SHORT COMMUNICATION

SUSCEPTIBILITY TO DAMPING-OFF IN SEEDLINGS OF *MEDICAGO DENTICULATA* WILLD. AND *M. MINIMA* (L.) BART. DURING THE EARLY POST-EMERGENCE PERIOD*

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Whilst it is recognized that substantial seedling losses can occur in crop and horticultural species from damping-off and similar causes, little attention has been given to this aspect of seedling loss in pasture plants.

This communication presents evidence that two pasture legume species vary markedly in susceptibility to attack from a damping-off fungus and that seedling losses from this cause can be high during the early post-emergence period.

Materials and Methods

Legume species used in this investigation were *Medicago denticulata* Willd. and *M. minima* (L.) Bart.

Three different soils were collected from the Macquarie Region of New South Wales, taken to the Canberra Laboratory, and the field capacity of each was determined.

Two experiments were carried out. In the first, 24 waxed paper cups of approx. 800 ml. capacity, lined with polythene, and filled with soil to within 10 mm of the top, were used. An amount of tap water calculated to bring each soil to its field capacity was added to each pot, and each was maintained at near constant weight for several days. Eighteen germinated seeds were then planted in each, just below the surface. Two pots of each soil were planted with *M. minima* and two with *M. denticulata*. Pots were maintained at near constant weight by daily additions of water. When, on the 9th day after planting, it was observed that the seedlings of *M. minima* were not growing vigorously, populations of both species were reduced to six per pot, and during the next 23 days counts were made of those seedlings that survived.

In the second experiment, pots of soil from the first experiment were re-used after the seedlings had been removed, the soil allowed to dry, and the surface cultivated to a depth of approx. 25 mm beforehand. General procedure was as in experiment 1 excepting that 36 seeds of *M. minima* were planted in each pot. Eighteen on one side were heavily dusted with the fungicide tetramethylthiuram-disulphide (TMTD) before planting, and the other 18 were not. In this experiment no seedlings were removed, and a count of surviving seedlings was kept from the 9th day onwards as before.

* Manuscript received August 27, 1962.

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Results

The survival of seedlings in experiment 1 during the period from the 9th to the 32nd day after planting is illustrated in Figure 1. On all soils the mortality of *M. minima* was very high, reaching 100% on two of them during the first 9 days of counting. There were some losses of *M. denticulata* seedlings during the first 13 days on these same two soils, but of a much lower order of magnitude than for the *M. minima* seedlings. On the remaining soil there was no loss of *M. denticulata* seedlings. Microscopic examination of the stem tissue of seedlings which did not survive showed the presence of abundant fungal hyphae in *M. minima* seedlings, whereas *M. denticulata* seedlings were only lightly infested.

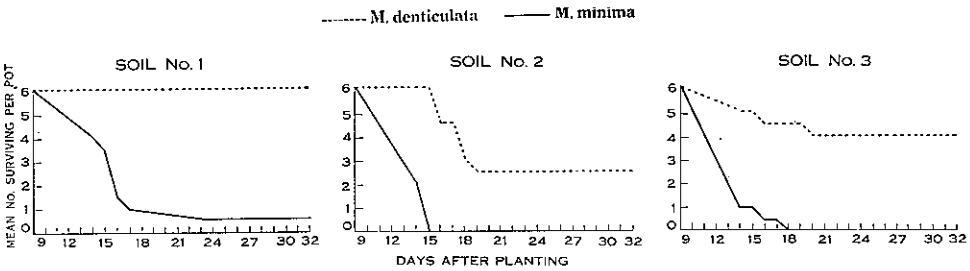

Fig. 1.—Mean number of medic seedlings surviving per pot 9–32 days after planting in three types of soil which were maintained at their respective field capacities.

The effect of TMTD treatment of *M. minima* seeds relative to the untreated control, in terms of seedling survival from the 9th day onward, is shown in Figure 2. Dusting the seeds with TMTD reduced seedling losses, particularly on soil 3.

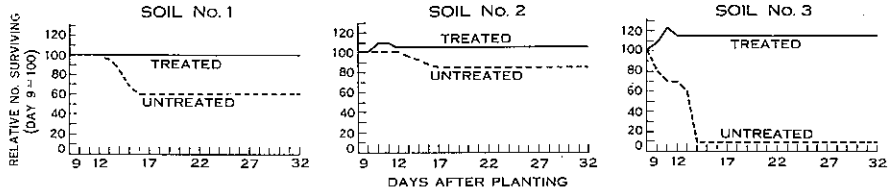

Fig. 2.—Survival of *M. minima* seedlings from treated seeds relative to those from untreated seeds, 9–32 days after planting in three types of soil maintained at their respective field capacities.

Discussion

The presence of abundant hyphae, tentatively identified as *Pythium* sp., in the stem tissue of *M. minima* seedlings suggests that this damping-off fungus was the cause of the seedlings dying, and the fact that the use of TMTD on the seeds reduced seedling losses supports this view. Relatively little fungal infection and the greater survival of *M. denticulata* seedlings growing under identical conditions in the glasshouse indicates that this species is more tolerant of this kind of fungal attack.

In the field (cf. Biddiscombe 1953)* *M. minima* is usually confined to the "puffs" (i.e. crests) of the gilgais, whereas *M. denticulata* occurs mainly in the depressions which are subject to water-logging. This is not inconsistent with the fact that young *M. minima* seedlings are much less tolerant of wet soil conditions than are those of *M. denticulata*.

* Biddiscombe, E. F. (1953).—*Aust. J. Agric. Res.* 4: 19.