attempts and in 49 (64%) of them the male eventually succeeded in lifting the female from the water. On July 6th, 35 out of 49 (71%) attempts led to successful lift-offs. Once airborne the pair flew immediately to the fringeing reeds to settle, and the male then issued copulatory invitations. Sometimes a second male grabbed the female with his legs while she was still in the water, thereby assisting the first male to lift her into the air.

When the male could not immediately lift the female out of the water, he frequently made sharp lateral flicks with his abdomen, apparently attempting to shake her free from the meniscus. When efforts to lift a female had failed, the male would attempt to drag the female along the surface by flying forwards with his body at 20-30° to the horizontal, but he was usually able to make little or no progress unless the female assisted (see below). On 5th July, when there was a light offshore breeze, many such pairs were blown backwards away from the bank and the females were eventually abandoned.

Female participation in rescue attempts

When a male attempted to lift a female from the water she commonly beat her wings a few times, depressing them against the meniscus and forcing herself off the surface. Without these movements males usually seemed unable to lift females (Fig. 2).

When a female could not be hoisted from the water by a male she was still able to assist with her rescue when the male attempted to tow her to the shore. By freeing her forewings from the meniscus, which many females were able to do, she was able to 'fly' along the surface, using a nearly horizontal stroke plane with the forewings while the hindwings were kept flat and motionless on the water surface. Her progress resembled that of a hydrofoil (Fig. 3). In this way the pair travelled at 5-10cm/s along the surface and took, if undisturbed 1-2min to reach the reeds where they climbed out. On July 5th when there was a light offshore breeze, only 2/77 (3%) of the males were able to tow a female successfully by this means to the reeds. The remaining 26 (33%) females, after repeated attempts by several males in turn, were abandoned and were blown out towards the centre of the lake. On July 6th, when there was no offshore breeze, 5/49 (10%) females were successfully towed ashore, and 9 (18%) females were abandoned,

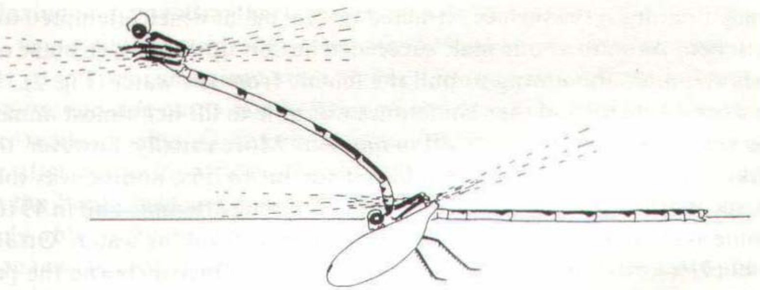

Figure 3. A male *E. cyathigerum* towing a female along the surface. The female assists by beating her forewings.

being left to drown. In all successful tows the female cooperated by beating her forewings. An observer standing 2m from the margin offered a convenient target for such pairs and several might climb out on him, as did occasional emerging larvae.

Abandoned females

Most of the 33% abandoned females on July 5th, and the 18% on July 6th, could not free either pair of wings from the meniscus and could not therefore contribute to towing. Moreover, even pairs which were able to travel successfully on the surface were usually attacked by numerous single males which interfered with progress and sometimes displaced the tandem male. One male whose female gripped a stalk and could not be moved persisted for 3 minutes, but males normally abandoned a female which could not be towed after, at the most, 55s. Up to a total of 15 males in turn would then form a tandem briefly and attempt to lift or tow such a female but they were usually unsuccessful, although one male, 4th in line, and another, 5th in line, was seen to lift a female into the air and fly off with her. The time for which second and later males persisted with a female was usually brief, being on average only a fifth (less than 10s) of the time that a first male spent, and as females gradually drifted further from the shore all rescue attempts ceased.

Females surfacing in the absence of males

On ten occasions I prevented males from approaching a female which had surfaced after oviposition. None of these females succeeded in taking off from the surface. Two were able to right themselves and to free their forewings, and with these they 'flew' along the surface at about 5cm/s and eventually reached a support on which they could climb out. Such females were capable of good orientation, steering by the use of asymmetric forewing beats. The remaining eight females were not able to right or free themselves in the absence of help from males.

Discussion

The results have shown that on the two days of observation, 66.6% of females which surfaced after oviposition

towed to the margin, and the remaining 27.8% were abandoned and probably drowned. The offshore wind on one of the days, the high density of males and the 2.5m gap between the oviposition site and the lake margin may all have mitigated against successful rescues. In other types of habitat with more emergent vegetation and fewer males, female survival rate after oviposition may be higher.

Why were some females rescued from the surface and others abandoned? Males seemed to differ in their capacity to lift females from the water: as described, in one case only the 4th male, and

and energy reserves may explain some of the variation. Females may also vary in weight, in energy reserves and in the degree to which they have become water-logged, depending on the duration of their dives. Males sometimes persisted with rescue attempts for only a few seconds seeming quickly to recognise females which could not be lifted, even though the females remained active.

Females which had been experimentally held under the water for 10s and then released, were able to take off by themselves from the water surface. In contrast those which had been submerged for much longer periods while egg-laying found it difficult to disengage themselves from the meniscus. They were often unable to free their wings either because they were too weak or because their cuticle had been wetted. Prolonged contact with water may

cuticle

change in the contact angle between water and cuticle (Beament, 1960). This could contribute to a female's inability to escape from the meniscus after a long dive. Many females on surfacing were able to free their forewings from the meniscus but their hindwings remained trapped. This difference is probably explained by the position of the forewings during a dive which are shielded between the hindwings and thus kept dry.

Submerged ovipositing females probably depend on the physical-gill action of the air bubble trapped on their body and wings for their oxygen supply (cf. Mill, 1972). When females were experimentally held motionless under water in a small plastic container for 5-10 minutes, they became asphyxiated. On surfacing they were motionless but eventually recovered. However, submerged ovipositing females survive without asphyxiation for much longer periods. Continual irrigation of the air trapped on their body surface may be essential for respiration. This can be brought about either by water currents or by the female's own movements during oviposition. On several occasions females were seen to visit the surface and then immediately re-descend for a further bout of oviposition with a replenished air bubble.

The duration of a dive may thus be limited both by respiratory demands and by gradual water-logging. The benefit of laying more eggs during a single prolonged dive must therefore be traded against increasing respiratory problems and cuticular changes which may hamper rescue. If females have only a small chance of returning to the water for a second bout of oviposition, perhaps because of inclement weather or heavy predation, they would be expected to maximise their first oviposition bout, laying as many eggs as possible.

The behaviour of *E. cyathigerum* seems well adapted for oviposition into submerged water-plant mats, but the species is notable for its successful exploitation of a great variety of habitats and it would be interesting to know the extent to which its behaviour varies with the habitat type.

References

Beament, J. W. L. 1960. Wetting properties of insect cuticle. *Nature* **186**: 408-409.

Fincke, O. M. 1986. Underwater oviposition in a damselfly (Odonata, Coenagrionidae) favours male vigilance and multiple mating by females. *Behavioural Ecology & Sociobiology* **18**: 405-412.

Mill, P. J. 1972. *Respiration in the invertebrates*. Macmillan, London.

Miller, P. L. 1982. The occurrence and activity of sperm in mature female *Enallagma cyathigerum* (Charpentier) (Zygoptera: Coenagrionidae). *Odonatologica* **11**: 159-161.

Robert, P.-A. 1958. *Les Libellules (Odonates)*. Delachaux & Niestle, Neuchatel.

Have you got the pond bug?

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We would like to encourage all those who have been thinking about making a garden pond and have not got round to it (and also those who have not thought about it at all), to make a start and get a pond established as soon as possible. Our pond has surpassed all our expectations.

Our garden is situated on a north facing slope, a quarter of a mile from the village of Leeds, which is five miles from the nearest town, Maidstone. The immediate surrounding land is used for sheep farming and cereal crops. The nearest *suitable* dragonfly habitat is 1½ miles away at Leeds Castle where there are some ponds on the golf course, and were we have recorded 12 species (Table 1). There are nearer areas of water but few dragonflies have been seen there.

We dug a hole during the beginning of May. We purchased a second-hand piece of butyl lining that was from an industrial fresh-water tank. A piece had already been cut from it leaving the remainder kidney-shaped, so all we did was place it on the ground and peg round it. We were fortunate in getting the pond filled before the hose pipe ban! The overall size is roughly 20ft x 18ft and 3ft at its deepest point. The B.D.S. paper on pond construction (Anon., 1988) was continually referred to.

John works on a golf course and was granted permission to have some reeds, sedges, floating plants and submergent plants from the ponds on the golf course. In addition more native plants were bought from the local garden centre (Table 2). Buckets of "sludge" were collected from a local stream and pond as suggested in Anon. (1988) so that smaller animal life was introduced from the start. Within a week or so of having filled the pond with water, we had a fairly reasonable looking pond. All we had to do then was wait.

On May 23rd, less than a fortnight after the pond was filled, there was great excitement with the arrival of our first dragonfly, a male *Libellula depressa*, even though he did not stay. On the 9th June our first female arrived and to our delight began ovipositing. On the 11th June, another male came and took up residence, chasing away other males, and with the arrival of one or two females, pairs were seen *in copula* and more ovipositing took place.

Our next visitor was a female *Anax imperator* who viewed the pond and decided to move on. We wondered if it was not quite up to her standards, so we decided to put in a few more potamogetons. By the end of July and into August, we were having regular visits from *Anax* with much ovipositing.

Table 1. Odonata species recorded between 23rd May and 8th September 1989 at our garden pond at Leeds, Kent, and at Leeds Castle.

	Leeds Castle	Garden pond
Ischnura elegans	☐	★
Coenagrion puella	☐	★
Enallagma cyathigerum	☐	
Aeshna cyanea	☐	★
A. mixta	☐	
A. grandis	☐	★
Anax imperator	☐	★
Orthetrum cancellatum	☐	
Libellula depressa	☐	★
L. quadrimaculata	☐	
Sympetrum sanguineum	☐	☐
S. striolatum	☐	★

★ Indicates species which have oviposited

Table 2. Some of the plants introduced in and around our garden pond at Leeds, Kent.

Yellow Iris	*Iris pseudacorus*
Branched bur-reed	*Sparganium erectum*
Soft rush	*Juncus effusus*
Wood club-rush	*Scirpus sylvaticus*
Lesser pond sedge	*Carex acutiformis*
Greater willowherb	*Epilobium montanum*
Purple loosestrife	*Lythrum salicaria*
Meadowsweet	*Filipendula ulmaria*
Brooklime	*Veronica beccabunga*
Fringed water-lily	*Nymphoides peltata*
Frogbit	*Hydrocharis morsus-ranae*
Broad-leaved pondweed	*Potamogeton natans*
Amphibious bistort	*Polygonum amphibium*
Greater bladderwort	*Utricularia vulgaris*
Spiked water milfoil	*Myriophyllum spicatum*
Rigid hornwort	*Ceratophyllum demersum*

June 14th saw the arrival of *Coenagrion puella* and *Ischnura elegans* both of which were ovipositing within about a fortnight. Our next highlight was on the 17th July when *Aeshna grandis* was seen ovipositing round the edge of the pond. We had by this time also seen quite a few larvae of *L. depressa*. On the 18th July *Aeshna cyanea* spent quite a while ovipositing. Although she searched for a few sites, she kept coming back to the same spot, the damp soil at the base of a sedge beside the pond.

It was almost a wrench to leave the pond and go on holiday! Since our return we have added *Sympetrum sanguineum* to the list on August 12th and *S. striolatum* on August 18th, but we did not notice *S. striolatum* ovipositing until August 31st. Towards the end of August, John put some well-rotted logs by the pond. *A. cyanea* was seen ovipositing in the soft wood of these logs on August 31st, as well as in the soil at the base of the sedge again. On the same day a male specimen of *L. depressa* turned up and stayed for two days. On September 8th the moulted skin of an *Anax* larva was found floating on the pond and, upon closer inspection, four larvae were seen on the underwater leaves of *Sparganium erectum*.

The numbers of each species have been few, but the variety and activity have more then made up for it (Table 1). The camera has been out on numerous occasions. As well as the dragonflies, there have also been water-boatmen, water beetles, pond skaters, whirligig beetles, frogs, and to top it all a couple of grass-snakes, one of which has been seen on two occasions, once swimming across the pond.

While I have been sitting by the pond during these hot summer days (instead of doing housework), I tell myself I am not wasting time, and that it is just an enjoyable way to relax! We are now eagerly awaiting the possible emergence of some of the dragonflies next year. Waiting to see if *A. grandis* develops successfully will take a little longer.

I hope we have sparked some enthusiasm. Who's for making a pond?

References

(Anonymous). 1988. *Pond construction for dragonflies*. British Dragonfly Society. 9pp.

Notes on the Dorchester Nymph, *Leucorrhinia dubia* (Vander Linden)

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Recently, Gabb (1988) listed a series of old (probably early Victorian) names of Odonata taken from printed labels in the Grosvenor Museum at Chester. These names included the 'Dorchester Nymph' for the White-faced Darter, *Leucorrhinia dubia* (Vander L.), and Gabb posed the question: "Could *Leucorrhinia dubia* have been found near Dorchester?", and therefore form an addition to the Dorset list. Accordingly, it may be of interest to record that information on this question is provided by Lucas (1900). In his section on the British distribution of the species, he included "Thorne Moor, near Doncaster [Yorks.]* (G. T. Porritt)". The asterisk leads to a footnote which helpfully comments:

> "This locality was by mistake at one time recorded as Thorne Moor, near Dorchester, and the southern locality was cited by various authors".

He added that the error had already been pointed out by Bath (1893).

Leucorrhinia is one of the rarest dragonflies to have been recorded in Yorkshire, with confirmed records restricted to Thorne Moors, a large complex of mire, fen and carr in the south of the county, extending into Lincolnshire, although remaining entirely within vice-county 63. The site is entomologically described by Skidmore *et al.* (1987). The Dale Archives at the Hope Library, Oxford University Museum (*vide* Smith, 1986) show that the noted entomologist J. C. Dale visited the Doncaster area in 1837, from 24th-31st July and on 11th August. He and his companions were probably invited to the town, or encouraged to stay, by Rev. F. O. Morris, a lifelong friend of Dale and then assistant curate of Armthorpe and Christ Church, Doncaster (Morris, 1897). The group worked Thorne Moors on 28th July and 11th August. According to J. C. Dale's entomological diary and C. W. Dale's catalogue of the Dale Collection, *Leucorrhinia* was taken on the visit of 28th July, though details of the collection, as given by Lucas (1908), add:

> "A female (72) bears the date Aug. 11, 1837 on a yellow label with J. C.'s figures, while another female (73) has a yellow label of the same sheet as the last, but not filled in. The last insect has Yorkshire (at side), which no doubt refers to the previous insect also".

It seems, therefore, that single specimens were probably taken on both dates (Limbert, 1985).

The first reference to *Leucorrhinia* from 'Dorchester' is probably in de Selys Longchamps' (1846) revision of the British Odonata; the locality was given on the authority of J. C. Dale. During his visit to the British Isles in 1845, de Selys Longchamps personally examined most of the national and private collections in

England, Scotland and Ireland, although lack of time prevented an inspection of the Dale Collection. However, J. C. Dale furnished de Selys Longchamps with "very detailed accounts", which sufficiently impressed the latter to declare that Dale had a "perfect acquaintance" with the order. It is possible that Dale mistakenly substituted Dorchester for Doncaster in the details which he vouchsafed. Alternatively, de Selys Longchamps, a Belgian, may have misunderstood Dale's difficult handwriting.

During the ensuing years of confusion over the exact locality recorded by Dale, *Leucorrhinia* was noted on Thorne Moors on one further date, apparently the only occasion known to Lucas in 1900. This involved a specimen taken by the Huddersfield entomologist G. T. Porritt on 26th May 1890, which still survives in his collection at the Tolson Memorial Museum in Huddersfield (Porritt, 1897; 1907; Lucas, 1900).

References

Bath, W. H. 1893. Observations on British Odonata. *Entomologist* 26: 108-109.

Gabb, R. 1988. English names for dragonflies. *Journal of the British Dragonfly Society* **4**(1): 19-21.

Limbert, M. 1985. Three rare Yorkshire dragonflies. *Yorkshire Naturalists' Union Bulletin* **4**: 4.

Lucas, W. 1900. *British dragonflies (Odonata).* Upcott Gill, London. 356 pp.

Lucas, W. 1908. Notes on the British dragonflies of the "Dale Collection". *Entomologist's monthly Magazine* **44**: 198-203.

Morris, M. C. F. 1897. *Francis Orpen Morris. A memoir.* John C. Nimmo, London. 323 pp.

Porritt, G. T. 1897. Preliminary list of the Neuroptera and Trichoptera of Yorkshire (omitting Psocidae and Ephemeridae). *Naturalist* **22**: 115-126.

Porritt, G. T. 1907. Orthoptera, Neuroptera and Trichoptera, in *Victorian County History of Yorkshire.* Volume 1. Archibald Constable & Co., London. 523 pp.

Selys Longchamps, Baron E. de 1846. Revision of the British Libellulidae. *The Annals and Magazine of Natural History* **18**: 217-227.

Skidmore, P., Limbert, M., and Eversham, B. C. 1987. The insects of Thorne Moors. *Sorby Record* **23**: supplement.

Smith, A. Z. 1986. *A History of the Hope Entomological Collections in the University Museum, Oxford.* Oxford University Press, Oxford. 172 pp.

Recent odonatological publications

Bellmann, H. 1987. *Libellen beobachten-bestimmen.* Neumann-Neudamm, Melsungen, Berlin, Basel, Wien. 272pp.

Beutler, H. 1989. Terrestrische überwinterung der Larven von *Platetrum depressum* (Linnaeus, 1758) (Odonata, Libellulidae). *Entomologische Nachrichten, Berlin.* 33 (1): 37-40.

Brooks, S. J. 1989. The dragonflies (Odonata) of London the current status. *The London Naturalist* 68: 109-131.

Cham, S. 1988. Dragonflies (Odonata). Report of the recorder. *Bedfordshire Naturalist* 43: 65-67.

Corbet, P. S., Harvey, I. F., Abisgold, J. & Morris, F. 1989. Seasonal regulation in *Pyrrhosoma nymphula* (Sulzer) (Zygoptera: Coenagrionidae). 2. Effect of photoperiod on larval development in spring and summer. *Odonatologica* 18 (4): 333-348.

Jarzembowski, E. A. 1988. A new aeshnid dragonfly from the Lower Cretaceous of south-east England. *Palaeontology* 31 (3): 763-769.

Michiels, N. K. & Dhondt, A. A. 1989. Differences in male and female activity patterns in the dragonfly *Sympetrum danae* (Sulzer) and their relation to mate finding (Anisoptera: Libellulidae). *Odonatologica* 18 (4): 349-364.

Murdoch, D. A. 1989. The dragonflies of London's East End. *The London Naturalist* 68: 81-84.

Palmer, M. 1987. A survey of the aquatic invertebrates of Romney Marsh. *Transactions of the Kent Field Club* 10 (3): 123-133.

Redshaw, E. J. 1987. New and scarce species of Odonata: 1985-86. *Transactions of the Lincolnshire Naturalists' Union* 21 (4): 194-198.

Rehfeldt, G. E. 1989. The influence of male interference on female perching behaviour before and during oviposition in libellulid dragonflies (Anisoptera). *Odonatologica* 18 (4): 365-372.

Rüppell, G. 1989. Fore legs of dragonflies used to repel males. *Odonatologica* 18 (4): 391-396.

Thomas, D. H. L. 1989. Dragonflies in the Saltfleetby-Theddlethorpe area. *Transactions of the Lincolnshire Naturalists' Union* 22 (2): 119-122.

Utzeri, C. & Dell'Anna, L. 1988. The onset of territoriality in *Libellula depressa* L. (Libellulidae). *Monitore Zoologico Italiano* (N.S.) 22: 552-553.

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Words that are to appear in italics (e.g. names of genera and species, though not of families) should be underlined.

Use of these terms is acceptable: 'exuvia' for cast skin (plural 'exuviae'); 'larva' (instead of 'naiad' or 'nymph'); 'prolarva' to designate the first larval instar.

References cited in the text should be in the form '(Longfield, 1949)' or '. . . as noted by Longfield (1949).' All references cited in the text (and only these) should be listed alphabetically at the end of the article in this form:

Hammond, C. O. 1983. *The dragonflies of Great Britain and Ireland.* 2nd edition (revised by R. Merritt). Harley Books, Colchester. 116 pp.

Longfield, C. 1949. The dragonflies of the London area. *The London Naturalist* 28: 90-98.

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