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COVER CROP TRIAL

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Cover crops are grown primarily to reduce soil erosion. They quickly establish a leafy canopy that protects soil against raindrop impact. Protected tropical soil often has a higher infiltration rate that reduces runoff while supplying the fresh water lens.

Cover crops, (sometimes called living mulches), also protect soil against the drying effects of direct sun, allowing soil to stay damp and teeming with microscopic life. Cover crops also help keep noxious weeds like mimosa from growing in the plantation. Some cover crops, particularly nitrogen-fixing legumes, can be plowed into the soil when they are young and succulent in order to add organic matter. This is called green manuring.

With over 2800 mm (110 inches) annual rainfall and steep cultivated slopes, American Samoa can benefit by using cover crops to control soil erosion and runoff at susceptible sites. The purpose of this study is to identify suitable cover crops for American Samoa.

Materials and Method

Seed of six cover crops was supplied by the United States Department of Agriculture's Soil Conservation Service's Plant Material Center at Hoolehua, Hawaii. The crops were: buckwheat (Fagopyrum esculentum), annual rye grass (Lolium multiflorum), rape (Brassica napus), vetch (Vicia dasycarpa), calopo (Calopogo-

nium coeruleum), and sunnhemp (Crotalaria juncea). (The latter three crops are often used as green manures).

Seeds were sown 03AUG87 by hand broadcasting on a damp, newly plowed, level, stony clay loam at a rate of 67 kg/ha (60 lbs/A), except for rape. Because of a shortage of seed rape was sown at a rate of 15.2 kg/ha (13.6 lbs/A). Seeds were gently hoed into the soil. A Randomized Complete Block Design with four replications was used, with each replicate on a 1.8 m x 1.8 m (6 ft x 6 ft) plot. No soil amendments were added, nor was irrigation used

Results and Discussion

After one week most seedlings were 25 to 75 mm (1 to 3 in) tall except for calopo, which had apparently not germinated. A damp blotter test on calopo seeds resulted in 88% germination after one week. Because of the author's unfamiliarity with calopo seedlings, they may have germinated in the field during the first week but were confused with the many weed seedlings which also sprouted. By 28AUG calopo seedlings were identified in the field.

Before the third week buckwheat had 2 to 3 heart-shaped leaves on stalks bearing small white flowers.

This vigorous initial growth soon slowed as a brief period of drought began in late August, (Figure 1). Throughout September many of the cowpea crops withered and died and were overtaken by weeds when rains again fell later in the month. Only sunnhemp

fully survived the drought and excluded weeds. The broad leaves of rape were seriously infested by leaf-eating insects. By mid-October sunnhemp was the sole cover crop in the field. Its shallow roots were nodulated with rhizobia and its bright yellow flowers were in bloom. These flowers still bloom at present on 2.5 m (8 ft) stalks, but have not yet to bear seed

Conclusion

Of six cover crop species sown near the beginning of a brief drought, only sunnhemp survived and flourished. The others may have flourished had the drought not occurred to stress them, but none excluded weeds as well as sunnhemp. Though rape may at first be seen as being at a disadvantage in being sown at a rate of about one-fourth the other cover crops, this is not so. Rape seeds are small and light, containing more seed per unit weight than the other cover crop seeds. The rate used is the recommended one. Besides, the susceptibility of this cover crop to insect pests and the possibility of it serving as an alternate host to Brassica spp. pests preclude its acceptance in American Samoa.

Sunnhemp is clearly the cover crop of choice for American Samoa. It grows vigorously in extremes of rainfall, gives excellent weed control, adds nitrogen to the soil, has no obvious pests, and can serve as an ornamental. Observation will continue in the hope of collecting seed from this experimental stand for further propagation and distribution to interested farmers

Acknowledgement

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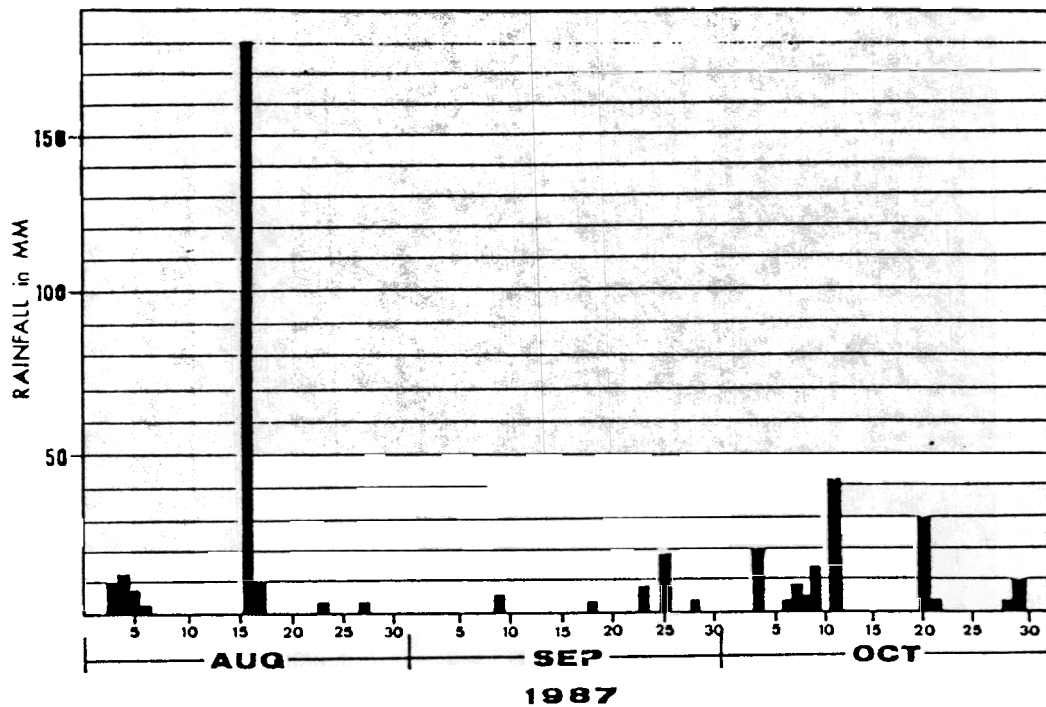


Figure 1. Rainfall record at the Land Grant Experiment Station at Maleimi, American Samoa, August through October, 1987. Total rainfall for AUG: 229 mm (9.0 in); SEP: 36 mm (1.4 in); OCT: 135 mm (5.3 in). The mean monthly rainfall for AUG through OCT as recorded at Pago Pago Airport between 1960 to 1980 is 187 mm (7.36 in), 170 mm (6.68 in), and 289 mm (11.37 in), respectively.