

## Economic Status of Neem Cake Mulch for Termite Control in Groundnut

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Termites are a serious pest of groundnut throughout the semi-arid tropics, particularly when rainfall is sparse during the growing season (Wightman et al. 1990). Termites damage or kill plants by boring into the roots and stems, destroy foliage, and damage the pods by piercing the shell or by removing the corky material between the strands of vascular tissue (scarification). The complete destruction of crops has been observed throughout Africa where it is often associated with drought. Pod damage increases the risk of an infection of *Aspergillus* spp that can lead to mycotoxin (aflatoxin) buildup during on-farm or commercial storage (McDonald and Harkness 1967).

Farmers in Africa also suffer up to 40% crop loss caused by termites during the time the harvested crop dries in field. Experiments at ICRISAT Center showed that plants stacked for drying could be protected from termites by piling them on a mulch of neem cake or chopped *Ipomaea fistulosa* branches (Gold et al. 1989).

Following this observation, a neem cake mulch was evaluated for its ability to protect the pods of growing plants from termite attack. This experiment was carried out because the only effective insecticidal treatments available for protecting groundnut plants from termites are centered on chemicals that are either banned or are highly toxic to mammals (e.g., phorate).

The test field had a long history of termite incidence. It is located in an area of low fertility Alfisol that receives no inputs other than those needed to sustain the termite population (straw, cut weeds, and other organic trash). The main species present are *Odontotermes obesus*, *O. brunnei*, *O. wallonensis*, and *Microtermes obesi*. Groundnut cultivar ICGS 44 was sown on five 1.5-m wide raised beds on 29 Jun 1990 with four rows bed<sup>-1</sup>. Sowing was carried out at a spacing of 15 cm between plants and 30 cm between rows. The beds were 100-m long and were divided into twenty 5-m long plots. Half the plots were treated with neem cake at 100 kg (30 m<sup>2</sup>)<sup>-1</sup> after sowing. This gave a neem cake layer of about 2-cm thickness across the bed. The rate was based on previous experience (Gold et al. 1989). Mulch disappeared by 6 weeks after sowing, presumably by the action of persistent and often heavy rain. It was repeated 40 days after crop emergence (DAE).

Termite activity was monitored by counting the termites associated with 20 cm × 30 cm long bamboo pegs that were lightly covered with soil in each plot. The mulch had no effect on the insects living on the foliage (jassids, thrips, and the groundnut leaf miner). The crop was harvested late (at 150 DAE) to increase the possibility of scarification.

After 40 days, a greater percentage of bamboo pegs had been attacked in the treated plots than in the nontreated plots (Table 1), although this equilibrated at a high level by 80 DAE. There was no significant difference between the number of termites on baits in the two treatments. Neem cake reduced the proportion of pods scarified by 14.3% and increased the pod yield significantly.

However, the yields were low, reflecting the non-improved nature of the soil, so that the increase of 0.11 t pods ha<sup>-1</sup> did not compensate for the high cost of the treatment. The purchase price of the two applications of neem cake, at Rs 1.6 kg<sup>-1</sup> was Rs 67 000 ha<sup>-1</sup>. If the pods were sold for Rs 10 kg<sup>-1</sup>, the two neem cake applications would have to increase the pod yield by 6.7 t ha<sup>-1</sup> to compensate for the cost of this input under the conditions of this experiment. This excludes transport and application costs.

In conclusion, a small benefit in terms of the yield of nondamaged groundnut pods was achieved by mulching a termite-prone groundnut crop with neem cake. How-

**Table 1.** Influence of neem cake mulch [two applications of 100 kg (30 m<sup>2</sup>)<sup>-1</sup>] on termite incidence and damage (scarification) in a groundnut field, ICRISAT Center, rainy season 1990.

	Termite incidence (numbers <sup>1</sup> ) ± SE	
	Neem cake mulch	Control no mulch
Bamboo baits attacked (%)		
40 DAE <sup>2</sup>	57.5±5.2	39.5±4.7 <sup>3</sup>
80 DAE	94.5±2.9	97.5±0.8
Termites bait <sup>-1</sup>		
40 DAE	2530±457	2070±527
80 DAE	1380±333	1150±197
Pods scarified (%)	42.4±2.0	56.7±3.9*
Pod yield (t ha <sup>-1</sup> )	0.46±0.04	0.35±0.01

1. Mean of data from 10 plots treatment<sup>-1</sup>.

2. DAE = days-after-crop emergence.

3. Significant at  $P = 0.05$  (Student's 't' test).

ever, the mulch proved labial, it appeared to increase the early-season termite population and gave no economic benefit. There was no evidence that insects other than termites were influenced by the treatment. We would not recommend farmers to apply this mulch to groundnut crops for termite control and yield enhancement unless they have a source that is cheaper. We believe that neem cake may still play a part in protecting the drying crop from termites.

## References

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