

Box No: 16

## Mulching Effects on Termite Scarification of Drying Groundnut Pods

C.S. Gold, J.A. Wightman, and M. Pimbert (ICRISAT Center)

Termites are important pests of groundnut in Africa and Asia. Plant mortality and/or reduced yields result(s) from tunneling in tap roots and stems, defoliation, attack of pegs, scarification of pods--with associated increases in aflatoxin contamination; (see cover photo), and consumption of drying haulms.

Termites are social insects with high reproductive rates. The location and destruction of subterranean nests is difficult while mortality to foraging termites may have little effect on colony size and provide only limited control. Therefore, termite control has relied heavily on prophylactic barriers through application of persistent chemical insecticides. Concern about harmful side effects to human beings and the

environment has created an interest in alternative control measures.

This paper reports results from a preliminary trial using mulches to protect drying groundnut pods against scarification by *Odontotermes* spp and/or *Microtermes obesi*.

Five treatments (a bare ground control, and mulches of sunn hemp, *Celosia argentea*, neem cake, and *Ipomoea fistulosa*) were placed in a split-plot design with 20 replications. Three-hundred g of groundnut pods (cv Robut 33-1) were placed either on, or mixed in, mulches while pods were placed directly on the ground in control plots. Plot size was 2 x 0.5 m. Mulch depth was 2.5 cm for neem cake and 5.0 cm for the other treatments.

Presence or absence of termites in study plots was noted on three occasions (29, 36, and 49 days after mulching) (Fig. 1). Termites were present in 50 to 70% of control plots (presumably attracted by groundnut pods). Termites were rarely present in neem cake and uncommon in *Ipomoea* mulches. In contrast, both genera of termites fed on sunn hemp leaves and were encountered in all plots containing this mulch. Termites were common initially in *Celosia* plots but declined at later sampling dates. Termites did not appear to feed on *Ipomoea* or *Celosia*.

Scarification was observed soon after pods were placed in the field and, presumably, continued for the duration of the trial. Both *Odontotermes* and *Microtermes* were observed within sheeting of scarified groundnut pods suggesting that both genera are responsible for scarification. Pods were collected 49 days after mulching and scored 0 - 4 (where 0 = no damage, 1 = 1-25%, 2 = 26-50%, 3 = 51-75%, and 4 = 76-100% damage) for scarification levels. Analyses were conducted on percentage of pods with scarification and damage levels.

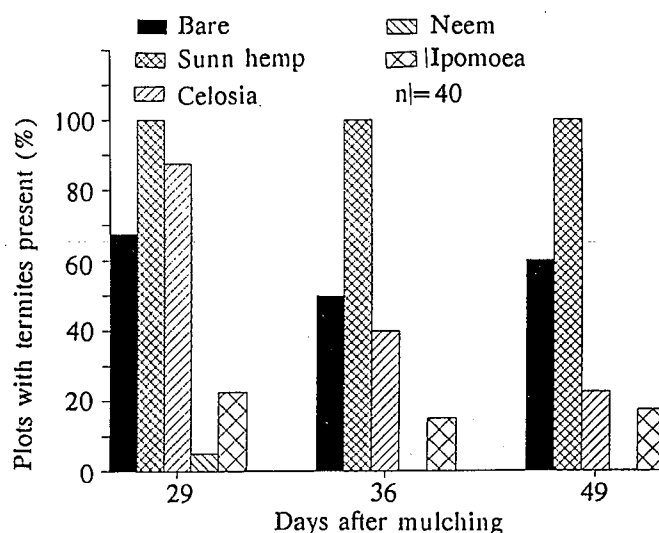


Figure 1. Termite incidence in control and mulched plots.

Damage to groundnut pods in the neem cake and *Ipomoea* treatments was negligible (Table 1). In contrast, 36% of the pods in the control plots were scarified with an average 22% of the surface area (for all pods) damaged. Sunn hemp mulches increased termite damage, relative to control plots, while damage in *Celosia* mulches was intermediate. Additionally, damage levels were lower for pods placed on top of, rather than mixed in, the mulches.

Low levels of termites in neem cake and *Ipomoea* mulches suggest these substances act as repellent barriers between the soil and groundnut pods. The absence of termites 49 days after mulching and negligible scarification levels in the same treatments further suggest that these effects may persist over

many weeks. If so, this would be an important property since termites are primarily "end of season" pests. Mulches incorporated into the soil at planting might later protect groundnut pods from termite attack.

Studies are currently being conducted at ICRISAT Center to elucidate the mechanisms by which neem cake and *Ipomoea* may reduce termite damage and how these findings might be applied to farmers' fields.

**Table 1. Termite damage of groundnut pods in different mulch treatments at ICRISAT Center, Jan to Mar 1989. (Split-plot design, n = 20).**

Position of pods	Pods scarified (%)	Scarification rating <sup>1</sup>
On top of mulch	20 (.21) <sup>2</sup>	0.50
Mixed in mulch	28 (.31)	0.75
F value	27.34**	24.39**
SE	±(.01)	±0.04
CV (%)	50.8	58.2
Treatment		
Bare ground	36 (.37)	0.88
Sunn hemp	59 (.66)	1.69
<i>Celosia</i>	17 (.17)	0.38
Neem cake	2 (.02)	0.04
<i>Ipomoea</i>	7 (.07)	0.14
F value	156.35**	118.67**
SE	±(.02)	±0.06
CV(%)	(54.7)	63.1

1. Scored on a scale of 0 to 4, where 0 = no damage; 1 = 1-25%; 2 = 26-50%; 3 = 51-75%; 4 = 76-100% of shell scarified.
2. Numbers in parentheses: arcsine transformed values of radians.