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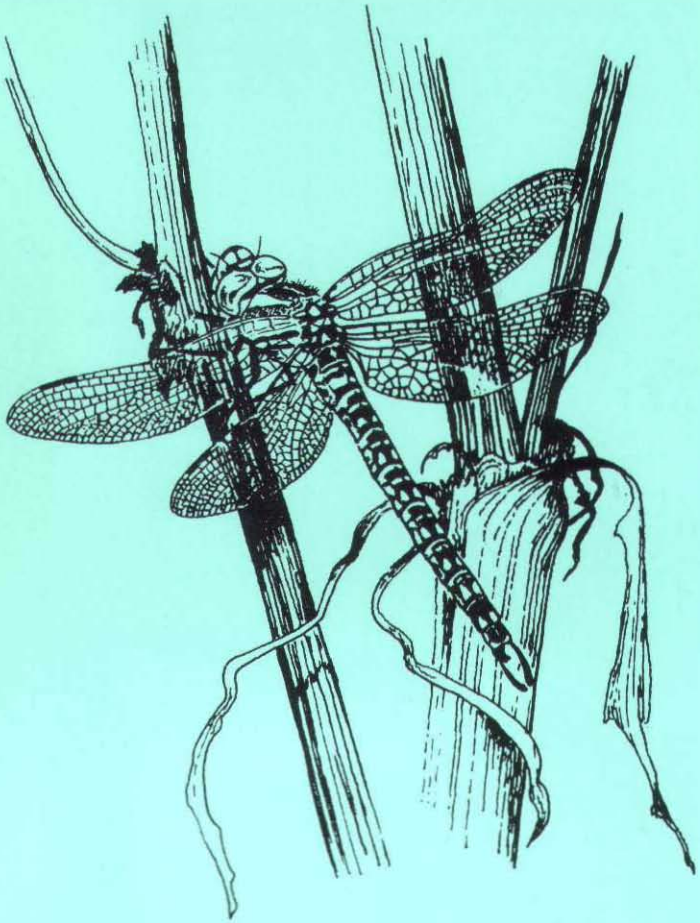

Editor: D. Tagg

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: *Brachyton pratense* by Ray Andress. A local dragonfly that had its best season for many years in 1992.

Traditionally (if nine years can add up to a tradition!) the Journal has not carried an Editorial. I think a brief note is called for now, firstly to pay tribute to Steve Brooks who edited the Journal up to last Winter and did it so professionally.

My own personal thanks are due for the time he spent last Spring putting me on the right track. That issue was still very much Steve's although it had my name on the cover!

So to the Journal and its content. I hope I can do as good a job as Steve has done in putting together something acceptable and so I would welcome any comment and criticism. Any thoughts from Members would be useful from just a listing of, say, the three or four articles they have found most worthwhile in recent issues to more wide ranging thoughts about the Journal's whole make-up and approach. Our membership is now over 1,000 and so if even a tenth of Members could let me have a few thoughts it would cover a wide range of opinions and prove most valuable.

D. Tagg.

Thoughts on distinguishing between Odonata and Anisoptera when using the English word "dragonfly"

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In April I was asked to review Evelyn Prendergast's excellent "Dragonflies of Dorset" for the BDS Journal and I expressed the view that the use of hyphens, when referring to anisopterans, was irritating. In June I received a letter from Col. Prendergast which ended with the words: "As it's a horrid wet day, I've jotted down some thoughts on Dragonflies versus dragon-flies — possibly as a basis for discussion or at least to make people think about it, as it needs clarifying I believe." I agree and I would like to make the following remarks and suggestions.

A similar problem was encountered by entomologists when they tried to distinguish "true" flies (Dipterans) from other insects whose name incorporated 'fly'. In order to solve the problem, it became customary to give "true" flies a hyphen (eg. Crane-fly, Hover-fly, Robber-fly), whilst insects from other Orders where unhyphenated (eg. Firefly, Mayfly, Stonefly AND Dragonfly). That being the case, I consider it improper to use a hyphen when referring to either Odonata or Anisoptera.

I would like to see it become common practice to use "Dragonfly" (with a

capital letter) when referring to Odonata and "dragonfly" (lower case) when referring to anisopterans. It would be simple and I feel sure we would soon get used to making the distinction in this way.

It might seem more complicated, however, when referring to a particular species: eg. Hairy Dragonfly/dragonfly, Emperor ditto, Golden-ringed ditto, Club-tailed ditto. Again, I think the solution is a simple one. We should leave out the problem word and call:

Brachytron pratense — Hairy Hawker,
Anax imperator — Emperor
Cordulegaster boltonii — Goldenring,
Gomphus vulgatissimus — Clubtail.

Other British Anisopterans are already referred to as Hawkers, Skimmers, Chasers or Darters and thus cause no problems. Species from places outside Britain can fit in with this system, for example:

Aeshna affinis — Mediterranean Hawker
Aeshna miniscula — African Hawker,
Anax parthenope — Lesser Emperor
Anax speratus — Orange Emperor,
Gomphus flavipes — Yellow-legged Clubtail
Ictinogomphus ferox — African Tiger Clubtail

On the whole the names become much more concise, although I agree that Green-eyed Hook-tailed Clubtail for *Onychogomphus forcipatus* is a mouthful — but no more so than its present name of Green-eyed Hook-tailed Dragonfly!

We need not concern ourselves with the English names given to species in the U.S.A. Apart from members of Gomphidae, which they actually call Clubtails, they are completely different to our own: Emperors are Darners; Goldenrings are Spiketails; Chasers *(Libellula)* are Skimmers; Darters *(Sympetrum)* are Meadowflies. We can do nothing about it!

Lastly, where damselflies are concerned, the problem is not acute. They should certainly not be hyphenated but, as zygopterans, they should be spelt with a small "d". Where species are concerned, I would say it does not really matter very much — probably capital letters would look better for Azure Damselfly, Emerald Damselfly, etc etc. Perhaps, one day, it might be possible to work out a system where the word Damselfly in the name could be omitted; possibly we could return to some of the old names quoted by Richard Gabb *(J. Br. Dragonfly Soc.,* **Vol. 4,** *No. 1)* — I like "Fay" for *Coenagrion* — but this is enough for now! **I would very much like feedback on this subject!**

The dragonflies of Yateley Common, Hampshire

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Yateley Common is located in the County of Hampshire, close to the border with Berkshire and Surrey, between the towns of Yateley and Camberley. The common consists of about 198ha of mixed heath and woodland and is a designated Country park and contains a Site of Special Scientific Interest.

There are seven ponds on the Common, **T**op pond, **H**ospital pond, **W**yndham's pond, **M**iddle pond, **L**ower pond, **S**trouds pond and the **G**ravel pit. The oldest pond on the Common is **S** pond which is believed to be a naturally occurring pond dating back about 200 years, although there is no direct record of this. **W** pond was probably created soon after this as a fish pond come reservoir by the local land owners, the Wyndham family. **T** pond is the youngest of the seven, being created about nine years ago after a gas pipe line was laid across the Common. The other four ponds all vary in age between these three and include a second fish pond **M** and an old gravel workings **G.** The largest pond is **W** pond covering 0.526ha with the smallest pond being **T** pond covering only0.11ha. The habitat around the ponds varies from open heath land to deciduous woodland with several intermediates between the two. All the ponds contain varying degrees of macrophyte cover, with both marginal and open water species.

The benthic macroinvertebrate communities were all sampled in the summer of 1990 as part of my undergraduate honours project using standard pond sampling techniques developed by Pond Action (1988). In addition to this a record was kept of all adult Odonata seen during the period of the survey. The resulting taxa lists produced a wide range of Anisopteran and Zygopteran species, 13 in total (see Table 1).

The two most productive ponds in terms of Odonata were **T** pond and **G** pond, both of which supported eight different species. Both these two ponds were very distinct in character, one being an acidic heathland pond, **T** pond, the other being an atypical circum-neutral gravel pit. Although both ponds had several species in common a few species were specific to each. **T** pond contained *Libellula quadrimaculata* a species known to prefer acidic heathland pools, (Hammond, 1977), and *Aeshna cyanea* which again is known to favour acid water conditions. *Libellula quadrimaculata* was later classified as the indicator species for **T** pond by Twinspan, a multi variant statistical package which was used to classify the ponds macroinvertebrate communities. **G** pond on the other hand contained *Orthetrum cancellatum,* a typical gravel pit species, (Hammond,

1977), plus a possible nymph of the rare *Libellula fulva*. Unfortunately this can not be confirmed as the nymph was only about instar two and was later lost in transit to the laboratory and no adults were observed. Species common to both ponds included *Anax imperator, Libellula depressa* and *Coenagrion puella* all of which were observed as adults and nymphs.

The remaining five ponds contained between two and five species of Odonata. Of these, **W** pond contained the fewest, with only two species of Zygopteran, *Pyrrhosoma nymphula* and *Coenagrion puella*. *Aeshna grandis* was observed hawking along the banks of the pond but was not recorded in the macroinvertebrate sample, though a female was observed ovipositing. The probable reason for this low number of species was the lack of suitable littoral zone habitat, including a lack of emergent vegetation and the effect of predation from the large fish population within the pond. These two factors appear to be very important in determining Odonata diversity within the ponds on the common, ponds with large fish populations and limited littoral habitat being the least populated. A further factor that may be influencing distribution and diversity is that of isolation. Friday (1987) showed that the immediate surroundings of the pond may influence its chances of discovery by actively dispersing species such as Odonata. This appears to be the case with both **M** and **L** ponds which only had three species of Odonata and were surrounded by dense woodland/scrub and were also the most isolated in terms of location in relation to the other ponds.

The most common species occurring on the common were *Coenagrion puella*, which occurred in six of the ponds and *Pyrrhosoma nymphula* which was present in all of the ponds. This is hardly surprising as they represent probably the two most common species of Zygopteran in southern England, (Hammond, 1977). *Erthromma najas* was also relatively abundant occurring in four out of the seven ponds, though surprisingly *Enallagma cyathigerum*, a relatively abundant species in central South England, was only present in one pond, **T** pond. *Ischnura elegans* was also recorded from only one site, **G** pond, which was again rather surprising as it occurred at many nearby sites. This may have been due to pure chance and sample error. Finally one further species of interest was recorded from **H** and **G** pond, this was *Cordulia aenea* which according to Gibbons (1986) is largely restricted to central southern England.

The seven ponds on Yateley common, although not especially distinct when taken as individuals, represent an area of great Odonatalogical interest when considered as a whole. If any one pond has to be considered as the best the honour has to go to Top pond, with a combination of its heathland nature and its impressive dragonfly community. But as a whole the ponds with their aesthetic

attraction and location make them of specific interest and conservational value and present the perfect opportunity to spend a day dragonfly watching.

Table 1. The dragonflies of Yateley Common

Species Found	Ponds						
	T	H	W	M	L	S	G
Anisoptera							
Aeshna cyanea	1	—	—	—	—	—	—
Aeshna grandis	—	—	—	—	1	—	—
Anax imperator	1	—	—	—	—	1	1
Cordulia aenea	—	1	—	—	—	—	1
Libellula quadrimaculata	1	—	—	—	—	—	—
Libellula depressa	1	1	—	—	—	1	1
Orthetrum coerulescens	—	—	—	—	—	—	1
Orthetrum cancellatum	—	—	—	—	—	—	1
Zygoptera							
Erthromma najas	1	1	1	1	—	—	—
Pyrrhosoma nymphula	1	1	1	1	1	1	1
Coenagrion puella	1	1	—	1	1	1	1
Enallagma cyathigerum	1	—	—	—	—	—	—
Ischnura elegans	—	—	—	—	—	—	—

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Ovipositing behaviour and observations on the eggs and prolarvae of *Ischnura pumilio* (Charpentier)

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Ischnura pumilio has been recorded from a variety of shallow water habitats in southern Britain (Fox 1989, Cham 1991, Fox and Cham *in prep.*). It is known to breed in temporary pools, being able to survive periods of drought. (Fox and Cham, *in prep.*). The egg stage and choice of oviposition site play an important role in the species' ability to colonise and survive under such conditions.

At a site of shallow seepages in Bedfordshire ovipositing behaviour of *I. pumilio* has been observed and the hatching of eggs observed under controlled conditions. The hatching of odonata eggs and the emergence of prolarvae is rarely observed and has not been described for *I. pumilio*.

Females are reported to oviposit in a variety of soft-stemmed aquatic plants growing in shallow water habitat (Fox & Jones 1991). During 1991 and 1992 females have been observed ovipositing into the stems of *Juncus inflexus, J. articulatus* and *Eleocharis palustris*. Each of these species appears to be equally abundant in the seepage areas yet more than 75% of observed females (n = 84) oviposited into *J. articulatus* as well as spending more time ovipositing on each occasion. This resulted in higher egg densities in these stems.

Unaccompanied females settle on suitable stems approximately 1 cm. above the water surface. The abdomen is curved strongly, thrusting the ovipositor into the plant tissue. Egg laying commences just above water level and, as each egg is laid, the female descends into the water until the thorax is in contact with the water surface. It may be difficult for a small damselfly to overcome the surface tension as no attempts to submerge were observed. It appeared to be the stimulus to move around the stem and repeat the procedure on another side. Each insertion took about 20 seconds.

Microscopic examination of stems revealed vertical rows of tiny scars caused by oviposition. Eggs are laid below the surface of the stem lying vertically above each other between the lignified ribs of the stem. Egg density varies considerably (4 — 51) and is influenced by the species of plant and whether females were disturbed during oviposition. Passing males often attempt tandem with ovipositing females but are repelled by a 'wing open' threat display. The preferred area of stem is in the region of the growing leaf sheath. Here, eggs laid below the surface of the stem are likely to become entombed as the tissue starts to regrow and this may be important in surviving drought conditions. On several

stems of *J. articulatus* egg density was sufficient to cause dark patches to appear.

Following oviposition, several stems of *J. articulatus* were collected and maintained in a small container in a warm room (25°C). These stems were observed daily under a microscope and the first signs of hatching occurred after 17 days. Hatching appeared to be well synchronised with 90% of prolarvae emerging from a stem during the first morning (N = 37). The remaining prolarvae had all emerged by the following noon. Other stems were maintained with just the rootmass kept damp so as not to inhibit the normal growth of the plant. One stem was kept completely out of water.

After 18 days these stems were resubmerged in water and in each case prolarvae emerged approximately two days later. This clearly shows the ability of the eggs to withstand short term drought but it is not known whether it reduces the number of eggs which hatch.

The hatching process

The eggs of *I. pumilio* have to be able to avoid desiccation during periods of drought and being laid into plant tissue affords them some degree of protection. The emerging prolarva, however, has to pass through the outer layers of plant tissue without sustaining damage and this requires a special mechanism.

Several hours before hatching the anterior tip of the egg can be seen just projecting from the surface of the plant stem. The hatching process appears to be initiated by the formation of a fluid-filled vesicle between the anterior tip and the head of the prolarva inside the egg. The cone-shaped tip of the egg is heavily pigmented and strengthened by a thick cuticle. From the time at which the first indication of hatching is visible, the amount of egg tip projecting slowly increases as the vesicle expands. The function of the vesicle appears to be to force the thickened tip of the egg through the surface layers of the stem to enable a free passage for the emerging prolarva. At this stage, numerous tiny projections can be seen over the surface of the stem, revealing the positions of the underlying eggs.

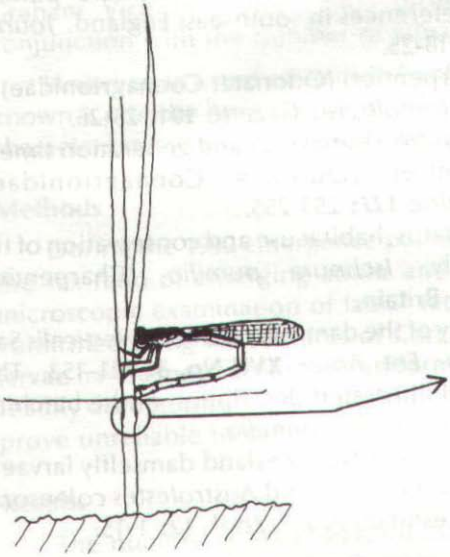
The vesicle eventually reaches a size at which the prolarva moves forward into the vesicle space. When the head of the prolarva fills the vesicle, the cone-shaped tip of the egg suddenly splits open, allowing the prolarva to emerge with ease. It rapidly leaves the egg to a point where it is only attached by a single thin filament at the posterior end. Within seconds the prolarval skin splits dorsally, allowing the second instar larva to emerge directly. The splitting is brought about by an arching movement of the prolarva and a series of peristaltic wave movements. This continues until the head and legs are free. The labium, which

within the prolarva lies alongside the legs, flicks forward to assume its functional position. Once the legs are free, the emerging larva appears to pause for up to 20 seconds. This is similar to the resting phase of emerging adults and may allow the legs to become fully functional. The larva is temporarily still attached to the prolarval skin by its three caudal lamellae, but as the legs become functional the hind pair is used to push free. Throughout the hatching process the prolarval skin remains attached to the egg. Where egg density is high, numerous skins can be observed hanging from the surface of the stem.

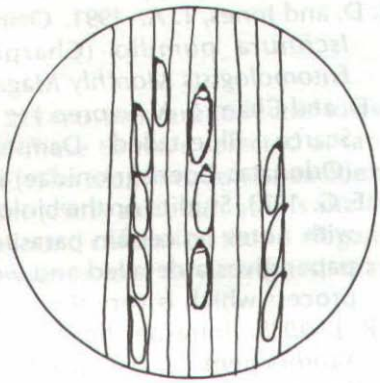
From time to time the eggs splits to the point at which the second instar larva emerges takes 4 to 6 minutes. This short prolarval stage appears to be an effective emergence mechanism for endophytic zygoptera larvae. As hatching is synchronised, newly emerged larvae become overcrowded on the stem. Within minutes of emergence, second instar larvae were observed to use threat displays to each other. The caudal lamellae at this stage are as long as the rest of the body and covered in relatively long hairs. At the mid point of each lamella is a dark patch which contrasts with the near white distal portion. As two larvae approach each other, the abdomen is arched laterally to thrust the caudal lamellae at the intruder. These threat displays appeared to encourage spacing out and dispersal. After such encounters, larvae were observed 'swimming' away using sideways movement of the abdomen. The surface film, which is in close proximity in shallow water conditions, offers an alternative means of dispersal. Larvae were observed walking on the under-surface of the water, often after swimming up following an encounter with another larva. It is interesting to observe these encounters in second instar *I. pumilio*, as extensive studies of other zygopteran species have shown that active threat displays occur from the fourth instar onwards (Rowe 1985).

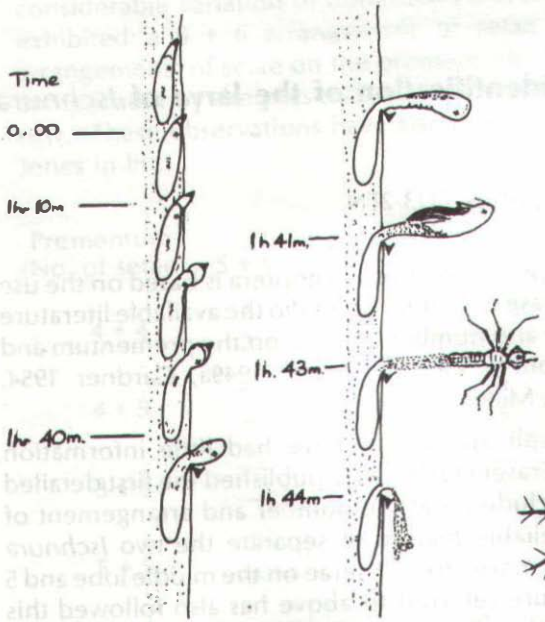
The observations presented here, although not exhaustive, show that early stages of *I. pumilio* are well adapted to survive adverse conditions. The mechanism of hatching appears well suited to species of zygoptera which oviposit endophytically and is similar to that of *I. verticalis* described in detail by Grieve (1937). In the case of *I. pumilio* the egg stage is important for surviving temporary drought conditions with the hatching process being stimulated by the return of normal water levels. The threat displays and dispersal of second instar larvae may also have important implications for this species' way of life. By dispersing at an early stage it may ensure that, under shallow water conditions, some larvae find themselves in permanently wet areas should drought occur after hatching.

Female *I. pumilio* ovipositing in stem of *Juncus articulatus*.

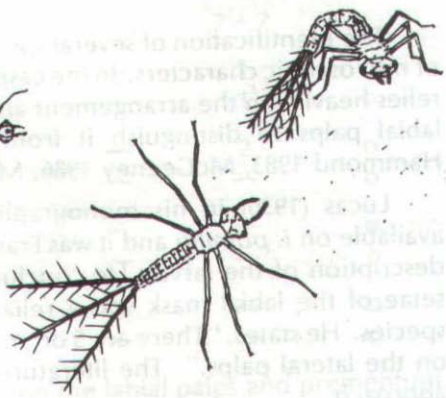


Position of eggs laid in stem of *J. articulatus*.





Hatching Sequence.



Threat display of 2nd instar larvae.

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A cautionary note on the identification of the larva of *Ischnura pumilio* (Charpentier)

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The identification of several species of British Zygoptera is based on the use of microscopic characters. In the case of *Ischnura pumilio* the available literature relies heavily on the arrangement and number of setae on the prementum and labial palps to distinguish it from *I. elegans* (Fraser 1949a, Gardner 1954, Hammond 1983, McGeeney 1986, Miller 1987).

Lucas (1930) in his monograph appears to have had little information available on *I. pumilio* and it was Fraser (1949b) who published the first detailed description of the larva. He concluded that the number and arrangement of setae of the labial mask was a reliable feature to separate the two *Ischnura* species. He states, "There are 5 or, more rarely, 6 setae on the middle lobe and 5 on the lateral palps." The literature referred to above has also followed this approach.

Carchini (1983) avoided the use of these characters, preferring to use the size of the spine-shaped setae on the lateral carinae of the abdominal segments. Graham Vick in Miller (1987) further refined this approach, using it in conjunction with the number of labial setae.

However, in a study at a site in Bedfordshire, numerous exuviae and larvae of known *I. pumilio* have consistently keyed out to *I. elegans* using the labial setae characters stated in the available literature.

Methods

During the 1992 emergence period 229 exuviae were collected to determine the sex ratio of emerging adults and of these 66 were selected at random for microscopic examination of labial setae. The identification of each exuvia was confirmed using the features of Carchini (1983) although at this site *I. pumilio* larvae have a more distinctive uniform ground coloration than *I. elegans* and are readily distinguished. This coloration, however, may vary at other sites and could prove unreliable to the untrained eye.

Results

The number of setae on both the labial palps and the prementum showed considerable variation in both males and females (see table). 56 exuviae (85%) exhibited a 6 + 6 arrangement of setae on the labial palps with varying arrangements of setae on the prementum. The number of premental setae was complicated by the presence of small vestigial setae on the inner edge of each row. These observations have also been made from Cornish specimens (Steve Jones in litt.)

Prementum (No. of setae)	Labial palps (No. of setae)					
	5 + 5	5 + 6	6 + 6	6 + 7	7 + 7	
4 + 4	2	—	11	—	1	o
	2	—	16	—	1	o
4 + 5	—	—	8	—	2	o
	—	—	6	—	—	o
3 + 5	—	—	—	—	—	o
	—	—	1	—	—	o
5 + 5	—	—	7	1	—	o
	—	1	7	—	—	o

Table to show the combinations of setae on the labial palps and prementum of male and female *Ischnura pumilio* exuviae.

Discussion

The available keys and literature appear to be based on a very limited sample of *I. pumilio* larvae which does not take into account the variability that occurs across the species range. The key in Miller (1987) is usable if the characters based on lateral spines are used. This feature appears to be constant in all specimens examined from Bedfordshire (n = > 350) and is readily distinguished if a reference specimen of *I. elegans* is available for comparison.

The following (an amendment of Miller 1987) is suggested:-

— On abdominal segments 7 and 8, the spines on the lateral ridges are stouter than those on the ventral surface.

Ischnura elegans

— On abdominal segments 7 and 8, the spines on the lateral ridges are about the same thickness and length as those on the ventral surface.

Ischnura pumilio.

Although the work presented here refers to *Ischnura* species, it raises the question as to whether micro diagnostic features used in the identification of other species are as reliable as the literature may lead us to believe.

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Inverted emergence by *Ischnura elegans* (Vander Linden) at Ashton Water Dragonfly Sanctuary

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Introduction

In the summer of 1990, I made a study of the weather-related aspects of dragonfly emergence at Ashton Water, Northamptonshire. I was assisted by a small 'team', one of whom noticed quite early on that several of the damselfly larvae had apparently emerged head-downwards.

We searched the available literature and could find no reference to this kind of behaviour, so I decided to keep a record of the positions in which we were finding the exuviae, in addition to the dates, locations and emergence supports. As other reports are now coming in, (Thompson 1990) (Thickett 1991), it seems worthwhile setting out what we noticed in this respect during a seventy-one day period that summer.

Methods

Between 16 June and 25 August, we searched daily for exuviae at selected bankside sites along two sides of the lake (Figure 1). The search usually started at about 9.00 a.m. We took turns at the task, recording the data for each exuvia.

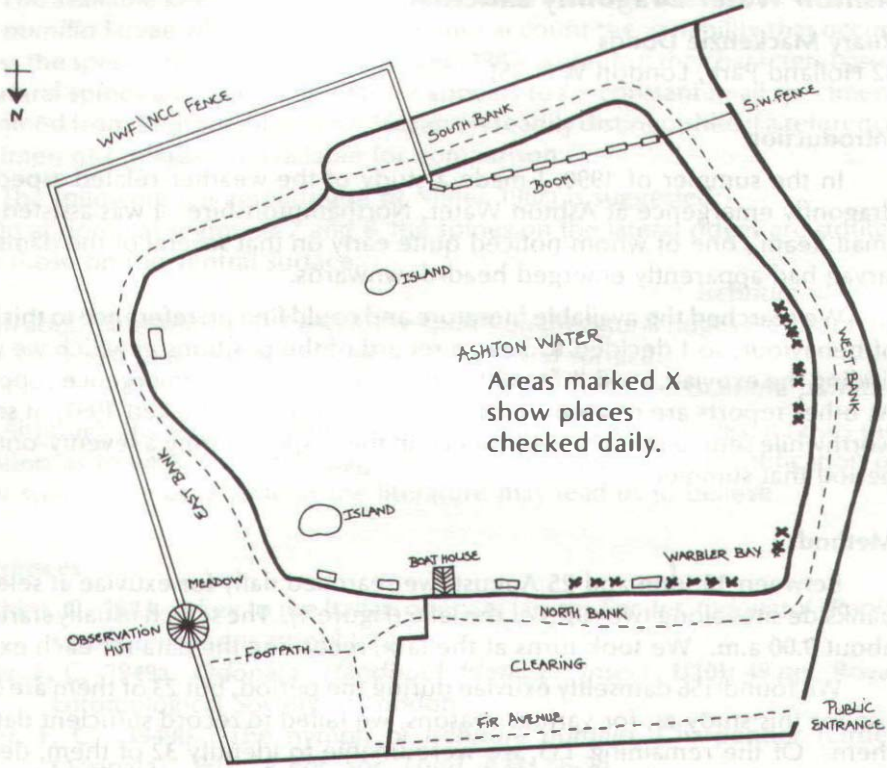
We found 156 damselfly exuviae during the period, but 23 of them are of no use for this study as, for various reasons, we failed to record sufficient data on them. Of the remaining 133, we were unable to identify 32 of them, despite thorough use of Askew (1988) and Miller (1987). However we kept them all, labelled in tubes, for future reference. The remaining 101 were identified as *Ischnura elegans*.

The exuviae were collected from Water Mint *(Mentha aquatica)*, Rush *(Juncus inflexus)*, Sedge *(Carex riparia)* and Reed *(Phragmites australis)*.

Of the 133 exuviae whose position and date were recorded, 49% were inverted. Of the 101 identified as *Ischnura elegans*, 48.5% were inverted.

During the seventy-one day period, we monitored weather conditions. We could see no apparent correlation between emergence positions and the weather. Air temperatures varied between 9C and 22C, water temperatures between 14C and 24C, and barometric pressures between 9.97Mb and 10.28Mb. There were five days, 23.6, 8.7, 15.7, 25.7 and 2.8, when exuviae were found in the inverted position only. However, the weather on those days was varied. For example 23.6 was stormy, 8.7 was cloudy and 2.8 was one of the nicest and hottest days of the year.

Figure 1, Ashton Water Dragonfly Sanctuary Inverted Emergence Study — 1990.



Results

Table 1

Positions of damselfly exuviae at Ashton Water, inverted versus not-inverted, recorded between 16 June and 25 August, 1990.

	TOTAL damselfly exuviae recorded	Positively identified as *Ischnura elegans*
Inverted	65	49
NOT Inverted	68	52
Total	133	101

Discussion

The figure of 48.5% for inverted *I. elegans* exuviae is a lower percentage than the 80% calculated by Thickett (1991) for the 30 or so exuviae found at Loch Tarrant on 31 May 1990. However, as mentioned above, there were five days at Ashton where our figure was 100%.

Ashton Water is not polluted, so hypotheses involving pollution (Thickett 1990) would not seem to be relevant in this case.

Peter Mayhew drew our attention to points made by Corbet (1962) about damselfly larvae exposing themselves to air prior to emergence in conditions of oxygen shortage. Peter suggested (Mayhew in lit.) that the very hot conditions of 1990, coupled with the fact that Ashton Water is a shallow, fairly stagnant lake, might have a bearing. But the phenomenon occurred right through the period. Moreover, weekend observations in 1991 showed that inverted emergence began as soon as the season started. Again, roughly half were inverted.

The questions remain: Is inverted emergence, in significant numbers, a new phenomenon? Does it happen only in *Ischnura elegans* and why does it happen at all?

Acknowledgements

I would like to thank my 'team' at Ashton during the summer of 1990, namely Kari de Koenigswarter who first noticed inverted emergence at Ashton prior to discussion with anyone, Peter Mayhew who gave us a month of his life to help in so many ways, and my children, Catharine and Richard who helped in the searches. I would also like to thank Norman Moore for his advice in setting up the study and Steve Brooks for endless patience and advice at all stages.

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

Corbet, P. S. 1962. *A biology of dragonflies*. Witherby Ltd, London.

Miller, P. L. 1987. *Dragonflies*. Naturalists' handbooks 7, Cambridge University Press, Cambridge.

Thickett, L. A. 1991. *Inverted emergence by Ischnura elegans (Vander Linden). Journal of the British Dragonfly Society* 7(2): 33.

Thompson, R. *Video* shown at B.D.S. Annual Indoor Meeting 1990.

Vagrant Emperor dragonflies *Hemianax ephippiger* (Burmeister) in Mallorca

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On 25th April 1990 I saw what I later identified as a male *Hemianax ephippiger* in sand-dunes adjacent to the S'Albufera Natural Park in the north of the island of Mallorca, Spain. Returning to the same area on 19th April 1991, I was intrigued to find not less than eight males of the same species in a sheltered woodland glade in the dunes immediately east of the "English Bridge". The insects were flying almost continuously in mainly sunny conditions with occasional cloud cover and a shade temperature of about 20° C. Eventually one was photographed at rest on a juniper bush. Other Odonata in the glade were: *Anax imperator, Aeshna isosceles, Crocothemis erythraea, Ischnura elegans, Orthetrum cancellatum* and *Sympetrum fonscolombii*. No *Hemianax* and few of the other species were observed on the nearby S'Albufera marshes where, however, there was much less shelter from the onshore wind.

H. ephippiger is a long-distance migrant which breeds in temporary water in arid and semi-arid zones of Africa. It appears only sporadically and rarely breeds in Europe (Askew, 1988; Dumont & Desmet, 1990). However, enormous numbers of this species were recorded by Dumont & Desmet (1990) moving through the Sahara Desert in winter 1987/88, spring 1989 and again in winter 1990. They also cite observations of exceptional numbers in the Rhone Valley, France and in Switzerland during spring 1989. They link these movements with unusually high rainfall in the central Sahel and the Sahara during 1988 and 1989.

It seems likely that my observations in Mallorca in 1990 and 1991 were also of migrants, though Askew (1988) states that breeding populations have occasionally become established in southern France and southern Spain for short periods. The S'Albufera wetland may therefore merit further investigation as a potential breeding site for *H. ephippiger*.

References

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

Dumont, H. J. & Desmet, K. 1990. Trans-sahara and trans-mediterranean activity of *Hemianax ephippiger* (Burmeister) in 1988 and 1989 (Anisoptera: Aeshnidae). *Odonatologica* **19**: 181-185.

Notes and observations

Compiled by **Alan Paine**
3a Burnham Close, Trimley St. Mary, Suffolk IP10 0XJ.

As I have not had any adverse comments I will continue this section in the same general format as last time, but if anyone has any ideas for improving the format please let me know. Thanks again to all who support this section with their observations.

A lot of publicity has been given over the past few years to global warming. Certainly parts of this country are experiencing much warmer summers recently, and there has been an upsurge in ornithological records of species normally found further south. Some butterflies have been reported with extended flight periods, with perhaps an extra brood in others; there has also been an excellent butterfly migration during July 1992. How are these climatic changes affecting our odonata?? In this section we have always concentrated on 'last dates'; perhaps it would be interesting to note 'first dates' as well, as undoubtedly some species are bound to take advantage by extending their flight periods and/or extending their ranges.

To comply with printer's deadlines, could all reports please be sent to me by January 10th and July 10th each year.

Mixed pairings

There was an error in the report of the Migrant Hawker/Southern Hawker *Aeshna mixta/Aeshna cyanea*. It was not the Grand Union Canal, but the Grantham Canal. Apologies for the error, which was mine and not the reporters.

Two mixed pairings were seen on the hot afternoon of 21st August 1991 at Woodstreet Farm pond, near Wool, Dorset. The first was a male Ruddy Darter *Sympetrum sanguinieum* which seized a male Keeled Skimmer *Orthetrum coerulescens* in tandem and then settling on a grass stem, where the *Orthetrum* was eventually released, it having remained quiescent. The second was another male Ruddy Darter which grabbed a female Common Darter *Sympetrum striolatum;* these landed, and the male twice raised his abdomen into the mating position, but the female gave no response, and eventually they flew off, still in tandem. (B)

Odonata caught in light traps

The report in the previous Journal has resulted in another case of odonata being caught in a moth light trap. This was a Common Blue Damselfly *Enallagma cyathigerum* caught on 30th June 1986 on the Bocconnoc estate, Lostwithael, Cornwall. (A)

Behaviour

On 10th August 1990 at a heathland pond on Bovington Ranges, Dorset, a male Emperor *Anax imperator* caught a Small Heath butterfly and, after flying around with it for a minute it dropped it, apparently unable to cope. The butterfly fell into the water alive and still moving, but was soon still. (B)

On 14th June 1992 at Ifield Wood, Sussex, a group of Emperor *Anax imperator* and about five Four-spotted Chaser *Libellula quadrimaculata* were flying around when, in a surprise attack a male Emperor caught hold of a Chaser in mid-air by the head, and carried it back to a nearby willow where it promptly began to dismember and eat it. (E)

Predation

The report of the Banded Demoiselle *Caleopteryx splendens* near Blithfield Reservoir in the previous Journal occurred on 26th July 1991. As it was thought a shrike might have been responsible the county bird recorder was contacted but no shrikes were reported from that area around that time. Although obviously this does not rule out a shrike being responsible can anyone suggest another cause for the damselfly to be impaled on a rush stem.

On August 26th 1991 at Kedington, Suffolk, a large green and black dragonfly (almost certainly a Southern Hawker *Aeshna cyanea)* which had settled on a grass stem was caught and eaten by a Green Sandpiper. (D)

Last dates

On 17th August 1991 two old specimens of the Norfolk Hawker *Aeshna isosceles* were seen still very active at Ludham Marshes, Norfolk, an area where this species is regularly seen flying well into August. (C)

Other last dates reported for 1991 have included:

Migrant Hawker *Aeshna mixta*	8th Nov.	Potter Heighem, Norfolk (C)
Common Darter *Sympetrum striolatum*	13th Nov.	Potter Heigham, Norfolk (C)
	24th Nov.	Minsmere, Suffolk. (G)
Black-tailed Skimmer *Orthetrum cancellatum*	20th Sept.	Potter Heigham, Norfolk (C)
Emerald Damselfly *Lestes sponsa*	21st Sept.	Potter Heigham, Norfolk (C)
	21st Sept.	Newbourne Springs, Suffolk (I)
Southern Hawker *Aeshna cyanea*	14th Nov.	Minsmere, Suffolk (G)

As a comparison for one site for previous years, the last dates for Common Darter at Minsmere in 1989 was 14th November and in 1990 15th November (G)

Range expansion, etc

On 21st May 1992 at the Saltwells Local Nature Reserve, Dudley, a female Variable Damselfly *Coenagrion pulchellum* was caught, but so far further infrequent visits have failed to produce any more. (F)

Movements

At lunch-time on 29th July 1992 a group of nine dragonflies was seen flying West over the tops of buildings along Yarmouth Quay, Norfolk. These buildings are at least 80 feet high, and once over them the dragonflies lost height and continued their Westerly journey. It was considered they had come in off the sea, and that they were probably *Aeshna* sp. (H)

List of observers

(A) via R. M. Belringer, 20 Wakefield Avenue, St. Budeaux, Plymouth, Devon PL5 1PU.
(B) Col. E. D. V. Prendergast, Manor House, Bagber, Sturminster Newton, Dorset BT10 2BY.
(C) D. J. Hewitt, 27 St. Nicholas Way, Potter Heigham, Norfolk NR29 5LE.
(D) P. Newport, 11 Dane Common, Kedington, Suffolk CB9 7HU.
(E) J. Havers, 53 Cuckmere Crescent, Gossops Green, Sussex RH11 8DJ.
(F) T. G. Benyon, Saltwells L.N.R., Pedmore Road, Brierley Hill, Dudley DY5 1TF.
(G) I. Robinson, Minsmere Nature Reserve, Suffolk.
(H) E. Jones, 22 Broom Gardens, Belton, Great Yarmouth, Norfolk NR31 9PB.
(I) A. R. J. Paine, 3a Burnham Close, Trimley St. Mary, Suffolk IP10 0XJ.

Book Review

The Dragonflies & Damselflies of Cheshire, Richard Gabb & David Kitching. National Museums & Galleries on Merseyside (1992). 62 pp. £7.85 (p&p 50p).

This extremely well-produced book is the latest to join an impressive list of works dealing with Dragonflies on a county basis. Gabb and Kitching approach their subject from a new angle. Those with only a limited knowledge and a burgeoning interest in Odonata will find little to help with identification of individual species but they will certainly learn about the best places in Cheshire in which to find them. For those who know a little more, the wealth of information on, for example, status, distribution, types of habitat and prime sites is of interest and great value.

The book commences with fascinating descriptions of the geography and geology of Cheshire. This is followed by an account of the county's Odonata recording history, beginning in the late 19th century and ending with the Tetrad (2 kilometre) Breeding Survey 1985-1991 which resulted from the authors' innovative work on a new, computorised, recording scheme. Almost all the details in the main body of the work were collated from this very sophisticated database.

The county boasts 25 species from the British list and all but one of them are illustrated, beautifully, by Chris Shields; his meticulous pen and ink drawings are pleasingly set against green and white habitat backgrounds and undoubtedly help to make the book the attractive publication it *is*. In addition to the illustrations, each species is presented under five headings:

(i) field notes, which give us fascinating snippets of information;
(ii) Cheshire status and distribution;
(iii) flight period;
(iv) a tetrad map, showing Cheshire overlain with a tetrad grid with symbols to show breeding status; and
(v) a database which provides a statistical representation of recorded distribution according to breeding status.

The final chapter is concerned with habitats. Cheshire provides a wealth of different types of habitat: meres and larger lakes; mosses and bogs; marl pits and ponds; canals and rivers. Each type is illustrated with two colour photographs: the individual site plus an example of an odonate recorded from it. Each type is generously dealt with and a "prime site" is chosen to typify each one. Dragonfly enthusiasts in and around Cheshire are well served. Dragonfly recorders in counties other than Cheshire will find the explanations regarding the setting up of a database, and the recording scheme which fed it, interesting and stimulating.

Jill Silsby

INSTRUCTIONS TO AUTHORS

Authors are asked to study these instructions with care and to prepare their manuscripts accordingly, in order to avoid unnecessary delay in the editing of their manuscripts.

Manuscripts should be typewritten using black ribbon, double-spaced, on one side of the page only and with margins at least 25 mm at the left, top and bottom; text pages should be numbered. Footnotes should be avoided.

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.

The titles of journals should be written out in full.

Tables should be typed, each on a separate, unnumbered page.

Legends for illustrations should be typed together in sequence on a single unnumbered page.

Illustrations (figures) should be prepared in black ink, and scaled to allow a reduction of 1.5 to 3 times. Lettering should be neat and uniform.

The legend for each table and illustration should allow its contents to be understood fully without reference to the text. The approximate position of each table and figure should be indicated in the text.

LATIN AND ENGLISH NAMES OF BRITISH ODONATA

ZYGOPTERA	DAMSELFLIES	ANISOPTERA	DRAGONFLIES
Calopteryx virgo	Beautiful demoiselle	*Aeshna caerulea*	Azure Hawker
Calopteryx splendens	Banded demoiselle	*Aeshna juncea*	Common Hawker
Lestes sponsa	Emerald Damselfly	*Aeshna mixta*	Migrant Hawker
Lestes dryas	Scarce Emerald Damselfly	*Aeshna cyanea*	Southern Hawker
Platycnemis pennipes	White-legged Damselfly	*Aeshna grandis*	Brown Hawker
Pyrrhosoma nymphula	Large Red Damselfly	*Anaciaeschna isosceles*	Norfolk Hawker
Erythromma najas	Red-eyed Damselfly	*Anax imperator*	Emperor Dragonfly
Coenagrion mercuriale	Southern Damselfly	*Hemianax ephippiger*	Vagrant Emperor Dragonfly
Coenagrion scitulum	Dainty Damselfly	*Brachytron pratense*	Hairy Dragonfly
Coenagrion hastulatum	Northern Damselfly	*Gomphus vulgatissimus*	Club-tailed Dragonfly
Coenagrion lunulatum	Irish Damselfly	*Cordulegaster boltonii*	Golden-ringed Dragonfly
Coenagrion armatum	Norfolk Damselfly	*Cordulia aenea*	Downy Emerald
Coenagrion puella	Azure Damselfly	*Somatochlora metallica*	Brilliant Emerald
Coenagrion pulchellum	Variable Damselfly	*Somatochlora arctica*	Northern Emerald
Enallagma cyathigerum	Common Blue Damselfly	*Oxygastra curtisii*	Orange-spotted Emerald
Ischnura pumilio	Scarce Blue-tailed Damselfly	*Libellula quadrimaculata*	Four-spotted Chaser
Ischnura elegans	Blue-tailed Damselfly	*Libellula fulva*	Scarce Chaser
Ceriagrion tenellum	Small Red Damselfly	*Libellula depressa*	Broad-bodied Chaser
		Orthetrum cancellatum	Black-tailed Skimmer
		Orthetrum coerulescens	Keeled Skimmer
		Sympetrum striolatum	Common Darter
		Sympetrum nigrescens	Highland Darter
		Sympetrum fonscolombii	Red-veined Darter
		Sympetrum flaveolum	Yellow-winged Darter
		Sympetrum sanguineum	Ruddy Darter
		Sympetrum danae	Black Darter
		Leucorrhinia dubia	White-faced dragonfly

CONTENTS

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