

Effect of the leucaena psyllid on yield of *Leucaena leucocephala* cv Cunningham in south-east Queensland

R.A. BRAY AND T.D. WOODROFFE
*Division of Tropical Crops and Pastures,
CSIRO, Brisbane, Queensland, Australia*

Abstract

The effect of the leucaena psyllid was measured by comparing yields of plots sprayed with insecticide with those of control plots at Samford, in southeast Queensland. Over four harvests, covering a range of temperature and rainfall regimes, psyllids reduced the yield of edible material by 52%, and yield of stem by 79%. Psyllid infestation had a residual effect by subsequently reducing yield even when psyllids were not present.

Resumen

El efecto del psyllid de la leucaena fue medido mediante la comparación del rendimiento de las parcelas asperjadas con insecticida con las parcelas control en Samford al sur-este de Queensland. Los psyllids redujeron el rendimiento de material comestible en un 52% y el rendimiento de los tallos en un 79% en cuatro cosechas efectuadas bajo un rango de regímenes de temperatura y precipitación. La infestación de los psyllids tuvo un efecto residual que causó una reducción del rendimiento subsiguiente aún cuando no estaban presentes.

Introduction

Since the emergence of the leucaena psyllid as a problem in Florida in 1983, and its subsequent spread throughout the tropical world, severe

damage has been caused to many plantings of *Leucaena leucocephala*, a valuable source of high quality feed for livestock. Although this damage has been assessed in such trials as the international series organised by the Nitrogen Fixing Tree Association (NFTA) (see for example Wheeler 1988) the rating scales that were used do not measure loss of production. To our knowledge, the only published report of the actual reduction in yield caused by the psyllid is that of Palmer *et al.* (1989) who showed that leaf yield could be reduced by up to 40% in the wet tropics. Such estimates are needed in order to assess the economic importance of the psyllid and to assist in assessing the need for further research and/or control measures. This note reports the reduction caused by psyllid infestation in leucaena yield in subtropical southeast Queensland.

Materials and methods

We established an experiment at Samford (27°22'S, 152°53'E) in December 1987 as part of the NFTA series of psyllid resistance trials. Bordering this trial were two guard rows of *L. leucocephala* cv Cunningham, each consisting of a 20 m row of plants at 25 cm spacing. These were cut back to a height of c. 75 cm in March and May 1988, and suffered psyllid attack until that time. In June 1988 we divided each row into 4 lengths of 5 m, (giving 4 replicates of 2 plots each) and thereafter imposed a psyllid-control treatment on one (initially randomly chosen) 5m plot in each replicate. We attempted to control psyllids by spraying weekly with 0.04% dimethoate (Rogor) when psyllids were present. The last spraying was in May 1990. Both the control and treated plots were harvested 4 times (see Table 1) by cutting to a height of c. 75 cm; the green material from the middle 2m of the plot was weighed, and samples taken to estimate edible material (leaf and stem <6 mm diameter), inedible stem (>6 mm diameter), and dry matter percentage. In harvests

Table 1. The effect of the leucaena psyllid on leucaena at Samford as shown by yields of unsprayed leucaena and leucaena sprayed with dimethoate

Growth period	Variable	Yield		Depression in yield
		Sprayed	Unsprayed	
		(g/m row)		(%)
May/88–Nov/88	Fresh weight	1219	644*	47
	Edible DW	474	238na ¹	50
	Stem DW	235	40na	83
Jan/89–Jun/89	Fresh weight	3150	644**	80
	Edible DW	498	167na	66
	Stem DW	434	0na	100
Jun/89–Dec/89	Fresh weight	2656	1300*	51
	Edible DW	603	327*	46
	Stem DW	337	118*	65
Jul/90–Nov/90	Fresh weight	1925	1017*	47
	Edible DW	402	226*	44
	Stem DW	208	92*	46

¹ na indicates a significance test was not possible.

1 and 2, replicates were bulked before sub-sampling. Statistical analysis was by analysis of variance.

Results

The spraying method used was effective in preventing major psyllid damage, although immigrant psyllids from the surrounding unsprayed areas rapidly invaded the sprayed plots. However, damage on these plots was never greater than slight leaf puckering. For the first three harvests the enclosed NFTA experiment showed high levels of psyllid damage either at the time of harvest, or at some time before, leading to various degrees of defoliation. Our control treatment was similarly affected. During the last growth period, following winter, psyllid populations were very low, and negligible damage occurred in the experimental area. Table 1 shows the reduction in yield caused by the psyllid. Over the four harvests, leaf yield was reduced by 52% and stem yield by 79%.

Discussion

Psyllids had a major effect on the yield of leucaena at this site, although levels of infestation varied over the experimental period. The reduction in yield shown in the first three harvests, when psyllids were present, was also apparent in the final harvest in the absence of damaging levels of infestation. This shows that there are long-term effects of psyllid infestations in depressing yield; psyllid-affected plants were less vigorous, shorter, and had thinner stems than the non-affected ones. In other situations, such as where leucaena is grown for fuel wood, the drastic reduction in wood production (i.e. stem) would also be of great importance.

References

- PALMER, BRIAN, BRAY, R.A., IBRAHIM, TATANG M., and FULLOON, M.G. (1989) The effect of the leucaena psyllid on the yield of *Leucaena leucocephala* cv Cunningham at four sites in the tropics. *Tropical Grasslands*, **23**, 105–107.
- WHEELER, R.A. (1988) Leucaena psyllid trials at Waimanalo, Hawaii. *Leucaena Research Reports*, **9**, 25–29.