GROUND COVER ON TEA ESTATES IN DIMBULA.*

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I have been invited to enlarge upon my experiences with regard to Ground Covers since my last two articles appeared in *The Tea Quarterly*, Vol. 6, Part 4, page 176, and Vol. 7, Part I, page 118.

The policy of establishing as complete a ground cover as possible on the small estate in Dimbula I am responsible for was initiated in 1928. Despite lower nitrogen applications in later years, and despite the fact that curtailment of crop was the policy early in the year, crop stands at 681 lbs. per acre for 1937; the previous highest yield was 648 lbs. per acre in 1932. I feel therefore that it can be claimed that ground cover on an estate kept regularly forked is proved not to have been detrimental to yield. I should add that the leaf harvested during the current year is of a finer variety than that harvested in 1932. The crop for the year 1936 also would have exceeded that of 1932 had orders not been received towards the end of the year to restrict crop further.

The policy adopted nine years ago was to allow all ground covers (including *Drymaria cordata*) to establish with the exception of the following: *Artemisia vulgaris*, *Centella asiatica*, *Desmodium triflorum*, *Plantago cancedlata*, and all grasses of any kind.

The method of eradicating these is to send round a special gang in the dry weather when the other ground covers have defoliated, and those which do not defoliate are in evidence. For a number of years this gang made a second round of the estate, but during 1937 the second round was discontinued as this expenditure was not justified, one thorough round proving sufficient.

The contractors have been paid Re. 1 per acre for eight months in the year, and Rs. 1-25 for four months when flowering weeds have

* The Institute does not necessarily endorse the views expressed in papers contributed by persons other than members of the staff.

been more formidable. The total cost of the special gang works out at just over 30 cents per mensem per acre. Details are as follows:—

Contract work at	...	Rs. 1.09 per acre
Eradication of supposed harmful varieties by supervisory gang		34 ,,
Compost work, etc.	...	13 ,,
		Rs. 1.56 per acre

I should add that the reason why Centella, Desmodium, Artemisia and Cancedlata are eradicated is merely because they are "suspect" owing in two cases to their carpeting effect and in the other three to the fact that they have a deep-rooting system.

With regular deep forking I do not think that grasses would have much toxic effect in that they do not grow prolifically in company with the other ground covers. Cootch and illuk should of course be eliminated.

As regards the objection to the deep-rooted varieties I am inclined to think that this root system below ground and below where the "fork" can reach might prove an advantage, in that the older roots must die off and the soil is consequently aerated.

The Rs. 1.09 per acre per month spent represents the following works only:—

(a) Hand pulling of flowering weeds and collecting same for compost purposes.

(b) Scraping from round the boles of the bushes the varieties which have a tendency to climb up to the plucking surface.

There is quite a lot of work involved in this but not nearly so much as the manual labour entailed on a clean-weeded estate in wielding large karandies with which valuable soil is loosened ready to be taken off the land by the first rains.

The advantages of a ground cover are demonstrated in the Report of the Committee which investigated the question of soil erosion in Ceylon, and can be eloquently proved by anyone who would care to examine the silt collected in the drains on the property in question where .62 cent per acre was expended on drains during 1936, and .17 cent in 1937.

I may add that when cutting new cart roads it has been found that perhaps 50 per cent less culverts are required than would be necessary if the estate were clean weeded.

The reason why I do not advocate the establishment of individual species of ground cover of proved nitrogen content only is that I consider it would take many years to achieve these so-called ideal conditions; in the meantime much valuable top soil is being lost.

In order of incidence the ground covers now established as a "mixed grill" are as follows:—

1. *Oxalis latifolia*
2. *Oxalis corymbosa* } in about equal quantities.
3. *Drymaria cordata*
4. *Justicia procumbens*
5. *Biophytum proliferum*
6. *Hydrocotyle sibthorpioides**

As a matter of interest I append a table showing the approximate average percentage of returned nitrogen which the named varieties of both ground cover and bush plant might yield to the soil.† These are kindly supplied by Dr. Joachim, the Agricultural Chemist at Peradeniya:—

	Per Cent Nitrogen in green material	Representing in lbs. per. 5 tons of green material		Per Cent Nitrogen in green material	Representing in lbs. per. 5 tons of green material
Oxalis	.35	40	Sunflower (loppings)	.7	78
Dadap (loppings)	.5	56	Fern	.35	40
Gliricidia (loppings)	.5	56	Mana grass	.5	56
Crotalaria usaramoensis	1.2	135	Nillu	.5	56
Tephrosia vogelii (loppings)	1.2	135	*Drymaria cordata*	.45	50
Tephrosia candida (loppings)	1.2	135	*Cassia didymobotrya* (loppings)	.70	78
Indigofera endecaphylla	.8	90	*Indigofera arrecta*	.8	90
			Indigofera stacyoides	.8	90
			Justicia procumbens	.7	78

* Please note that in previous articles the Hydrocotyle was wrongly termed "*Ranunculus wallichianus.*"

† Except in the case of leguminous covers the nitrogen shewn is derived from the soil and is not therefore a new addition.

I am of opinion that in a very few years the property in question will mainly be covered by one ground cover only and this will prove to be *Justicia procumbens*. It shows marked signs of swamping Drymaria and even Oxalis. The nitrogen content is .72 per cent against Drymaria .45 per cent, and Oxalis only .35 per cent. The one disadvantage would seem to be that it also, like Drymaria, has a tendency to creep upwards on to the bushes. But why not control this ? We control our nitrogenous bush plants and other higher growths established in tea and I do not see why objections should be raised to the need to control ground covers.