
**PARTIONING OF FERTILITY AND COMPETITION EFFECTS OF A
Gliricidia sepium x *Zea maise*
AGROFORESTRY SYSTEM ON SLOPING HIGHLANDS IN THE MID-COUNTRY
WET ZONE OF SRI LANKA**

¹W A J M Costa and ²A G Chadrapala

¹Department of Crop Science, Faculty of Agricultura, University of Peradeniya

²Natural Resource Management Centre, Faculty of Agriculture, University of Peradeniya

Contour hedgerow intercropping (HI) is an agroforestry system recommended to improve soil fertility and sustain annual crop yields on the steep lands of humid central highlands of Sri Lanka. The objective of the present experiment was to quantify the overall tree-crop interaction (TCI) by partitioning the positive fertility effect (F) and the negative competition effect (C) of *Gliricidia sepium* hedgerows on maize (*Zea mays* L.) grown in a HI system on a sloping (35%) land at Peradeniya in the mid-elevation (479 m above sea level), humid (rainfall of 2000 mm/yr) zone of Sri Lanka. The experimental treatment structure consisted of two hedgerow intercrops with (H_m) and without (H_o) tree prunings added as mulch and two sole maize crops with (C_m) and without (C_o) mulch. The highest maize yields were obtained in C_m whereas C and H_o had the lowest with no significant difference between them. H_m had an intermediate yield. The overall TCI was positive (ranging from 26 to 112% depending on the method of estimation of C) because of substantially positive F (85 to 94%) which outweighed the predominantly negative C (-67 to +18). Mulching increased the availability of P and K to maize and increased soil pH. Mulching also decreased soil N and K and increased soil P during the cropping season. There was significant competition for light by hedges, especially near the hedgerows. However, positive effects of mulching ensured greater crop growth and radiation interception away from hedges. Soil water (SW) depletion from top layers (0-30 cm) was highest in H_o. Within mulched treatments, H_m showed lower SW depletion than C_m during the first 10 weeks showing the shading effect of hedges. However subsequently, H_m had greater SW depletion than C_m indicating greater SW extraction which was confirmed by SW depletion in deeper (30-110 cm) layers. Based on inter-treatment variation of nutrients, water and radiation, it is concluded that in the present situation, the fertility effect of hedgerow prunings exceeded the competition effects of hedges.