

Short communication

Effect of symphyla, *Hanseniella* sp., on establishment of pineapples in south-east Queensland

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Summary

A glasshouse study was made of the effects of symphyla, *Hanseniella* sp., on the development of pineapple plants grown from crowns. Nine weeks after introducing 12, 24 or 48 symphyla per plant into the soil in plant pots, the root systems were reduced by 47.7%, 61.7% and 92.8%, respectively, compared with the undamaged controls. Plants failed to establish where 48 symphyla had been introduced and were severely retarded where 24 symphyla had been introduced.

INTRODUCTION

Symphyla, *Hanseniella* sp., destroy the tender root tips and root hairs of the pineapple plant. In Hawaii, serious loss of yield results if there is a heavy infestation of *Hanseniella unguiculata* (Hansen) at planting (Carter 1967). Poor growth of pineapples in Brazil is also caused by *Hanseniella* sp. (Loureiro and Fortes 1972).

In south-eastern Queensland, crop failures in pineapples have been associated with heavy infestations of *Hanseniella* sp. at planting. Attacked plants, some of which had more than 100 symphyla in the soil around the base of each plant, were slow to establish. The purpose of the present study was to examine the effect of different numbers of symphyla on the development of pineapple plants grown from crowns.

MATERIALS AND METHODS

During 1976-77 a glasshouse trial was conducted at Nambour in south-eastern Queensland. Crowns of the pineapple cultivar Smooth Cayenne were planted in 10 L plastic pots containing a mixture comprising ten parts sandy loam soil to three parts gravel.

The soil was sterilized by fumigation with methyl bromide for 24 h at 200 g/m³ then aired for 72 h before use. Immediately after planting one crown in each pot, 0, 12, 24 or 48 symphyla were introduced to the soil around the base of each plant. There were 12 replications of each treatment. Nine weeks after planting, the number of symphyla recovered from the soil in each pot was counted. The dry weight of the roots and the length of the longest leaf of each plant were also recorded.

RESULTS

The general effect of different numbers of symphyla on root and leaf growth of the pineapple plants is seen in Figure 1. Data on dry root weight and length of longest leaf in relation to symphylid numbers are given in Table 1. From these data it is clear that introductions of 12, 24, and 48 symphyla per plant significantly reduced the dry root weight compared with the control plants. The introduction of 48 symphyla per plant gave a significantly lower dry root weight than all other treatments but there was no significant difference between introductions of 12 and 24 symphyla per plant. The percentage reductions in weight compared with the control plants were 47.7%, 61.7% and 92.8%, for introductions of 12, 24 and 48 symphyla per plant. As with the effect on root development, the introduction of 48 symphyla per plant had the most significant effect on leaf growth. Introductions of 12 and 24 symphyla per plant resulted in significant leaf shortening

compared with the untreated plants but were not different from one another. The percentage reductions in longest leaf lengths compared with the control plants were 8.1%, 16.8% and 33.4% for introductions of 12, 24 and 48 symphyla per plant.

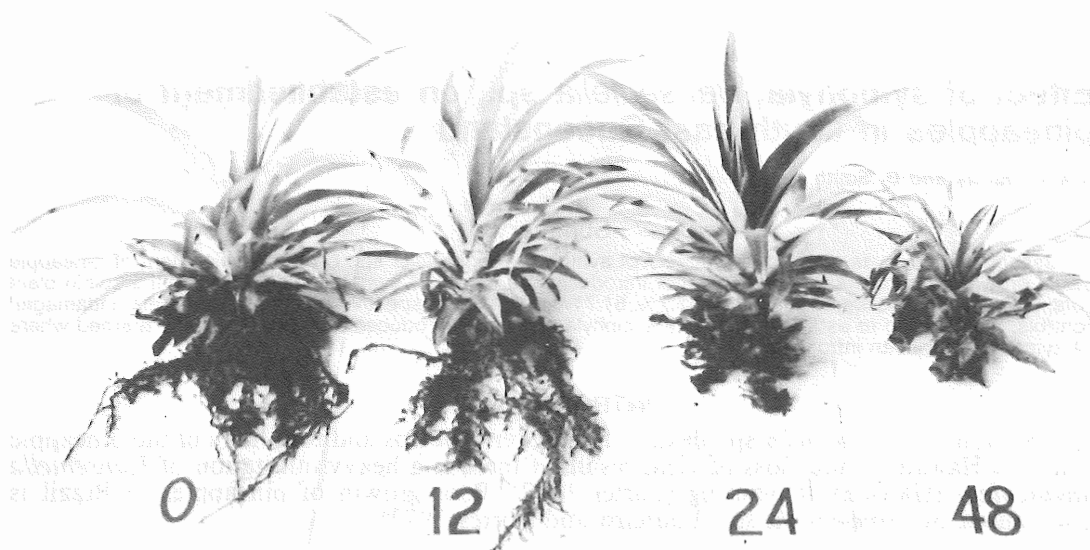


Figure 1. The effect of 0, 12, 24 and 48 symphyla per plant at planting of pineapple crowns on the growth of the plants, as seen after nine weeks.

Table 1. The effect of 0, 12, 24 or 48 symphyla per plant, introduced at planting, on the growth of pineapple crowns, as determined after nine weeks

Number of symphyla introduced at planting	Number of symphyla recovered		Dry weight of roots (g)		Length of longest leaf (mm)
	Trans*	Equiv.	Trans+	Equiv.	
0		0	1.13	2.09	361.2
12	3.29	26.71	0.74	1.09	332.1
24	3.97	53.16	0.59	0.80	300.6
48	4.58	97.97	0.14	0.15	243.4
s.e.	0.18		0.08		17.3
l.s.d. 5%	0.52		0.23		49.9
1%	0.71		0.30		67.1

* Transformation $\log_e x$

+Transformation $\log_e(x+1)$

DISCUSSION

In pots where 48 symphyla per plant were introduced the crowns failed to establish. Establishment occurred where 24 symphyla per plant were introduced but severe root brooming, a characteristic of symphyla damage, resulted in significantly reduced growth (Figure 1). Damage to the young roots and some root brooming occurred also where 12 symphyla per plant were introduced and this number must be regarded as the maximum tolerable at time of planting. Six symphyla per plant are unlikely to affect establishment (Murray and Smith, unpub. data). As numbers of 100 or more symphyla per plant have

been observed under field conditions in association with unthrifty plants having poor root development, it is considered that the importance of this insect as a field pest in south-eastern Queensland should be investigated.

ACKNOWLEDGEMENTS

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References

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Loureiro, M.C. and Fortes, J.M. (1972), *Hanseniella* sp. (Symphyla) nova praga rizofaga de *Ananas comosus* (L.) Merr, no Brasil, *Revista Ceres* 19 (103), 217-221.

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