2. Dhr. L. DE BRUYN doet de volgende mededeling.

The parasite-predator community attacking **Lipara** species in Belgium

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Abstract

The species of the genus *Lipara* are polyphagous parasites of the Common Reed, *Phragmites australis* whereupon they form a typical cigar- or spike like gall. In Belgium, these galls are parasited by five Hymenopterous parasites and predated by one dipterous and one vertebrate predator. The mortality rate caused by parasitism and predation is discussed for each *Lipara* species.

Introduction

The species of the genus *Lipara* (Diptera; Chloropidae) are polyphagous parasites of the Common Reed, *Phragmites australis* (Cav.) TRIN. ex STEUD. in the Palearctic Region. The females usually oviposit on the stem, leaves or leafsheets of the reed. After hatching the larvae crawl to the top of the shoot, where they enter under the edge of a leafsheet and penetrate downwards to the growing point. Due to feeding activities and/or metabolic products of the larvae, the newly formed internodes are strongly shortened and a typical cigar- or spike like gall is formed.

In Belgium, three *Lipara* species can be found, viz. *Lipara lucens* MEIGEN, *Lipara pullitarsis* DOSKOCIL et CHVÁLA and *Lipara rufitarsis* (LOEW) (DE BRUYN, 1985).

When the galls are opened, a number of larvae turn out to be parasited by Hymenoptera. GIRAUD (1883), mentioned six parasites of *Lipara* of which three were new to science. Later additional parasitic species were reported from the Netherlands, Austria and England (BLAIR, 1944; MOOK, 1967; CHVÁLA et al., 1974; NARTSHUK, 1977; IMHOF, 1979; KANMIYA, 1984). The present study reports on the parasites and predators of *Lipara* species in Belgium.

Material and methods

During the Winters of 1983-84 to 1986-87, *Lipara* galls were collected at different localities in Belgium and The Netherlands. A variety of habitats were visited, ranging from high density reedstands, along shores of lakes or streams, to small, thin and scattered reed vegetations in dry places along roadsides or at the edge of woods. The galls collected in this manner were transported to the laboratory where they were dissected under a binocular microscope. The pupae and larvae, found in the galls, were kept in small glass vials to rear the adults.

Results & discussion

In all, five Hymenopterous parasites belonging to four families were found: *Polemochartus liparae* (GIRAUD), *Polemochartus melas* (GIRAUD) (Braconidae), *Stenomalina liparae* (GIRAUD) (Pteromalidae), *Tetrastichius legionarius* GIRAUD (Eulophidae) and *Scambus* sp. (Ichneumonidae). Besides these also one dipterous predator, *Cnemopogon apicalis* WIEDEMAN (Scatophagidae), and one vertebrate predator were encountered.

Due to the different influences on the development of the host, the parasites can easily be distinguished when the galls are dissected.

In the galls parasited by *Stenomalina liparae*, a whitish pupa of the wasp is found in the dried-up grey larval skin of its host. When the pupa reaches maturity, it becomes transparent and the green colour of the adult wasp may by perceived. The wasp parasites the young *Lipara* larva by boring through the enrolled leaves. The adult leaves the gall by gnawing a hole through the leafsheets just above the gall chamber. It is the most common hymenopterous species parasiting *Lipara* in Belgium. It was found in 38 localities out of 101 visited (table 1). Also the abundance (proportion of the total number of parasites found) of *S. liparae* is very high (± 41%). Although *S. liparae* was found in the galls of all three species, it seems primarily a parasite of *L. lucens*. 93.28% of the specimens (194) were found in galls of this *Lipara* species (table 2). The rate of parasitism by *S. liparae* seems to be higher in West than in East-Europe. In England (BLAIR, 1932), Germany (WAGNER, 1907) and The Netherlands (MOOK, 1967), it is the most common parasite of *L. lucens*. In Czechoslovakia (CHVÁLA et al., 1974), it is less common, and in Hungary (ERDÖS, 1961) it was not found.

In the galls parasited by the *Polemochartus* species, a fully developed pupa of the host is found. Through the wall of this pupa, the pupa of the parasite can be distinguished. Normally the larvae of the *Lipara* species overwinter as last instar larvae. The parasite induces a premature pupation of the host (VARLEY et al., 1933). The parasited pupae were always found in the hardened gall chambers. The oviposition behavior of *P. liparae* was

Mortality factor	presence n	abundance n	abundance %
Polemochartus liparae	20	92	17.39
Polemochartus melas	13	33	6.24
Stenomalina liparae	38	218	41.20
Tetrastichius legionarius	5	15	2.84
Scambus sp.	13	56	10.58
Cnemopogon apicalis	4	6	1.13
Predator	15	54	10.21
miscellaneous	23	55	10.40
Total	101	529	100.00

Table 1: Distribution parameters for the parasites and predators (presence: number of localities where that species was encountered; abundance: proportional contribution in relation to the total number of parasites).

studied in more detail by MOOK (1961). Oviposition takes place in the *Lipara* eggs on the surface of the shoot. The *Polemochartus* species leave the gall from the tip as do their hosts.

P. liparae is slightly more common then *P. melas* (table 1). It was found in 20 localities, and the abundance was ± 17%. *P. melas* was found in 13 localities and approximately 6.25% of all parasites belong to this species. The major difference between the two species is found in their host preference. *P. melas* parasites all three *Lipara* species, with, nevertheless, a clear preference for *L. rufitarsis*, while *P. liparae* only parasites *L. lucens* and *L. pullitarsis*, with a clear preference for *L. lucens* (table 2). In The Netherlands, *P. liparae* was only found as a parasite of *L. lucens*. More to the East, in Czechoslovakia, it is the most important parasite of *L. lucens*. In Hungary it was the only parasite found in this species (CHVÁLA et al., 1974).

GIRAUD (1863) suggested that *P. melas* may be merely a colour variety of *P. liparae*. Yet, both forms not only show morphological differences, but they also show a distinct difference in their host preference (table 2). These results may indicate that both forms may be good species. As in our study, *P. melas* is the most important parasite of *L. rufitarsis* in Czechoslovakia (CHVÁLA et al., 1974). In the Netherlands it was only occasionally reared from *L. lucens* galls (MOOK, 1967).

Lipara species attacked by *T. legionarius*, are easily recognised since the transparent, whitish and intact larval skin of the host is completely stretched out (about twice as large as normal). *T. legionarius* is a gregarious parasite. Inside the hostal skin a high number (up to 40 specimens) of small larvae or pupae can be found.

T. legionarius is a rather rare parasite as it was only found in 5 localities (table 1). It is exclusively found in the host *L. lucens* (table 2). *T. legionarius* is rare all over Europe. It was also mentioned from The Netherlands, Czechoslovakia (CHVÁLA et al., 1974), Austria (GIRAUD, 1863), and the DDR (RUPPOLT, 1957).

	L. lucens		L. pullitarsis		L. rufitarsis	
# examined galls	1183		667		344	
# adult flies	834	70.50 %	595	89.20 %	247	71.80 %
P. liparae	81	6.85 %	5	0.75 %	-	-
P. melas	6	0.51 %	2	0.30 %	30	8.72 %
S. liparae	194	16.40 %	7	1.05 %	7	2.03 %
T. legionarius	15	1.27 %	-	-	-	-
Scambus sp.	9	0.76 %	-	-	45	13.08 %
C. apicalis	-	-	5	0.75 %	-	-
predator	3	0.25 %	44	6.60 %	8	2.33 %
miscellaneous	41	3.46 %	8	1.20 %	7	2.03 %

Table 2: Contribution of each factor (parasites, predators, miscellaneous) to the mortality rate of each *Lipara* species.

When a wintergall, parasited by the *Scambus* species, is opened, at most some very small fragments of the host larval skin are found, and only the parasite larva is present. It is primarily a parasite of *L. rufitarsis* (table 2); only a few were found in *L. lucens* galls. In literature the following *Scambus* species are mentioned as parasites of *Lipara* species: *S. phragmitidis* PERK. (The Netherlands, Austria: WAITZBAUER, 1969; CHVÁLA et al., 1974), *S. arundinator* F. (Austria: GIRAUD, 1863), and *S. detritus* HOLMGR. (England, Germany, Berlin: WAGNER, 1907; BLAIR, 1944; RAGHI-ATRI, 1980).

Besides hymenopterous parasites, there is also a dipterous predator, *Cnemopogon apicalis*, attacking the *Lipara* flies (DE BRUYN, 1985). During the present study, *C. apicalis* was only found in the soft galls of *L. pullitarsis*. Formely, it was also reported as a predator of *L. lucens* (WAGNER, 1907; THEOWALD, 1961).

Another relatively important source of mortality among *Lipara* species is predation by Vertebrata. The galls in question show a large hole in the wall of the gall chamber, where usually no larvae or pupae are present. The size and form of these holes indicate that they can only be caused by larger organisms like birds and/or mammals. The form of the holes points in the direction of birds, rather than mammals. However, we have not seen any birds attacking *Lipara* galls during our investigations, but according to MOOK (1967), a possible predator could be the Blue Tit (*Parus caeruleus*).

Especially in *L. pullitarsis* the contribution of vertebrates to the mortality rate is considerable (table 2), and is higher in comparison with the hymenopterous parasitism. this may be explained by the fact that the galls of *L. pullitarsis* don't contain a hardened gall chamber such as in the other species. When the galls are opened, the larvae of *L. pullitarsis* are found between the soft enwrapping leaves of the gall. The larvae of the other species are situated in the hardened gall chambers, and are therefore much more efficient protected against predators. So the effort to hew out the larvae of *L. pullitarsis* is probably considerable lower for the birds.

The overall mortality rate is lowest in *L. pullitarsis* (table 2). Almost 90% of the larvae, which have survived up to gall formation, attain the adult stage. Highest mortality is due to predation influence. Approximately 30% of the *L. lucens* larvae die due to parasitism or predation. The factors contributing most to the death are parasitism by *S. liparae* (16.40%) and *P. liparae* (6.85%). Mortality rate for *L. rufitarsis* is approximately the same as in *L. lucens* (± 30%). Here however, it are the hymenopterous parasites *Scambus* sp. (13.08%) and *P. melas* (8.72%) which cause the highest mortality.

Acknowledgement

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3. M. ROUARD fait circuler une boîte avec l'Acarien *Varroa jacobsoni* OUD. et fait la communication suivante:

La présence de cet Acarien, redoutable parasite de l'abeille domestique, est connue dans les régions est et nord de notre pays depuis 3 ans. Sa découverte en Entre-Sambre-et-Meuse est de nature à montrer que le pays est en voie d'infestation généralisée.

Varroa jacobsoni OUD.: Daussois (Nr.), IX.1987, leg. H. GUERRIAT.

FAIN, A.: *Bull. Annls. Soc. r. belge Ent., 115, p. 190.*

Assemblée mensuelle du 7 novembre 1987
Maandelijkse vergadering van 7 november 1987

Exceptionnellement, l'assemblée mensuelle du mois de novembre s'est tenue le samedi 7 novembre à l'Institut de Zoologie de l'Université de Liège avec la participation des membres du Cercle des Entomologistes liégeois.

Après la partie administrative et les présentations des différentes communications (que vous trouverez ci-après), M. Ch. JEUNIAUX, Directeur de l'Institut de Zoologie, a présenté les recherches en entomologie réalisées à l'Institut.

Au début de l'après-midi, les participants ont eu le choix entre:
- la visite de l'aquarium et du musée;
- la démonstration du microscope électronique à balayage;
- les communications affichées:
  - « Fourmis et pesticides » de Mme M.-H. DEBOUGE et M. J.-P. THOME
  - « Particularités du tube digestif des Coléoptères Carabidae » de Mme M.-F. VERSALI.

Vers 15 h. s'est tenue la séance plénière pendant laquelle quatre communications ont été présentées:

1. « Destin des *Speonomus* pyrénéens transplantés dans la grotte de Ramioul en 1969 et 1970: démographie et aspects de leur biologie. (Coléoptères Catopidae, Bathyscinae) » par Melle BOUWIR, licenciée en Sciences zoologiques.

2. « Morphologie comparée du squelette thoracique des Insectes » par M. J. BARLET, Docteur en Sciences zoologiques.

3. « Particularités de la faune entomologique du parc national suisse » par Mme N. STIERNET, licenciée en Sciences zoologiques.

4. « Les Pamphiliidae de la faune de Belgique, essai de faunistique comparée » par M. N. MAGIS, Maître de conférence à l'Université de Liège.

Admissions / Toelatingen:

M. René VANDAMME, rue Eugène Toussaint 34/1d/r, 1090 Bruxelles, est présenté par MM. J. VAN STALLE et P. GROOTAERT comme membre associé. M. VANDAMME étudie les Ornithoptères, les Nymphalidae (Amérique du sud) et les Papillionidae.

Communications / Mededelingen:

1. M. P. LAYS présente quelques insectes intéressants qu'il a récolté dernièrement en Malaisie.

1. Femelle de *Duliticola* sp.(Col. Drilidae).

Les caractères néotoniques de la femelle lui a valu la dénomination de « larve trilobite ». Le genre semble endémique à la sous-région malaise. L'exemplaire, long de 28 mm, fut