

**Zeitschrift:** Mitteilungen der Schweizerischen Entomologischen Gesellschaft =  
Bulletin de la Société Entomologique Suisse = Journal of the Swiss  
Entomological Society

**Herausgeber:** Schweizerische Entomologische Gesellschaft

**Band:** 61 (1988)

**Heft:** 1-4

**Artikel:** An ecological study of Janetiella pyriformis (Berlese, 1920), a phoretic  
Uropodina from decomposing organic matter (Acari : Anactinotrichida)

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**DOI:** <https://doi.org/10.5169/seals-402325>

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## An Ecological Study of *Janetiella pyriformis* (BERLESE, 1920), a Phoretic Uropodina from Decomposing Organic Matter (Acari: Anactinotrichida)

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*Janetiella pyriformis* an obligatory phoretic Uropodina mainly living in manure or compost has been found in Switzerland in the course of a study on the effects of predatory mites on nematodes. The systematical position of *J. pyriformis* (ex *Dinychopsis pyriformis* BERLESE, 1920) is reviewed and discussed. The genus *Janetiella* is redefined and the main morphological characters of *J. pyriformis* are presented. The species possesses two deutonymphal morphs: the phoretic heteromorph stage and the sedentary deutonymphs. Under laboratory conditions the life cycle of *J. pyriformis* requires about three months. The mites were observed feeding on nematodes, but despite their high density they seem to have a rather modest impact on the control of nematodes, as they move slowly and probably also feed on other food resources, such as fungal hyphae.

### INTRODUCTION

Phoresy in mites appears to be an original adaptive strategy which allowed these wingless Arthropods to colonize various specialized microhabitats, often without any connection with the soil, the original habitat of the Acari. Phoresy is a phenomenon in which one animal seeks out and attaches to the outer surface of another animal for a limited time during which the attached animal ceases both feeding and ontogenesis; such attachment resulting in dispersal from areas unsuitable for further development, either of the individual or its progeny (FARISH & AXTELL, 1971). Usually the mites attach to mobile organisms, generally Insects, but also to many other Arthropods, and more rarely to Vertebrates.

Phoresy is frequent in three groups of mites: Acaridida (= Astigmata), Tarsoneimida, and Gamasida (Gamasina and Uropodina). Phoresy seems to have appeared independently in these three tribes, and the holdfast mechanisms are different. In Acaridida, the phoretic instar is a very heteromorph deutonymph, the hypopus. The animal fixes itself to the host by ventral suckers. In Tarsoneimida, phoresy is assured by a female phoretomorph, exhibiting a very strong claw on leg I which permits the mite to attach to the host. In Gamasina, the female is normally the phoretic instar, it clings to the host usually by its claws I. Phoretic females are generally homeomorphic. On the contrary in Uropodina the deutonymph is the phoretic instar: it attaches to the host integument by an anal pedicel. According to the species, the phoretic uropodine deutonymphs are slightly or strongly heteromorphic, the presence of the anal pedicel inducing morphological

specializations of the anal area (ATHIAS-BINCHE, 1975, 1976a, b, 1978, 1984a). Phoresy may be obligatory in species colonizing specialized or unpredictable microhabitats (dung, bat guano, holes of trunks, etc.), it may also be facultative or cyclical. Detailed papers by ATHIAS-BINCHE (1979, 1984a, b, 1987) were devoted to the ecological significance of phoresy in Uropodina.

In soil many free-living Uropodina species are not phoretic. Some euryoecious edaphic forms present deutonymphs with anal specialization, but records of animals attached to hosts are very rare. Phoresy is presumed to be facultative, for instance in *Olodiscus minimus* or *Cilliba cassidea* (ATHIAS-BINCHE, 1976b, 1985). In species colonizing specialized microhabitats, phoresy is obligatory and allows the populations to migrate towards ecologically new biocenoses. In the obligatory phoretic species, all the deutonymphs are phoretic. They are usually heteromorphic. In some cases, sedentary deutonymphs may exist and insure the dynamics of the population in the biotope when it is a slowly evolving one, such as in old or dead trunks. These sedentary deutonymphs may be homeomorphic as *Allodinychus flagelliger* (ATHIAS-BINCHE, 1978), or heteromorphic as *Polyaspis patavinus* (ATHIAS, 1975; ATHIAS-BINCHE, 1976a).

*Janetiella pyriformis*, a species mostly living in manure or rotten wood debris, is a typical obligatory phoretic Uropodina with two types of deutonymphs. It was observed in the course of a research program devoted to the study of the effect of predatory gamasid mites on nematodes and the possibility to use the Gamasina for the control of nematode populations (HABERSAAT, in prep.). As *J. pyriformis* was found in great number in a compost heap, the opportunity was offered to supplement our knowledge of this interesting species.

The present paper deals with a revision of the systematic status of *J. pyriformis*, reviews on its geographical distribution, its biology and its ecology. Its use as control for nematode population is also discussed.

#### MATERIAL AND METHODS

The soil samples were taken in February 1986 from a compost heap composed of daily kitchen waste in a private garden at Frauenfeld (Northeastern Switzerland). The Uropodines were extracted alive either by handsorting or by a modified Macfadyen funnel extractor (BIERI *et al.*, 1978) in glass vials (height 60 mm, diameter 27 mm), filled one third with moistened plaster of Paris to avoid desiccation of the microarthropods. The vials were changed four times a day and the living Uropodina sorted out.

The *J. pyriformis* individuals were mass reared in groups of about 50 individuals in small plastic weighing bottles (height 30 mm, diameter 40 mm) on a mixture of plaster of Paris and charcoal (7:1) after SNIDER & al. (1969). Both, rye grains infiltrated by fungal mycelium, and parasitic nematodes – *Ditylenchus myceliophagus* and *Heterorhabditis heliothidis* – were offered as food. *H. heliothidis*, a nematode attacking the curculionid beetle *Otiorrhynchus sulcatus* F., was added in a water suspension.

In a search for alternative food sources for *J. pyriformis*, 20 *Drosophila* eggs were offered in the mass rearing chambers for two days and inspected for feeding marks.

Some adults were controlled daily and the eggs placed in separate culture cells modified after GOTO (1960) and ABBATIello (1965): glass Petri dishes (height 12 mm, diameter 40 mm) were made tight with a para-rubber ring (outer

diameter 38 mm, inner diameter 30 mm, height 1.5 mm) between the lid and the dish. They were pressed together with a rubber band to avoid desiccation and escape of the mites, especially the juvenile instars. The dish was filled to a depth of 5 mm with a mixture of KeraminS and charcoal (7:1). Hardened with water KeraminS yields a more even surface than plaster of Paris.

The cells were kept at room temperature varying from 20 C° to 22C°. Until hatching of the eggs they were controlled every second day afterwards three times a week.

To study potential antagonists of *J. pyriformis*, individuals were placed together with *Hypoaspis angusta* KARG., a predatory gamasid mite. Ten females of *H. angusta* were starved for two days. Then in each culture cell one proto- or deutonymph and one adult of *J. pyriformis* besides about 500 *H. heliothidis* were added. After three days the Uropodina were checked for predatory injuries.

For behavioural studies the Uropodina were watched under the dissection microscope with cold light.

For identification, specimens were cleared in pure lactic acid and observed under the light microscope (Nomarski interference contrast), using the open slide technique.

Some specimens were studied using the scanning electron microscope. The material was successively immersed in 75, 95 and 100% ethyl. alcohol. Adults were cleaned by means of an ultrasonic apparatus (amplitude: 12  $\mu$  peak to peak during 10 s). Then the specimens were simply air dried before being gold-coated. The electron micro-photographs were made by the senior author, using the SEM of the Centre de Microscopie Electronique, Université de Perpignan, France.

## RESULTS

### *Systematic status of Janetiella pyriformis*

*J. pyriformis* was described by BERLESE (1920) under the generic name *Dinychopsis* BERLESE, 1916, type species *Dinychopsis fractus* BERLESE, 1916 and included in the family Trachyuropodidae.

Reviewing the presently known members of the genus *Dinychopsis*, it appeared that it is in fact composed of two groups of species. The first one corresponds to the *fractus* group, characterized by a flat ovoid body, the second one to more strongly sculptured animals.

The *fractus* group seems to be heterogenous too and may be composed of two types of species:

- the *fractus* group *sensu strictu* is at present composed of only one species, *Dinychopsis fractus*, which is characterized by a very short peritrema and the lack of a hyaline anterior expansion on the female epigynial shields (see HIRSCHMANN & ZIRNGIEBL-NICOL, 1962, table 23, fig. 7).

- the *appendiculata* group, is characterized by a sharp ended chelicera, a long peritrema and the presence of an anterior expansion on the epigynial shield; it is composed of three species:

- *Dinychopsis appendiculata* BERLESE 1910 (see HIRSCHMANN & ZIRNGIEBL-NICOL, 1962, table 29, fig. 4)

- *Dinychopsis insignis* (HIRSCHMANN & ZIRNGIEBL-NICOL, 1962) = *Uroobovella insignis* HIRSCHMANN & ZIRNGIEBL-NICOL, 1962 (tab. 29, fig. 1)

– *Dinychopsis jerzyi* (BÜHLMANN, 1980) = *Uroobovella jerzyi* BÜHLMANN, 1980 (fig. 3 to 24).

HIRSCHMANN (1979a) included a fourth species *Pseuduropoda reticulata*, WILLMAN, 1941, but this placement remains doubtful. HIRSCHMANN (1979b) created the “Stadiengattung” *Appendiculobovella* for that group; this name may be retained despite the fact that HIRSCHMANN did not give a description of the genus, and the suffix *obovella* may refer to the genus *Uroobovella*. The latter genus belongs to a distinct family, very different from the *Dinychopsis* complex.

The group of *J. pyriformis* is composed of two closely related species which were included in two different genera by BERLESE, i.e.:

– *Janetiella pulchella* (BERLESE, 1904), = *Trachyuropoda (Janetiella) pulchella* BERLESE, 1904 (see HIRSCHMANN & ZIRNGIEBL-NICOL, 1962, tab. 26, fig. 1). Later, the systematic status of the subgenus *Janetiella* was extremely confused. We think that it is better to refer this taxon to the *pulchella* group and erect it to the generic level, type species *Janetiella pulchella* BERLESE 1904, because the mem-

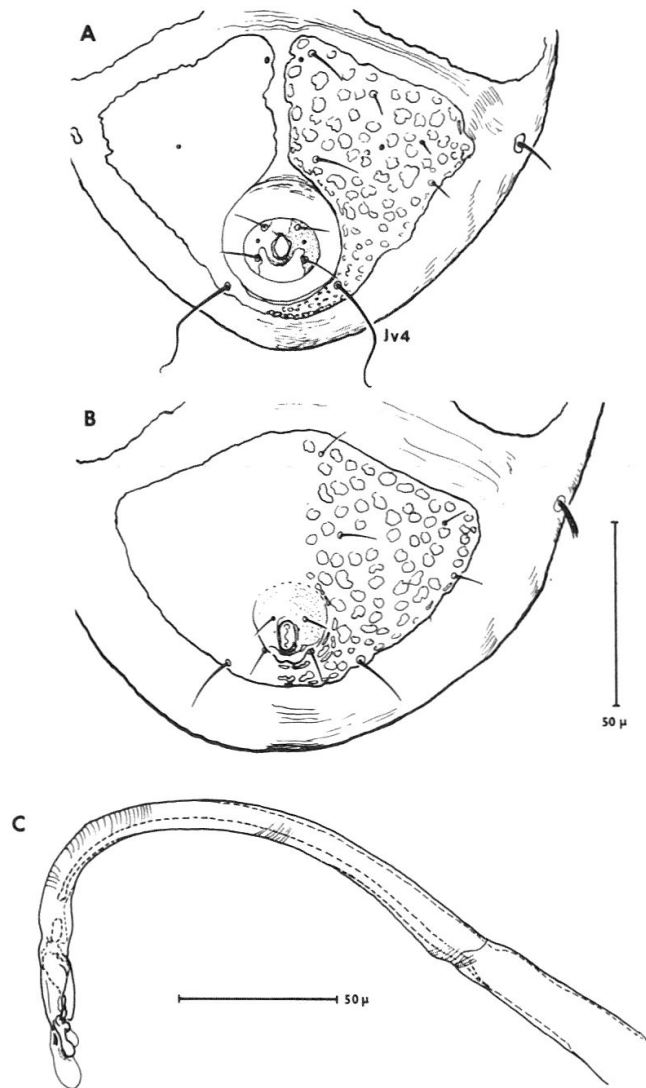


Fig. 1. *Janetiella pyriformis*. A) Phoretic deutonymph, ventro-anal region. B) Sedentary deutonymph, ventro-anal region. C) Female, chelicera, lateral. Scale = 50  $\mu$ .

bers of this genus are distinct from the classical Trachyuropodidae, a family of exclusively myrmecophilous forms, while members of the genus *Janetiella* may be found in various types of habitats.

– *Janetiella pyriformis* (BERLESE, 1920) = *Dinychopsis pyriformis* BERLESE, 1920. According to HIRSCHMANN (1979a) and BLOSZYK (1982), *Trachyxenura penicillata* LEITNER, 1947 could be a synonym. It was found in Austria by LEITNER in manure, the main biotope of this species.

HIRSCHMANN (1979b) created the “Stadiengattung” *Pulchellaobovella* for *J. pulchella*, but for priority reasons, the genus *Janetiella* should be retained.

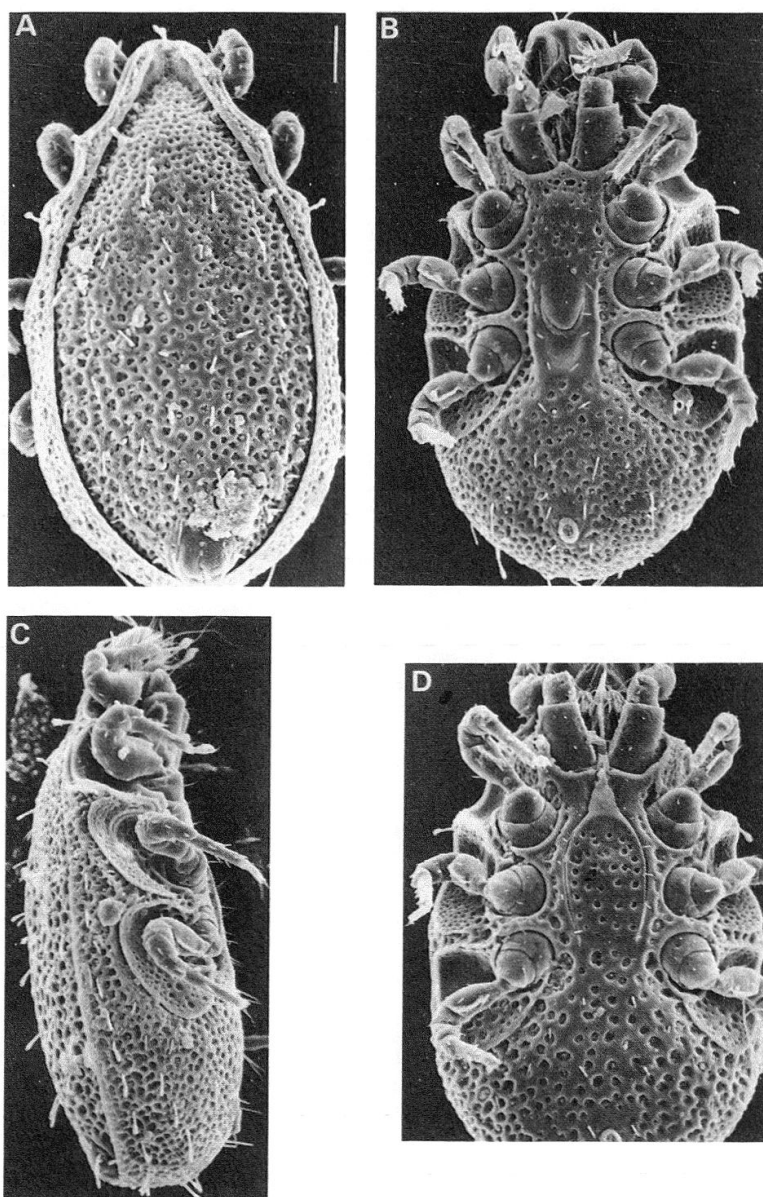


Fig. 2. *Janetiella pyriformis*, adults (x 200, scale = 50  $\mu$ ). A) Female, dorsal. B) Male, ventral, pf: pedofossa IV. C) Female, lateral. D) Female, ventral.



*Brief redescription of genus Janetiella* BERLESE stat. nov.

Type species: *Trachyuropoda (Janetiella) pulchella* BERLESE, 1904.

Detailed pictures of all the instars of this species may be found in HIRSCHMANN & ZIRNGIEBL-NICOL(1962, tab. 30, fig. 1).

All the features of the superfamily Uropodoidea *sensu* ATHIAS-BINCHE & EVANS, 1981.

Body of adults elongate, with a very important vertex (Fig. 2: A, B; Fig. 4: A), peritreme long, curved, forming a loop visible in dorsal view ("shoulders", Fig. 2: A, Fig. 4: A). Pedofossae present, well individualized (Fig. 2: B, C, D; Fig. 4: A). Cuticle strongly sclerotized, with puncta.

Marginal shield present, anteriorly fused with vertical shield, laterally fused with the ventral structures (Fig. 2: A, C). Dorsal shield fused with the vertex. Pygidial part of the dorsal shield gibbose, due to the very posterior insertion of

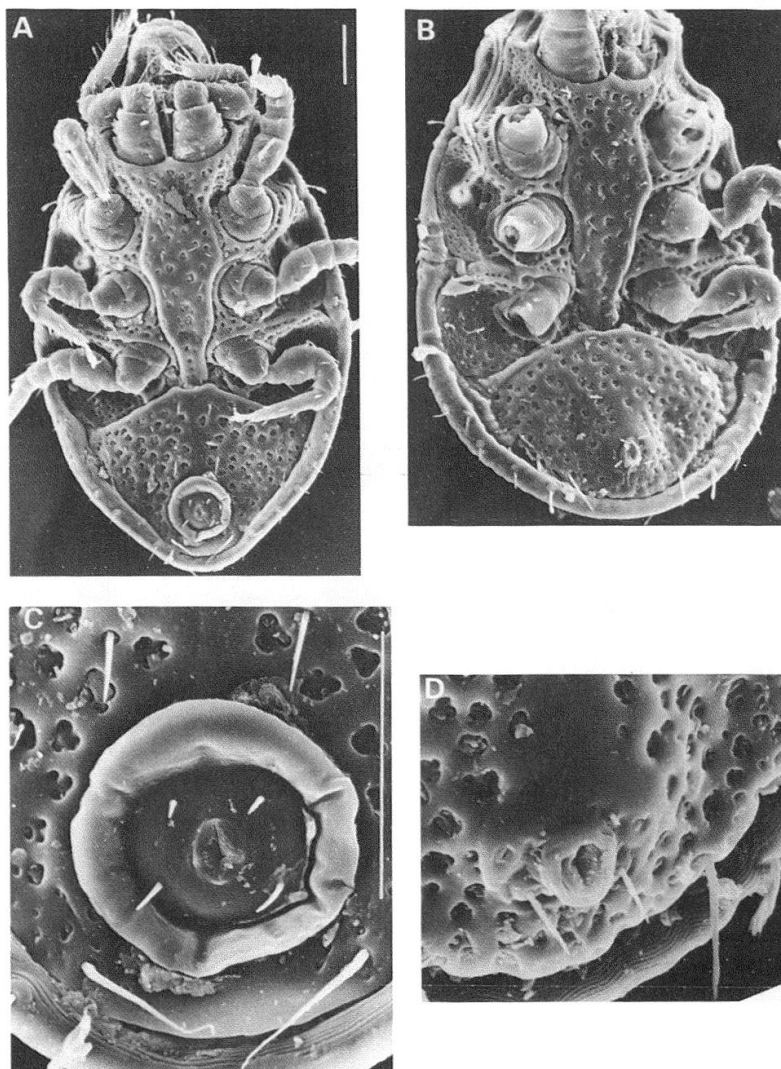


Fig. 3. *Janetiella pyriformis*, deutonymphs (scale = 50  $\mu$ ). A) Phoretic deutonymph, ventral (x 250). B) Sedentary deutonymph, ventral, legs removed (same magnification). C) Phoretic deutonymph, anal area (x 1000). D) Sedentary deutonymph, anal area (same magnification).

the posterior retractor muscles of the chelicera. Dorsum covered with brush-like setae.

Female epigynal shield tongue-shaped, bearing an anterior angulose hyaline expansion (Fig. 2: D; Fig. 4: A).

Presence of a claw on leg I, with a long pretarsus (Fig. 4: A).

Chelicera very long and pliable, of evolved type (Fig. 1: C). Digitus fixus ending by a smooth sensory organ.

As mentioned above, BERLESE placed the subgenus *Janetiella* in the family Trachyuropodidae. However, the Trachyuropodidae constitute a specialized family, mainly associated with ants and exhibiting a very peculiar morphology. It seems better to maintain the genus *Janetiella* in a distinct group which might be related to the *Dinychopsis-Appendiculobovella* complex, but this placement needs further research.

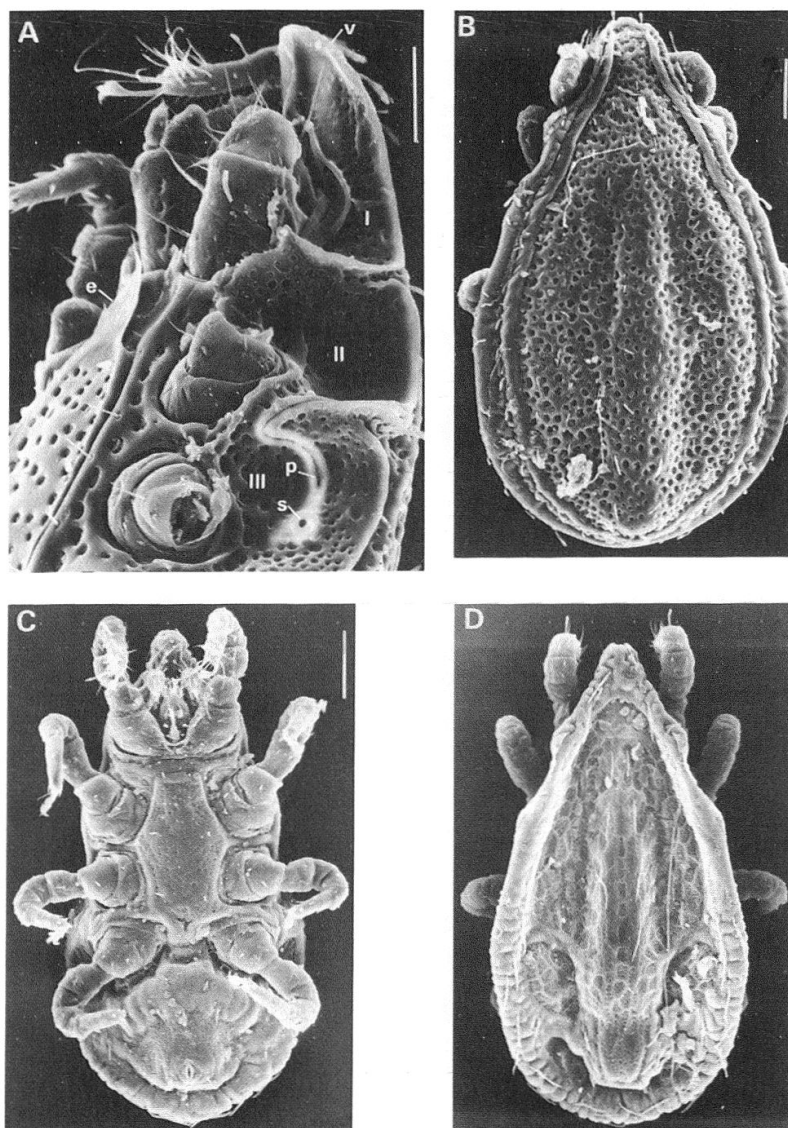


Fig. 4. *Janetiella pyriformis* (scale = 50  $\mu$ ). A) Female, lateral, legs removed (x 400), e: anterior expansion of the epigynal shield, p: peritreme, s: stigma, v: vertex, I, II, III: resp. pedofossae I, II, III. B) Sedentary deutonymph, dorsum (x 250). C) Protonymph, ventral. D) Protonymph, dorsal.



### *Main morphological features of J. pyriformis*

*J. pyriformis* exhibits all the features of the genus. Body dimensions are given in tab. I; no sexual differences in body dimensions were observed in adults. The dimensions given by HIRSCHMANN & ZIRNGIEBL-NICOL (1962) seem to be higher than that noticed by the other authors and us.

As many other obligatory phoretic Uropodina, one can observe two types of deutonymphs: the phoretic and the sedentary morph (Fig. 3; Fig. 1: A, B). The phoretic deutonymph is not very heteromorphic: its body length is equivalent to that of the sedentary morph, it is however slightly more sclerotized. The ventroanal shield of the phoretic deutonymph is more angulose and exhibits an axial zone of desclerotization (only visible in light microscope, compare Fig. 1: A and Fig. 3: A, C; see also HIRSCHMANN & ZIRNGIEBL-NICOL, 1962, tab. 30, fig. 1). The ventroposterior seta *Jv4* is longer in the phoretic morph, and very flexible (Fig. 1: A); its marginal setae are smooth, while they are brush-like in the other morph. The major difference is in the anal area, which is adapted to the production of an anal pedicel in the phoretic morph (Fig. 32: C, D).

The protonymph exhibits a lanceolated dorsal shield (Fig. 4: D); the pygidial shield is bow-shaped and narrow (see HIRSCHMANN & ZIRNGIEBL-NICOL, *ibid*). Its ventral face is characterized by the presence of the outline of pedofossae (Fig. 4: C).

The closely related species, *J. pulchella* is rather less elongated ( $L/w = 1.75$  in *J. pyriformis* and 1.4 in *J. pulchella*), the vertex is less prominent and the body is slightly smaller (381–420 x 265–306  $\mu\text{m}$ )

### *Geographical distribution and habitat preferences*

*J. pyriformis* is a typical European species. It was described from Firenze (Italy) by BERLESE (1920) where it was found in rotten wood debris attacked by xylophagous insects. It was later found in Austria (LEITNER, 1947), Germany (HIRSCHMANN & ZIRNGIEBL-NICOL, 1962), in Romania (HUTU, 1974), in Czechoslovakia (PECINA, 1970), in Lithuania (GHILIAROV & BREGETOVA, 1977), in Poland (BLOSZYK, 1982) and now in Switzerland. This species was never recorded in the Scandinavian area, nor in the British Isles and it seems to be absent in Southern France and Spain. However, as *J. pyriformis* lives in specialized microhabitats, this absence may be due to the lack of appropriate samplings.

From a detailed study of the altitudinal distribution of this species in Poland (BLOSZYK, 1984), *J. pyriformis* was mostly found in plains and more rarely between 500 and 900 m in this country.

Tab. 1. *Janetiella pyriformis*, body dimensions (length  $\times$  width,  $\mu\text{m}$ ) of the studied population and from BERLESE (1920), HIRSCHMANN & ZIRNGIEBL-NICOL (1962) and BLOSZYK (1982).

instar	present study	BERLESE	HIRSCHMANN	BLOSZYK
adult	506x304	500x290	575x350	525x323
phoretic DN	475x275		540x360	
sedentary DN	475x275		555x380	
PN	370x176		400x255	
L	225x137		360x230	

Tab. 2 indicates the different habitats where *J. pyriformis* was recorded. This species is rather fimicolous, but it is also found in rotten wood debris. In Switzerland it was collected to a great amount in a compost pile and the surrounding soil.

Tab. 2. Types of biocenosis where *J. pyriformis* was recorded.

	Authors
Rotten wood	BERLESE 1920
Rotten manure with sawdust	LEITNER 1947
Horse manure with straw	id.
Zoological garden old horse and elephant manure	PECINA 1970
Stable manure	HUTU 1974
Rotten wood	BLOSZYK 1982
Ant hills, bird nests	id.
Soils habitats (parks, woodlands)	id.
Compost	present paper

As many other Uropodina colonizing specialized microhabitats (ATHIAS-BINCHE, 1984a), it is mainly found in biocenoses rich in decomposing organic matter, characterized by an intense microbial activity and very rich in invertebrates decomposers (nematodes, dipteran larvae, microarthropods). This is due to the fact that Uropodina are mainly biolytic feeders, i.e. eating living organic material; consequently they are situated near the end of the trophic chain involved in the decomposing process (ATHIAS-BINCHE, 1981, 1983). In addition, these slow moving mites are not very active predators, such as the Gamasina, and they feed either on microorganisms and fungi or on injured, feeble or slow moving prey. These characteristics imply habitats very rich in such organisms and thus rich in various resources and ecological niches.

*J. pyriformis* seems to be a rather unspecialized phoretic Uropodina, but it is significantly more abundant in biocenoses characterized by an intense decomposing activity. As many other obligatory phoretic forms, it is rare in true edaphic biota such as the litter layer or the humus. As an example, in the course of a survey about the effects of different cultivation methods on the microarthropods of two farms close to Zürich *J. pyriformis* was not found (HABERSAAT, un-

Tab. 3. Frequency of *J. pyriformis* in various types of habitats in Poland ( $F\% = N$  number of samples with *J. pyriformis*/T total number of samples (from BLOSZYK, 1982).

Habitats	N	T	F%
Rotten trunks	17	66	25
Tree hollows	13	54	24
Bird nests	1	73	1.3
Ant nests	1	28	3.5
Soil, xerophilous grasses	1	25	4
Soil, deciduous forests	2	142	1.4
Soil, oak-hornbeam forests	1	45	2.2
Soil, parks	1	60	1.6

publ. data). In addition, the study of BLOSZYK (1982) in Poland demonstrated that its frequency was very low in soil habitats (it is to be noticed that this author did not sample coprophilous-type habitats, see Tab. 3).

For its dispersal as phoretic deutonymph, it may be assumed that Insects are used as vector, presumably xylophagous or coprophilous beetles.

### *Feeding behaviour*

*J. pyriformis*, which possesses very thin and pliable chelicerae, is probably a liquid feeder, as many other Uropodina (ATHIAS-BINCHE, 1981), presumably able to pierce thin or non sclerotized membranes.

Three times an adult and once a deutonymph of *J. pyriformis* were observed feeding on the nematode *H. heliothidis*. The specimens would not actively search for the nematodes, they attack those which came close to them. This behaviour is of the type of the predator "lying in wait for game", this is common in slow moving Acari such as Uropodina (ATHIAS-BINCHE, 1981) which are not true active running predators, such as Gamasina for instance.

*J. pyriformis* appeared not to feed on dipteran eggs, as all the offered *Drosophila* eggs remained untouched. In contrast to many Gamasina, cannibalism was never observed.

Reproduction occurred in cells with the nematodes *H. heliothidis* and *D. myceliophagus* infiltrated on rye grains. As many predatory mites, e.g. Gamasina, Uropodina may feed on fungal hyphae, as a diet complement. It is possible that *J. pyriformis* grazed on fungal hyphae in the culturing cells, but we did not observe such feeding behaviour.

As outlined above, the uropodid predatory forms are only able to attack slow moving preys, such as nematodes. In addition, most of them exhibit very long chelicera. Consequently they usually attack soft-bodied or injured organisms. Predatory behaviour is not uncommon in Uropodina, but they are generally not strict predators as shown by the review of ATHIAS-BINCHE (1981): under laboratory conditions many species may feed both on animal material (preys or boiled egg yolk) or vegetal food (yeast, flour, soil algae, fungal hyphae).

### *Effects of J. pyriformis on the nematode populations*

*J. pyriformis* is abundant (30–100 individuals/l) in the investigated compost heap and they could have some reducing effect on the nematode population. But *J. pyriformis* feeds rather slowly compared to other Gamasina (i.e. *H. angusta*). The sites where it is found indicate that it is probably a thermophilous species and other food resources are likely. Due to these features, it appeared that *J. pyriformis* could not be used as an antagonist of nematode pests in agriculture.

### *Life cycle*

The postembryonic development is composed of 4 instars in Gamasida: larva, protonymph, deutonymph and adult. In the present study we observed the developmental cycle of 10 individuals (Tab. 4). The development of 8 individuals was abortive (1 egg, 3 protonymphs and 4 deutonymphs).

The total development required about 3 months, with a minimum of 2 months and a maximum of 4.5 months. The abortions and the high maximum of developmental time indicate that the animals were not reared under optimal con-

Tab. 4. Average, minimal and maximal time of development from egg to young adult, observed at room temperature (20 to 22 °C) in days.

	egg	larva	protonymph	deutonymph	total
average	9.5	17.6	25.6	29.5	82.2
minimum	8	8	11	26	53
maximum	16	48	38	33	135

ditions, the moultings being delayed in an unfavourable environment (ATHIAS-BINCHE, 1981, 1985).

From the compilation of ATHIAS-BINCHE (1981, 1985), the development duration of the Uropodina ranges from 7.6 months in large species to about 3 months in small forms (temperatures varying from 15 to 20 °C). In rare cases, the development may require only 1 month as in *Leyodinychus krameri*, a species living in stored food, at a temperature of 30 °C, but this short duration may be only due to the high temperature of the laboratory conditions.

The duration of the postembryonic development of *J. pyriformis* is similar to those observed in other small Uropodina. However, in natural conditions and under temperate climate, the development may require a longer time (6 to 9 months for small species according to ATHIAS-BINCHE, 1985) because of low winter temperature and local factors (lack of resources, dryness, etc.). Thus, usually, the populations of free living Uropodina are bivoltine, the total life duration ranging from 7 to 10 months in small species under temperate climate.

#### *Notes on the interactions with the gamasid mite Hypoaspis angusta (Laelapidae)*

*H. angusta* is a polyphagous species. It mainly feeds on nematodes, but also on Poduridae and *Drosophila* eggs. In some cases, it might attack individuals of *J. pyriformis*. Of the 10 tested *H. angusta*, 8 had fed on a proto- or deutonymph, 4 on the adults and 2 on either instar of *J. pyriformis*. The gamasid mite attacked the synarthrodial membranes of the coxal part of the legs. However, these observations were made under laboratory conditions, and it is highly probable that Gamasina rarely select Uropodina as prey – especially adults – under natural conditions. In actual fact, the Uropodoidea (= “Higher Uropodina”) are strongly sclerotized. In addition, Higher Uropodina are able to akinesis (immobility determined by reflexes, i.e. “freezing” of some Arthropods, in danger), during which the legs are ventrally tugged in and protected by the pedofossae; thus the animal becomes very difficult to attack. Endoparasite organisms seem to cause most of the adult mortality (ATHIAS-BINCHE, unpubl. data). However, the immature stages, larvae and protonymphs, are softer than the adults, and predation may play a great role in the juvenile death rate, and consequently, on the dynamics of the total population.

#### CONCLUSIONS

*J. pyriformis* is an obligatory phoretic Uropodina colonizing specialized microhabitats characterized by their richness in decomposing organic matter. It is mostly fimicolous, i.e. living in manure or compost, but it is not very specialized

because it may also be found in rotten wood material. This species appears to be accidental in soil biota and in other specialized biocenoses, such as bird nests or ant hills.

*J. pyriformis* possesses two deutonymphal morphs: the phoretic heteromorphic stage and the sedentary deutonymph. In the obligatory phoretic forms, the presence of a sedentary deutonymph allows to maintain the local population during the dispersal of the phoretic morph in species colonizing slowly evolving biocenoses, such as dead trunks or compost piles (ATHIAS-BINCHE, 1979, 1984, 1987). Thus, as in the case of *J. pyriformis*, numerous generations of the same population may reproduce in the same site during several years and only a proportion of the group migrates. On the contrary, obligatory phoretic species possessing only phoretic deutonymphs are frequently observed in more ephemeral microhabitats, such as dung or small carcasses. In this case, the survival of the population is insured by all the emigrant deutonymphs.

As many other small-sized Uropodina, the life cycle of *J. pyriformis* requires about three months under laboratory conditions. However, the cycle duration might be longer under natural conditions, and it may be assumed that this species is bivoltine *in natura*.

In the course of a study on the effects of predatory mites on the nematode population in compost and manure in Switzerland, we demonstrated that *J. pyriformis* may feed on nematods. But these slow moving mites are not active predators, such as Gamasina, because they are only lying in wait for prey, as many other Uropodina. In addition, they probably feed also on other resources, such as fungal hyphae. Despite their high density in compost and manure, the *J. pyriformis* populations seems to have a rather modest impact on the control of the nematode densities.

As it was stated by ATHIAS-BINCHE (1983), Uropodina do not have a strong direct effect on ecosystems or on specialized microhabitats, because these slow moving mites are neither active predators nor primary decomposers because they are mostly liquid feeders, and in fact, they are situated near the end of the trophic chains. On the other hand, and because of these ecological characteristics, their density and their diversity bears witness to the efficiency of the biological decomposing activity of their substratum.

#### ACKNOWLEDGEMENTS

We wish to thank Dr. J. BŁOSZYK, Poznan, Poland, for giving us valuable unpublished data on the habitat preferences of *J. pyriformis* in Poland. Many thanks to Dr. S. VON BOLETZKY, Banyuls, France and Prof. Dr. V. DELUCCHI, ETH, Zürich for reviewing the English manuscript.

#### RÉSUMÉ

*Etude écologique de Janetiella pyriformis* (BERLESE, 1920), uropodide phorétique des matières organiques en décomposition (Acariens: Anactinotriches).

*Janetiella pyriformis*, un Uropodide phorétique obligatoire décrit de bois morts en Italie a été retrouvé en Suisse au cours d'une étude de l'effet des Acariens prédateurs sur les Nématodes de fumier animal.

La position systématique de *J. pyriformis* (*Dinychopsis pyriformis* BERLESE, 1920) est revue et discutée. Le sous-genre *Janetiella* est brièvement redéfini et élevé au niveau générique. Les principaux caractères morphologiques de *J. pyriformis* sont présentés.



*J. pyriformis* est une espèce médio-européenne. Elle est surtout fimicole, mais se rencontre aussi dans le bois pourri et des milieux riches en matière organique en décomposition. Elle est rare dans le sol ou d'autres biocénoses particulières (nids d'oiseaux, fourmilières). C'est donc une espèce peu spécialisée pour une forme phorétique obligatoire; elle se caractérise par la présence de deux morphes deutonymphaux, la deutonymphe phorétique et le morphe sédentaire. L'existence de deux morphes est fréquente chez les Uropodides des biocénoses à évolution lente. Les formes à deutonymphe phorétique unique sont plutôt caractéristiques des biocénoses plus éphémères. *J. pyriformis*, comme d'autres Uropodides, peut s'attaquer aux Nématodes, mais il s'agit d'une chasse à l'affût et non d'une attaque rapide comme chez les Gamasides. Malgré sa densité importante dans les milieux fimicoles, *J. pyriformis* n'a pas d'impact prépondérant sur le contrôle des Nématodes. Cette espèce semble pouvoir également se nourrir d'hyphes mycéliens. De fait, une forte densité d'Uropodides témoigne d'une grande richesse biologique du milieu, mais ces animaux ont peu d'impact direct sur la structure des communautés. Toutefois, leur présence signale des milieux écologiquement évolués.

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(received May 30, 1988)