LOHSE (1989) donne les dessins respectivement de l'édéage et de la spermathèque. Nous y joignons un autre dessin de la spermathèque, vue sous un angle légèrement différent (d'après un des exemplaires de Baudour).

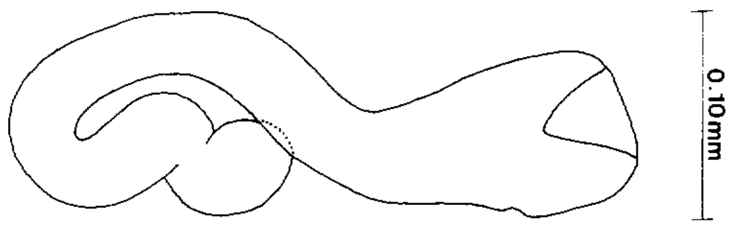

Fig. 2. Trichiusa immigrata LOHSE, spermathèque (longueur: 0,28 mm).

Biologie

L'animal semble avoir une préférence marquée pour les composts chauds, en voie d'active fermentation. Nos quelques captures l'y situent au printemps et en automne (espèce bivoltine?).

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Collembola of the Zonien forest (Province Brabant, Belgium)

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Samenvatting

Kleine bodemvalletjes (Ø 14 mm) werden gebruikt om de oppervlakte-actieve Collembola in 4 locaties van het Zoniënwoud te bemonsteren. In totaal werden 16 springstaartensoorten geïdentificeerd, waarvan 1 soort (Xenyllodes armata (AXELSON, 1903)) *nieuw is voor de Belgische fauna. De meeste soorten behoren tot de families* Isotomidae *en* Entomobryidae. *Kleine bodemvalletjes worden geschikt geacht om een snelle inventarisatie te realiseren van de oppervlakte-actieve springstaartensoorten in verschillende biotopen.*

Summary

Small pitfalls (Ø 14 mm) were used to sample the surface-dwelling Collembola at 4 sites in the Zonien forest. One of the 16 identified species (Xenyllodes armata (AXELSON, 1903)) *is new to the Belgian fauna. The majority of species belong to the families of the* Isotomidae *and the* Entomobryidae. *Using small pitfalls is thought to be a practical method to obtain quick inventories of the surface-dwelling Collembola in different biotopes.*

Introduction

We performed a small survey of the collembolan community in the Zonien forest near Brussels, as part of more extensive ecological research on the Arthropod communities in this ecosystem (e. g. SEGERS & MAELFAIT, 1988; DESENDER *et al.*, 1987). The purpose of the investigation was twofold. Firstly, we had experience with small pitfalls in grasslands only (BLANCQUAERT *et al.*, 1982; BERBIERS *et al.*, 1989), and so thought it useful to study the performance of this sampling method in another biotope. Secondly, the obtained data add to the scarce knowledge on the composition and the distribution of collembolan communities in Belgium (BERBIERS & MERTENS, in prep.).

Material and methods

The collembolan fauna at 4 sites (A, F, K, L) in the Zonien forest was sampled. A set of 20 small pitfalls (glass tubes, ∅ 14 mm, length 65 mm) was dug in the forest floor at each site from May 10 till May 24 1989. Each of the pitfalls was half filled with a 4% formaldehyde solution. The rim of each pitfall was set level with the upper boundary of the A_1-horizon, after careful removal of the litter layer (O_1- to O_2-horizon). In site F only 17 pitfalls were recovered.

Site A is situated in U.T.M. square FS03 (10 x 10 km) and the other sites are situated in U.T.M. square FS02. The soil is loamy at every site, but at sites K and L there is severe compaction in the A_1-horizon, leading to gley formation and waterlogging of the upper soil layer.

Table I: Origin of the leaf litter (count and classification of all identifiable leaf fragments in 2 squares of 400 cm^2 per site), depth of litter layer (10 measurements per site) and pH of the soil at each site.

Sites	A	F	K	L
Origin of leaf litter (% of items)				
beech	1.1	2.3	100	100
hornbeam	18.4	31.2	-	-
birch	32.8	2.3	-	-
pedunculate oak	41.4	63.1	-	-
other	6.3	1.1	-	-
Depth of litter (cm ± S.D.)	2.10 ± 0.6	3.15 ± 1.0	3.20 ± 2.7	2.25 ± 0.6
Soil pH (H_2O)	3.9	4.0	3.7	5.9

Sites K and L are covered with beech (*Fagus sylvatica* L.), but at sites A and F, the vegetation is more mixed and contains chiefly pedunculate oak (*Quercus robur* L.), hornbeam (*Carpinus betulus* L.) and birch (*Betula pendula*) ROTH. Consequently, the litter layer at sites K and L is composed of decaying leaves of *Fagus sylvatica* L. only, while at sites A and F the composition of the litter layer is more heterogeneous (Table I). No marked difference in depth of the litter layer was observed among sites, but the pH of the soil at site L is much higher than at the other sites. This is a lasting effect of extensive liming that took place in 1973.

Results and discussion

In all, more than 1,100 individuals belonging to 16 different species (identification according to GISIN, 1960) were caught (Table II). Seven species belong to the family *Entomobryidae* and 4 species belong to the *Isotomidae*. With the exception of the *Onychiuridae*, which are mainly active in the soil capillaries, all species either have an epigeic or a hemiedaphic life-mode (GISIN, 1943), meaning that they are active on or in the litter layer. Some species (e. g. *Entomobrya albocincta, Entomobrya corticalis, Orchesella cincta)* also dwell on the bark of trees

(BERBIERS & MERTENS, 1988).

Table II: Summary of the captures at the different sites, with reference to species (*) collected by Marlier (1942) in the vicinity of the Rood Klooster (site A).

Species	A	F	K	L	Total
Family *Entomobryidae*					
Lepidocyrtus curvicollis BOURLET, 1839*	277	359	203	66	905
Tomocerus flavescens (TULLBERG, 1871)*	18	26	1	2	47
Entomobrya corticalis (NICOLET, 1841)	42	4	0	0	46
Orchesella cincta (LINNAEUS, 1758)*	11	7	10	3	31
Tomocerus vulgaris (TULLBERG, 1871)*	5	8	0	4	17
Orchesella villosa (GEOFFROY, 1764)*	3	6	0	0	9
Entomobrya albocincta (TEMPLETON, 1835)	8	0	0	0	8
Family *Isotomidae*					
Folsomia quadrioculata (TULLBERG, 1871)*	5	8	7	1	21
Isotoma viridis BOURLET, 1839	10	9	0	0	19
Isotomina bipunctata (AXELSON, 1903)	6	0	1	1	8
Isotomurus palustris (MüLLER, 1776)*	0	5	0	0	5
Family *Poduridae*					
Neanura muscorum (TEMPLETON, 1835)	1	0	0	0	1
Xenyllodes armata (AXELSON, 1903)	0	0	0	2	2
Family *Sminthuridae*					
Dicyrtoma ornata (NICOLET, 1841)	14	1	0	0	15
Sminthurinus aureus (LUBBOCK, 1862)	0	1	0	3	4
Family *Onychiuridae*					
Onychiurus sp.	1	2	1	0	4
Total	401	436	223	82	1,142

The differences in number of species and their individual catch yields among sites (Table II) are probably due to a number of factors. First of all, it is important to note that differences in catch yield of the individual species among sites, as obtained with pitfalls, only partially reflect differences in local abundance (MAELFAIT & BAERT, 1975) and can also result from local differences in locomotory activity of the species.

In general, springtails have a high locomotory activity when the saturation deficit of the air is high, and have a low locomotory activity when the saturation deficit of the air is low (JOOSSE & GROEN, 1970). So, the different catch yield among sites could follow from differences in moisture content of the soil among sites. In particular, the higher moisture content of the soil at sites K and L that is the result of compaction, could explain why the catch yield is lower at these sites.

The observed differences in catch yield, however, could also result from a different litter composition at the different sites (Table I). A more heterogeneous composition of the litter possibly allows for a more heterogeneous fungal flora at sites A and F (TOUCHOT *et al.*, 1983), and hence, as most collembolan species chiefly feed on fungi (VANNIER, 1979), could sustain a more heterogeneous collembolan fauna.

In addition, differences in pH among sites (Table I) could account for differences in overall density or in overall locomotory activity of the species. In soils that are limed, and in which the pH increases, it is commonly observed that the abundance of Collembola decreases (HUHTA *et al.*, 1983).The pH of a soil also affects the locomotory activity of springtails. As MERTENS (1975) showed, the locomotory activity of *Orchesella villosa* is minimal in the pH range of 5 to 8, but increases sharply at a lower pH. So, the higher pH at site L could actually curtail the locomotory activity of the springtails. Taking into account that site L was limed in 1973, our catch data therefore seem to suggest that liming has an extremely long impact on the springtail communities of such a site.

Subsequent to the presentation of a method to sample corticolous Collembola (BERBIERS & MERTENS, 1988), we here present a modified method to sample surface-dwelling Collembola. Compared to sampling with large pitfalls (∅ 10 cm) which sometimes yield large catches (e. g. 4,000 to about 6,000 individuals in one week with sets of 10 large pitfalls, BERBIERS *et al.*, 1990), the catches obtained with small pitfalls are substantially smaller. Using small pitfalls seems therefore an adequate method for providing quick inventories of the surface-dwelling Collembola in woodlands. Such inventories would greatly increase the knowledge on the composition of springtail communities and on the distribution of individual species in Belgium.

The scarcity of data on these subjects is underscored by the finding of *Xenyllodes armata*. This species appears to be new to the Belgian fauna (BERBIERS & MERTENS, in prep.), and was not previously detected by MARLIER (1942) who already collected 24 species of Collembola in the Zonien forest. In all, we add 8 further species to MARLIER's (1942) inventory, but further research is needed to confirm if all species mentioned by MARLIER (l.c.) are still part of the collembolan community of the Zonien forest.

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