

production, subsidy levels of 97 and 99 percent, respectively, would be required.

The results of this modeling exercise must be regarded as provisional until validated by field trials, but the apparent economic attractiveness of the hypothetical *Leucaena*/rice alley cropping system would seem to justify the research attention of agronomists.

## Live mulch systems

Live mulch crop production involves planting a food crop directly into a living cover of an established cover crop without tillage or destruction of the fallow vegetation. This incorporates the soil conservation features of organic mulch and no tillage and has the advantage of smothering weeds and contributing N in the case of a legum live mulch.

**Weed competition, tillage and ground cover.** Observations in 1980 showed marked differences in weed biomass due to the weed control method and ground cover type in maize. Although the field dry weight of maize stover used as ground cover averaged 10 t/ha, this was not enough to completely eliminate weed growth. Weed biomass was identical in the unweeded check of the conventional and no-tillage plots, and these were significantly higher than in the unweeded check of the live mulch plots (Table 48).

**Table 48. Effect of weeding frequency and ground cover on weed competition and maize (TZE 4) yield (IITA, 1980 First season).**

Ground cover	Weed control	Weed D. wt. (t/ha)	Grain yield <sup>1</sup> (t/ha)
Conventional tillage	Weed free	0 c	1.54 cde
	Weed × 2	0.8 b	1.65 cde
	Unweeded check	1.49 a	1.05 e
No tillage	Weed free	0 c	2.57 a
	Weed × 2	0.83 b	2.43 ab
	Unweeded check	1.4 a	1.84 bcd
Maize stover	Weed free	0 c	2.27 ab
	Weed × 2	0.91 b	2.39 ab
	Unweeded check	1.31 a	1.56 cde
<i>Arachis repens</i>	Weed free	0 c	1.36 de
	Weed × 2	0.27 c	1.52 cde
	Unweeded check	0.31 c	1.32 de
<i>Psophocarpus palustris</i>	Weed free	0 c	2.63 a
	Weed × 2	0.05 c	2.50 a
	Unweeded check	0.11 c	2.14 abc

Average stand concent of  $50.27 \times 10^3$  pl/ha.

<sup>1</sup>Means followed by the same letter in the same column are not significantly different at the 5% level of the New Duncan's Multiple Range Test.

The unweeded check, live mulch plots had fewer weeds at harvest than in each of the conventional and no-tillage and maize stover plots that were weeded twice. Uncontrolled weed growth significantly reduced the maize grain yield in the conventional and no-tillage and maize

stover plots but not in the live mulch plots. These results confirm the finding of last year that live mulch crop production has potential for minimizing the need to control weeds in maize. The highest maize yield was observed in a live mulch plot in which *Psophocarpus palustris* was maintained.

High maize yields in this live mulch cover were not related to weeding treatment. On the other hand, comparable yields were obtained in no-tillage and maize stover plots that were weeded at least twice. Yield in the conventional-tillage plots was significantly reduced even when the plot was kept weed free.

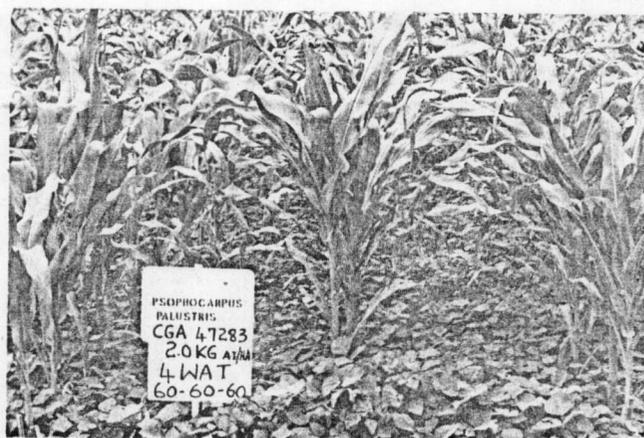
**Ground cover and N fertilization.** The effect of ground cover on the N fertilizer requirement of maize was investigated. All plots received a blanket application of 30 kg P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O/ha. Maize responded to varying levels of N fertilizer applied in the conventional and no-tillage and maize stover plots but not in the live mulch plot in which *Psophocarpus palustris* was the ground cover (Table 49).

**Table 49. Effect of N fertilizer level and ground cover on maize (TZE 4) yield (IITA, 1980 First season).**

Ground cover	N-fertilizer (kg/ha)	Grain yield (t/ha)
Conventional	0	1.24 d <sup>1</sup>
	60	1.49 cd
	120	1.51 cd
No-tillage	0	1.63 cd
	60	2.70 a
	120	2.51 ab
Maize stover	0	1.74 cd
	60	1.98 bc
	120	2.49 ab
<i>Arachis repens</i>	0	1.09 d
	60	1.72 cd
	120	1.45 cd
<i>Psophocarpus palustris</i>	0	2.47 ab
	60	2.39 ab
	120	2.41 ab

Average stand count of  $50.6 \times 10^3$  pl/ha

<sup>1</sup>Means followed by the same letter in the same column are not significantly different at the 5% level of the New Duncan's Multiple Range Test.



**Typical live mulch stand in one of the field experiments in 1980.**