The effects of *Folsomia sp* on the amount of mycelium in laboratory cultures of soil fungi.

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Introduction.

During the experimental culture of soil microfauna using culture plates (Springett 1964) it was noticed that there was less fungal mycelium in culture plates containing animals than in similar plates lacking animals. As the action of soil animals on the microflora is their major contribution to the process of decomposition it was decided to test their effect on the amount of fungal mycelium under more rigorous conditions.

Method.

Culture chambers were prepared by pouring 15 ml of three percent soil extract agar into petri dishes and sprinkling the surface of the cooled agar with sieved air dried soil. The plates were moistened with a few drops of live soil solution and incubated at 20°C for two days. The plates were treated in three ways:-

1. 10 plates received 30 Folsomia each
2. 10 plates received 30 Folsomia each but the animals were removed after 24 hours.
3. 10 plates received no animals.

A second series of plates was prepared again using three percent soil extract agar but with 0.03 parts per thousand of rose bengal added to the agar.

Discrete colonies of a green sporing fungus (probably Trichoderma) could easily be counted. Most of the remaining

fungal mycelium formed a web of white hyphae spreading over the soil surface and could not be counted. A subjective assessment of the amount of spreading fungus was made, each culture plate being assigned to one of five classes:-

1. A complete covering of thick hyphae with many fruiting bodies.
2. A complete covering of fine hyphae with some patches of thick hyphae and fruiting bodies
3. A complete covering of fine hyphae
4. Separated patches of fine hyphae
5. Hyphae not visible under a stereomag. microscope at x 16.

Results.

The number of green sporing colonies and the number of animals in the two series of culture plates are shown in figs. 1 and 2. The data from the plates which contained animals for one day only are omitted for clarity as they did not differ significantly from those from the control plates without animals.

There was no significant difference between the treatments on the soil extract agar (fig.1) until the thirteenth day when the number of fungal colonies on the plates without animals increased while that on the plates with animals decreased. The fungal population on the grazed plates continued to fall to a mean level of ten colonies per plate while that on the ungrazed plates rose

to a mean of 60 colonies per plate and then fell to a mean level of 45 colonies per plate. Eggs laid by the collembola started to hatch on day 20 and the Folsomia population continued to increase until the experiment was stopped at 30 days.

The Folsomia population on the rose bengal agar plates died within 10 days. The numbers of fungal colonies on the plates which had contained animals and on the control plates were not significantly different.

The mean classifications of the amount of white spreading fungus on the plates at the end of the experiment are shown in table 1.

Table 1.

The mean classification of white spreading fungus after thirty days.

	Soil extract agar	Soil extract agar and rose bengal
With Folsomia throughout	5	1
Folsomia present one day only	3	3
Control, no Folsomia	2	2

The white spreading fungus was prevented from developing on the soil extract agar plates which contained breeding populations of Folsomia. In both the rose bengal and the soil extract agar series the control plates had a complete web of fine hyphae with patches of thick hyphae and fruiting

bodies. The plates which had had Folsomia present for one day only had a web of spreading fungus but without the thick hyphae and fruiting bodies. The rose bengal plates on which the Folsomia had died were covered with a dense mat of hyphae and fruiting bodies.

Discussion

The activities of Folsomia in soil culture chambers greatly reduce the visible amount of fungal mycelium. The collemboles probably affect their food supply in the same way as any grazing animal; that is, by feeding, trampling, the spreading of seed or spores and the alteration of the substrate. The alteration of the physical and chemical properties of the substrate is probably a major factor in changing the species composition of the microbial decomposers.

Further experiments to determine the effect of soil animals on the ability of the microflora to break down plant litter are in hand. The laboratory experiments indicate that soil animals may have a profound influence on the species composition of the soil microflora and its distribution in the soil as well as on physical and chemical properties of the soil.

Summary.

The amount of fungal mycelium in culture plates with and without breeding populations of Folsomia sp. was recorded. The presence of Folsomia sp prevented the growth of the mycelium.

Acknowledgements.

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References.

Springett J. 1964. A method for culturing. Enchytraeidae Oikos 15 175-177

Captions for figures.

figure 1

The mean number of fungi and animals on soil extract agar plates.

———————— Number of fungi; animals present throughout the experiment. The standard errors of the means are shown.

——.——.—— Number of fungi; animals never present. The standard errors of the means for days 15 to 32 are shown.

. . . . . Number of animals.

figure 2

The mean number of fungi and animals on soil extract agar plus rose bengal plates

———————— Number of fungi; animals present for twelve days.

——.——.—— Number of fungi; animals never present. The standard errors of the means are shown.

. . . . . Number of animals.

fig 2

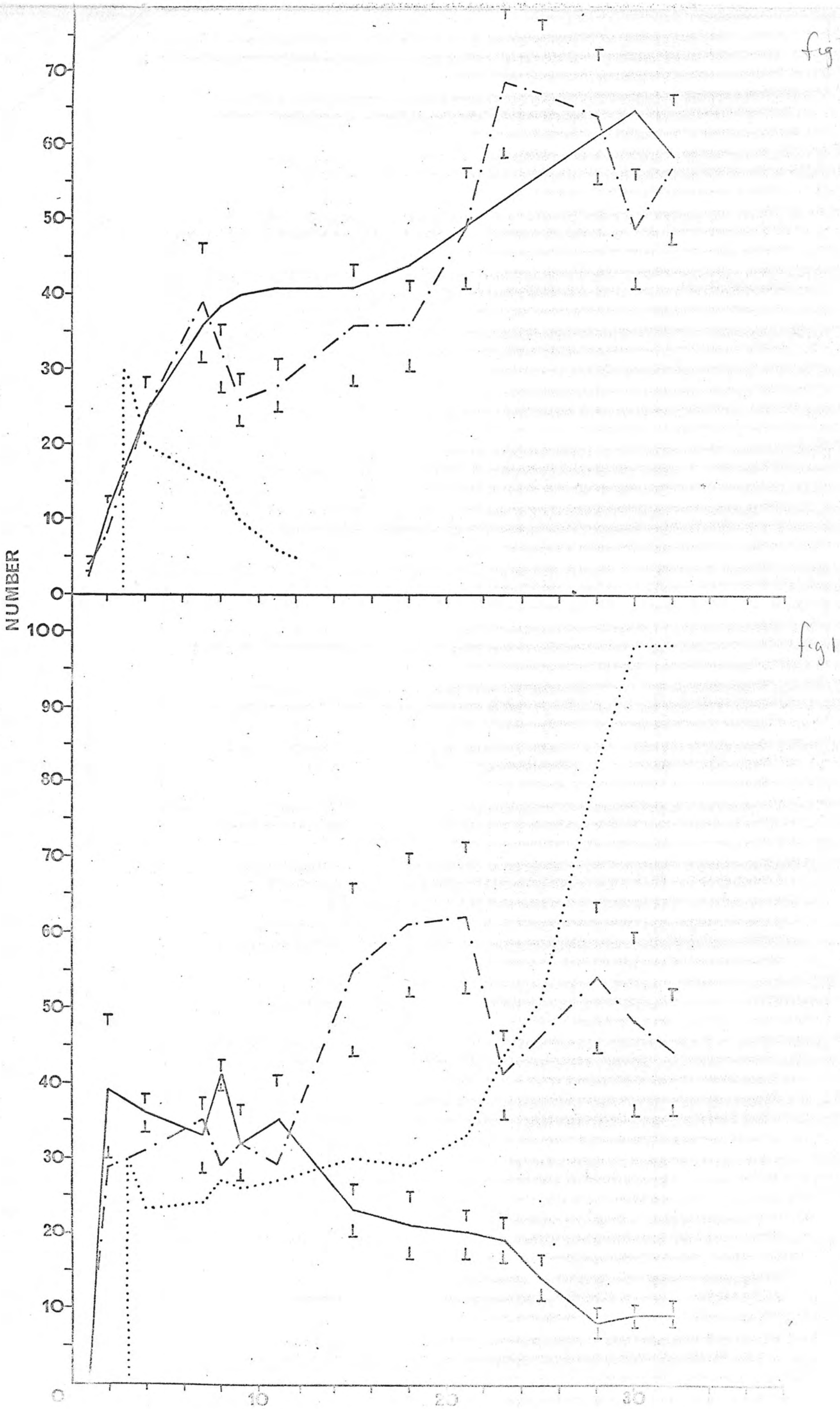

fig 1