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Growing *Calopogonium Mucunoides* as a solution to Soil Erosion on the West Coast

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The increasingly devastating effects of uninterrupted soil erosion is perhaps nowhere more patent in this country than in the rolling topography of the South-West Coast of India exposed to an annual rainfall ranging from 100 to 200 inches. While expensive measures of soil conservation like contour bunding, bench terracing etc. are being formulated and carried out under National Plans as well as under the auspices of State Governments separately at very considerable cost, it may sound as fantastic to claim that soil erosion on the slopes of Western Ghats even with over 160 inches of rainfall need cause no concern and involve no expenditure exceeding Rs. 5/- per acre. That the above is neither a miracle nor an exageration would be clear from the following account.

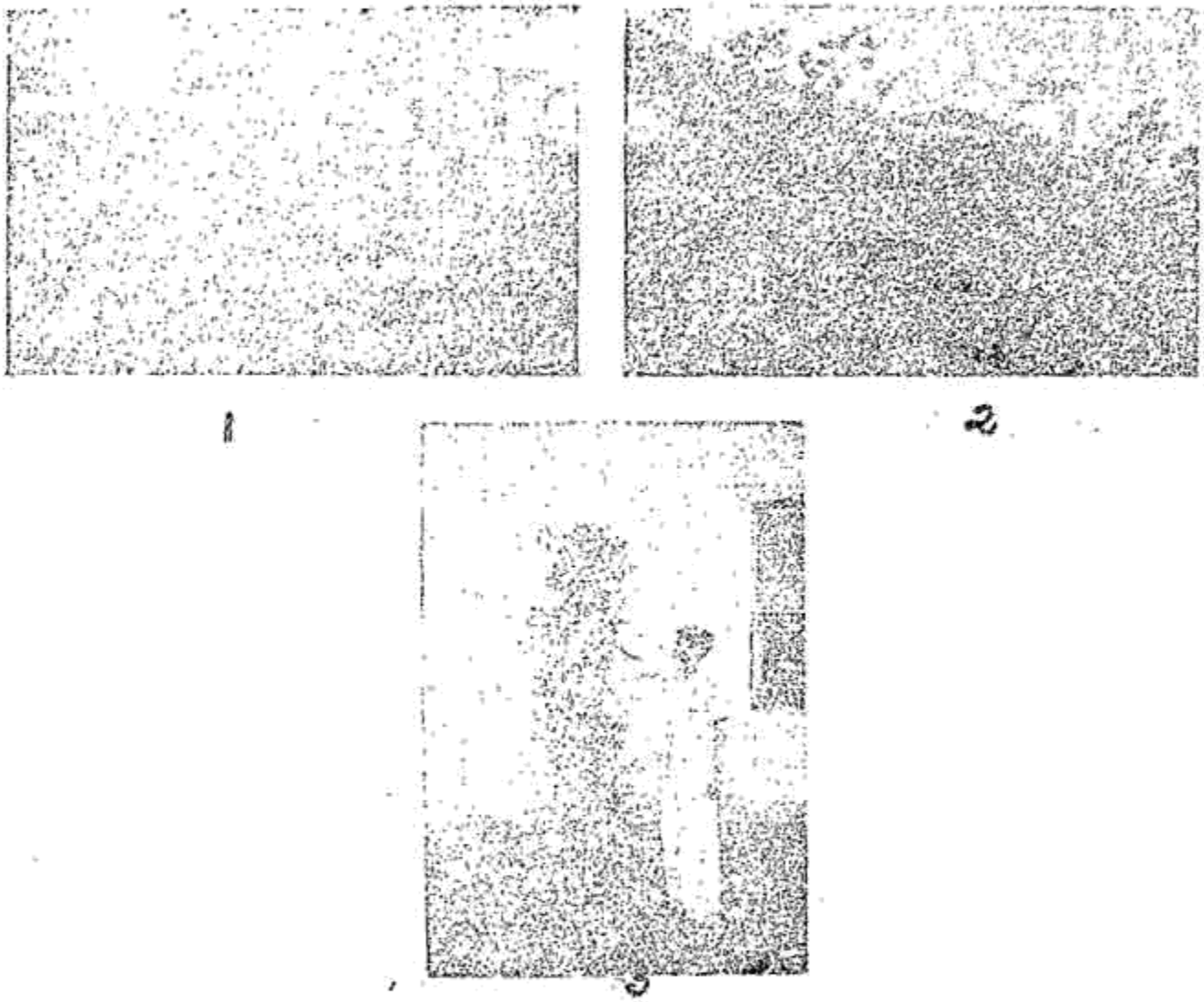
When the Madras Government decided to locate the Central Pepper Research Station at Panniyur on the slopes of the Western Ghats, in Malabar District under the scheme financed jointly by the Madras Government and the Indian Council of Agricultural Research, they were confronted with the problem of conserving the soil on the site comprising gradients ranging up to one in three. Some idea of the extent of soil erosion that was likely in this site measuring 1150 feet from the summit to the foot of the slop and 1100 feet across the slope can be had from the fact that the mean gradient of the site is one in five, that the site is has loosely packed lateritie soil, that the locality enjoys an annual rainfall of over 160 inches and that the catchment area above the site is about 20 acres. The site, after clearence of the tree and scrub jungle growth and removing the stumps and roots and planting *Erythrina indica* standards for training pepper and further digging to remove the subsequent growth from remnants of the original vegetation by November 1952, could not but excite the doubts of almost every visitor as to how it would be possible to stem the rigours of the next monsoon on the newly cleared slopes with its innumerable pockets with sediments snd loose soil, ready to get washed down with the first torrential downpour. This was, in fact, the natural doubt expressed by some of the members of the Spices Enquiry Committee who inspected the site in January 1953.

The picture then and the picture of the site now present such great contrasts that they have to be seen before they can be believed. Some of the illustration (Figs. 1 to 5) in this article would perhaps help the reader to visualise the remarkable and almost astonishing changes that have been effected, all due to the remarkable crop, *Calopogonium mucunoides.*

This plant along with *Pueraria phaseoloides* (Tropical Kudzu) and *Centrosema pubescens* were no doubt well-known to planters to some extent, having been particularly fancied in rubber plantations. The trial of these cover crops on a small-scale in the Research Stations and Farms in Madras State was taken up under instructions from the present Director of Agriculture, Madras in 1947—'48. With the usual chequered career during the early stages of these small-scale trials at numerous centres, the special virtues of *Calopogonium mucunoides* as a cover crop for perennial plantations came to light at the Agricultural Research Station, Ambalavayal, Wynad during 1950, when it was grown over an area of about six acres in mandarian orange orchard. This success inspired the present author with the hope that in *Calopogonium mucunoides* lies the answer to the problem of soil erosion in the Pepper Research Station as well.

Accordingly with the receipt of light showers early in April 1953, a total quantity of 150 lb of *Calopogonium* seed was broadcast on the entire cleared area of 20 acres. In about three months, by the end of June 1953, when the south-west monsoon began with its usual heavy rains, *Calopogonium* had spread its matting vegetative growth so effectively over the ground, as to leave only the irregular rock outgrowths exposed to the view. The crop seeded profusely and dried up completely by January 1954 leaving a thick mulch of dry leaves over the entire ground. A total quantity of 800 lb of seed was collected, and in spite of this, a very large quantity of seed got dispersed on the ground. With the first rains in the middle of April 1954, the self-sown seeds germinated in profusion. As there was occasional rains in the months of April and May 1954, the plant made very vigorous growth and by the beginning of June 1954 when the south-west monsoon began with very heavy and almost incessant rains, the crop had produced a thick vegetative cover to over the entire ground. By the end of July 1954, the crop had made vegetative cover to a thickness of nearly 12 inches, smothered all weed growth and covered even the rock outgrowths. The plant is found capable of growing to a length of about 8 feet in the course of about 16 weeks

and to strike root at every one of the nearly 25 nodes over this length, though about 50% of these nodes only actually develop roots in the field. Each plant has three leader shoots and about eight main lateral shoots from each leader shoot. In addition to the large volume of leafy growth over the ground, the plants are found to have developed a large volume of roots in the ground.



In figure 1, a typical vegetative cover produced by *Calopogonium* within about four months of germinating is presented. The picture of a neighbouring private plantation without any cover and the bare ground exposed to soil erosion is presented in figure 2. The mass of leafy growth with fine roots produced from some of the three plants of *Calopogonium* in about four months is presented in figure 3. Thick shade as seen in figure 4 is not found to curb or limit the expanse of *Calopogonium*. Except when sheet rock with no soil whatsoever exists, the plant finds its way and establishes itself though the minutest cracks and crevices. As a means of destruction of weeds, it is patently effective and obviously cheaper than the most effective weedicide known. From figure 1 it will be seen that *Calopogonium* has practically smothered all weed growth including grass growth.

In figure 5, it can be seen how luxuriantly the plant has established itself on a steep embankment. The chief merit of *Calopogonium* as a cover crop, in addition to the ease with which it can be established in a very short period, is that it recedes to the back ground during the summer months, when it dries up, leaving the coast clear to the plantation crop to absorb all the moisture available in the soil. This is a great advantage and as important as the conservation of soil during the heavy beating rains of the South-West monsoon. The role of *Calopogonium* cover crop during summer is not limited to stepping aside for making all the soil moisture available to the plantation crop, as it also providee a protective dry mulch, an invaluable screen against the severe scorching sun in this period. thereby conserving soil moisture through considerably reduced evaporation of soil moisture. It has also another equally important function of enriching the soil by adding an amount of leaf-mould estimated at about 5000 lb. per acre annually.

Tropical Kudzu and *Centrosema* are no doubt valuable vegetative covers in their own way. But, *Calapogonium* has certain superior attributes such as drying up in summer and the ability to cover the ground within the shortest period. Profuse seeding is yet another virtue of *Calopogonium*. This results in the cover crop establishing itself every year with the summer showers from the self-sown seeds. From the foregoing, it will be seen that growing *Calopogonium* is the cheapest and most effective answer to soil erosion in plantations of pepper, orange and coconut on the West Coast, and will in addition act as an effective check against

obnoxious weed growth in these plantations, enrich the soil and conserve the soil moisture.

There are yet other uses for *Calopogonium* on the West Coast. The paddy lands of the West Coast depend primarily, at present, on green leaf collected from the forests and neighbouring vegetation as a source of organic manure. In fact, this together with cattle manure is the main manurial application that the large bulk of paddy area of the West Coast receives. The denudation of the forests as a result of cutting of trees for leaf and fuel has been a long-standing, vexing problem. The needs of the paddy grower as well as the safety of our forest wealth will be met or safeguarded if *Calopogonium* is broadcast on the extensive expanse of the grassy hillocks of the West Coast so that green leaf of this leguminous plant can be available for manuring the paddy fields. Extension of *Calopogonium* to the uncultivated grassy hill slopes is a desirable line of fostering food production at a minimum expenditure of money and energy, in addition to soil conservation on the hill slopes.

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