hôte est donc fait par les adultes. Chez cette espèce, le choix a probablement évolué vers des plantes avec un contenu en glucosides phénoliques élevé, ce qui permet une défense efficace des oeufs et des larves.

La seconde espèce, *Ph. tibialis,* est également stimulée par un mélange de glucoside phénolique et de sucre, la salicortine et le saccharose. Cependant, ce résultat n'explique pas les raisons de la monophagie de cette espèce. Bien sur d'autres composés, qu'il reste à identifier, pourraient jouer un rôle dans le choix de la plante-hôte, mais d'autres facteurs pourraient également entrer en ligne de compte.

En effet, la sélection d'une plante comme hôte n'est pas seulement due à des substances chimiques senties ou goûtées par des insectes mais cette sélection commence par la sélection de l'habitat, qui peut dépendre d'autres signaux comme des signaux visuels (morphologie des plantes, couleurs,...). C'est l'ensemble de tous ces signaux qui doit être considéré dans l'analyse des mécanismes responsables de la sélection d'une plante-hôte par un insecte et dans certains cas, nous sommes encore loin de comprendre tous ces mécanismes.

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Successful reproduction in Belgium of the damselfly *Lestes barbarus* (FABRICIUS, 1798) (Odonata Lestidae)

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Abstract

Lestes barbarus *(Odonata: Zygoptera) completes its life cycle in Belgium. Formerly, this species was thought to wander from Southern France to Belgium every year. For three consecutive years small populations were present at Merchtem and Wilrijk. The species was found ovipositing in* Juncus effusus. *During a larval survey in June 1996 several ultimate and penultimate instars were found at both sites. These observations raise the number of Lestidae reproducing successfully in Belgium to five. Although* Lestes *larvae seem unable to coexist with fish, our results show that coexistence with newts is possible. A limiting factor in the larval distribution of* L. barbarus *may be competition with L. sponsa. The emergence pattern suggests a latitudinal temporal gradient in emergence, as in* L. sponsa *where emergence begins earlier in warmer southern areas.*

Key words: Odonata, Lestidae, *Lestes barbarus*, Belgium.

Introduction

The Lestidae is one of the oldest families of Odonata (FRASER, 1957). Members of the genus *Lestes* Leach, 1815 are rather large damselflies with a metallic green body, long spines on the legs, many pentagonal cells in their wings, and a pterostigma at least twice as long as broad (ASKEW, 1988). At rest, the wings are held partly open, not closed vertically over the back as in other damselflies. Females oviposit in branches or stems of bushes or large herbaceous plants growing over or near water (ASKEW, 1988).

The genus includes about eighty species, distributed almost worldwide, with six European representatives (Askew, 1988) of which five have been recorded in Belgium (Michiels *et al.*, 1986). Four of these - *L. dryas*, *L. sponsa*, *L. virens*, and *L. viridis* - were known to have resident populations in Belgium. The fifth, *L. barbarus*, was only known as an occasional visitor. It is a holomediterranean faunal element (Dévai, 1976 in Geijskes & van Tol 1983) and there were only 11 observation sites in Belgium of *L. barbarus* prior to 1994, mostly from solitary animals. There were no observations in successive years at the same place (Goffart, 1994). Suddenly, in 1994 the species was found at several places in small numbers (De Knijf, 1994). It is thought that the very hot and dry summers of the last years, together with southern winds brought the animals to Belgium (Goffart, 1994; Stoks, 1994).

The first observations of reproduction of *L. barbarus* in Belgium date from August 1994 with oviposition of a solitary female at Wilrijk on 3 August (Stoks, 1994), two tandems on 9 August at Lochristi (De Knijf, 1994) and from mid August 1994 at Merchtem (De Block, pers. obs.). It was, however, still thought that these animals wandered every year from Southern France to Belgium. We report here on the results of larval surveys at the Wilrijk and Merchtem sites in June 1996.

Material and methods

Larvae were collected with a standard sweeping net. In a single sweep 1m of the vegetation was sampled. They were brought to the laboratory and examined with a stereomicroscope. For identification we used keys of Askew (1988), Bellmann (1993) and Heidemann & Seidenbusch (1993).

The site in Merchtem (ES 84) is a small (perimeter ca. 50m; depth ca. 40cm) man-made, isolated pond, surrounded by meadows. It has a rich littoral vegetation dominated by *Juncus effusus* and with stands of *Phragmites australis*, *Typha latifolia*, and *Alisma plantago-aquatica*. There are three willows at the pond's edge. The pond does not dry up due to its clayey bottom. Other Odonata inhabiting the pond are *Ischnura elegans*, *Coenagrion puella*, *Erythromma viridulum*, *Libellula depressa*, *Sympetrum sanguineum*, *S. striolatum*, and *S. flaveolum*. Dominant predators are larvae of the newt *Triturus vulgaris*. We sampled this pond on 4 and 9 June 1996.

The site at Wilrijk (ES 96) actually consists of two ponds separated by 50 m. The largest pond has a perimeter of 230m and a depth of ca. 50cm, the smaller one is 124m around and was not deeper than 20cm in spring. They are situated in a park landscape surrounded by a grassland, dominated by *Arrhenaterum elatius*, *Deschampsia flexuosa* and *Holcus lanatus*. In the north and in the west, this pasture is lined by deciduous forest. The waterside vegetation is highly discrete with several bushes of *J. effusus*, *Eleocharis palustris*, *A. plantago-aquatica* and *Butomus umbellatus*. In several of these patches there was also *Lythrum salicaria*, *Bidens tripartitus* and *Lysimachia vulgaris*. On the large pond more than 50% of the perimeter is surrounded by *Alnus glutinosa*, overhanging the water. The aquatic vegetation consists mainly of *Ranunculus* sp. and also *Hottonia palustris* in the large pond. Both ponds dry up every year; the small pond before the larger one. Other Odonata inhabiting the ponds are *L. sponsa*, *L. viridis*, *I. elegans*, *C. puella*, *E. viridulum*, *Pyrrhosoma nympula*, *Anax imperator* (only small pond), *Aeshna mixta* (only large pond), *Orthetrum cancellatum* (only small pond), *L. depressa*, *L. quadrimaculata*, *S. sanguineum*, *S. striolatum*, and *S. flaveolum*. Besides the dragonfly larvae, other important predators are larvae of the newts *T. cristatus* and *T. vulgaris*. We sampled these ponds at 10 and 12 June 1996.

Results

At the site in Merchtem, a total of 31 larvae of *L. barbarus* were collected in two sweeps at 4 June. No larvae nor adults of other lestid species were observed. All animals were in their last instars on 4 June. The larvae were larger than most of those of *T. vulgaris* and of the anisoptera (*Sympetrum*). MDB even saw predation of a larval *L. barbarus* upon a smaller larval *T. vulgaris*.

At the site in Wilrijk larvae were found in both ponds. The smaller pond was almost completely dry on 10 June, leaving a small water surface (perimeter 20m). In two sweeps, four larvae were collected together with five larvae of *L. viridis*, 10 of *L. sponsa* and more than 50 of *T. vulgaris*. In the larger pond, 11 larvae were found in two sweeps together with more than 50 larvae of *L. viridis*, 20 of *L. sponsa* and more than 20 of *T. vulgaris*. The larvae from the small pond were transported to a small pond at the RUCA-campus. Several of them emerged in June. The first teneral from the large pond was seen on 19 June.

Discussion

The most northern record from this mediterranean species is from South Sweden (Sandhall, 1987). In the Netherlands (Geijskes & van Tol, 1983), Germany (Jurzitza, 1988) and Poland (Mielewczyki, 1972) the species is reported as an irregular breeder. However, populations are not sustaining for more than two years in these countries. The reason for this is unclear (Jurzitza, 1988). Our observations clearly indicate that *L. barbarus* is also capable to complete its life cycle in Belgium. Because at both sites small populations were present from 1994 onwards, it is tempting to assume that the populations of 1995 were offspring from the 1994 generation. First, *L. barbarus* is still rare in Flanders and the chance to wander to exactly the same spot in small numbers seems improbable. Second, the climatic conditions in spring and summer, thought to limit their northern distribution, were quite comparable the last three years. Finally, animals of this species are philopatric and capable of homing behaviour (Utzeri *et al.*, 1976, 1984).

In this endophytic egg-laying species the egg is the overwintering stage. During the egg stage they seem able to resist low temperatures and the freezing of their breeding ponds (winter 1995-1996). The eggs hatch around April and by then the larvae fall into the water and complete their larval stages in three months (CARCHINI & NICOLAI, 1984). Therefore, this species can survive in temporary ponds, given they are filled from April to July. Moreover, UTZERI *et al.* (1984) found that in Italy the species typically populates temporary ponds that dry up for a long period during summer. In these ponds they may have a competitive advantage over other damselfly species and avoid predation by anisopterans and fish. In fact members of the genus *Lestes* are typical for fishless environments (MACAN, 1977; BAKER, 1989).

In both ponds at Wilrijk, larvae of *barbarus* and *sponsa* were in their last instars in June. Only the larvae of *viridis* were obviously smaller, reflecting a temporal separation with *viridis* emerging later. The higher abundance of *barbarus* in the Merchtem site may therefore be explained by the local absence of interference competition with *L. sponsa.* In Italy *L. barbarus* is able to coexist with *L. virens* because they are temporally separated: *L. barbarus* emerging first (CARCHINI & NICOLAI, 1984). Competition between *L. barbarus* and the widespread *L.sponsa* may be a limiting factor for its expansion in most ponds in northern Belgium where *L. sponsa* is often abundant. This agrees with the situation in France where *L. barbarus* is locally abundant in the Mediterranean region where *L. sponsa* is less frequent (MARTENS & SMEYERS, 1978; DOMMANGET, 1994). Therefore it can be expected that in East and West Flanders, where *L. sponsa* is rather rare (ANSELIN, 1992, 1993), there are better opportunities for colonisation. Little is known about the impact of newts on larval damselfly populations. PIERCE *et al.* (1985) found that adult red-spotted newts preyed on damselfly larvae of the genus *Enallagma* but they were much less important predators than fishes. Our results show that lestid larvae can coexist with newts and can even feed upon smaller individuals. Therefore, in contrast to fish, newts do not seem to limit the viability of lestid populations.

No larvae emerged before 19 June and many larvae were still present by the end of June. UTZERI *et al.* (1988) and CARCHINI & NICOLAI (1984) report that emergence in Italy takes place between the second half of May and the first half of June when the ponds start drying. Emergence is obviously later in Belgium and rather corresponds with Poland where first emergence has been reported on 13 June (MIELEWCZYK, 1972). This may reflect a latitudinal temporal gradient in emergence, as in *L. sponsa* where emergence also begins earlier in warmer areas (UEDA, 1978).

For the moment the species is not included in the Red List of the dragonflies of Flanders because they are considered as wanderers (DE KNIJF & ANSELIN, 1996). In Germany, however, where the situation is comparable with Belgium, the species is listed in category two (endangered) (CLAUSNITZER *et al.*, 1984). The long very hot summers of the last

years with southern winds probably played a role in the colonisation of northern countries (GOFFART, 1994; STOKS, 1994). These warm conditions may be especially important in spring when larvae have to develop in few weeks to adults. With global warming being predicted, these conditions may become common. This process is thought to have caused the steady incline of another mediterranean dragonfly, namely *Crocothemis erythraea* Brullé (OTT, 1996a, 1996b). Even in Britain, where there are only four records of *L. barbarus*, the species is therefore listed as a possible future coloniser (MERRITT *et al.*, 1996). Seen the recent jump in observations together with the first proofs of successful reproduction, and the predicted global warming it is to be expected that the species will maintain itself in Belgium.

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Première liste de Diptères Asilidae de la circonscription administrative du Languedoc-Roussillon

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Introduction

La circonscription administrative du Languedoc-Roussillon réunit les départements de l'Aude (11), du Gard (30), de l'Hérault (34) de la Lozère (48) et des Pyrénées orientales (66). D'une superficie de 27.376 km^2, la région présente un relief très varié avec, à l'ouest, le Mont Canigou (2.785m) et le Mont Lozère (1.702m) à l'est. Le sud est bordé par les plages méditerranéennes et le nord par le rebord du Massif Central.

La circonscription renferme des sites entomologiques dont la réputation n'est plus à faire; outre le Mont Canigou, déjà cité, on mentionnera particulièrement Saint-Guilhem-le-Désert, localité qui a retenu l'attention de coléoptéristes comme IABLOKOFF (1950), SCHAEFFER (1952) et LUMARET (1978, 1979).

RASMONT (1988) et PATINY (1995) se sont intéressés aux Hyménoptères Apoïdes de la circonscription et ont souligné la position remarquable du Languedoc-Roussillon au carrefour des faunes atlantique, ibérique, africaine, médio-européenne, eurosibérienne et boréo-alpine.

Mon Collègue Jean-Michel MALDES, du C.I.R.A.D. (Montpellier), a bien voulu me consulter à propos de l'existence en France de *Laphria bomboides* et m'a adressé simultanément un lot de près de 400 Asilidae non identifiés, capturés dans la circonscription. Les recherches sur ces Diptères y sont restées jusqu'à présent fort sommaires: 34 espèces y ont été relevées seulement, alors que 100 taxons ont été cités de la région voisine Provence-Alpes-Côte d'Azur (TOMASOVIC, 1995b).

L'identification de l'important matériel réuni par MALDES m'a poussé à regrouper l'ensemble des informations sur les Asilides observés dans les cinq départements.