

A TRIAL OF INDIGOFERA ENDECAPHYLLA IN TEA AT PERADENIYA

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INTRODUCTORY

THE question of the general use of a ground cover crop in tea, and of *Indigofera endecaphylla* in particular, has been dealt with in the series of articles on Green Manuring which recently appeared in *The Tropical Agriculturist*. In this article, therefore, only the results of the particular trial in question will be dealt with.

DESCRIPTION OF THE TRIAL

From 1917 to 1924 twelve half-acre tea plots and two one-acre plots on the Experiment Station, Peradeniya, were under a manurial experiment. At the conclusion of that experiment it was decided that all the plots should be planted up with *Indigofera endecaphylla* and that the manurial treatment applied to each plot should be continued unchanged. The same plucking and pruning methods were also continued so that, apart from climatic fluctuations, the only change in the conditions under which the tea had been growing was that a cover of *Indigofera* was formed whereas clean weeding was formerly practised.

The principal object of the trial was to determine whether the presence of the cover crop would exert any depressing influence on the yield of the tea or in any way affect the health or vigour of the bushes. Further, the conditions of the soil has been studied throughout and for this purpose two-yearly analyses have been undertaken by the Agricultural Chemist.

In order that the cover crop should have every opportunity of "doing its worst" only the necessary minimum of cultural operations were undertaken. The creeper was cut and rolled back to the side of alternate rows to permit the annual application of manures and of the pruning mixture every two years. No forking in of the creeper was attempted.

YIELDS

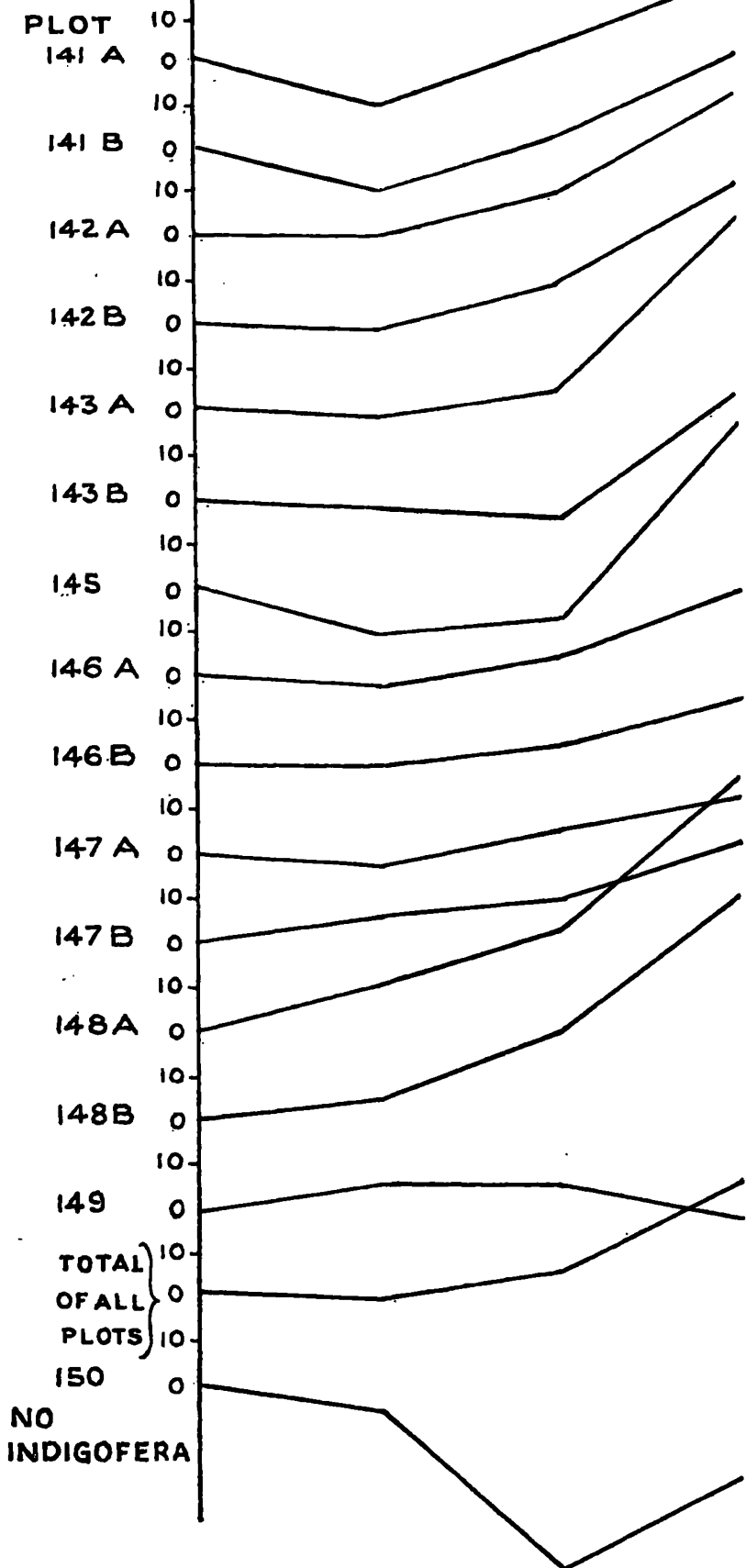
For the purpose of this trial yields have been recorded in two-year inter-pruning periods starting from the 1923 pruning which was done two years before the planting of *Indigofera*. The period 1923-25 is taken as the basis of comparison, and both in the table and in the graph the percentage increase or decrease in weight of green leaf after the planting of *Indigofera* is shown in comparison to that period.

Percentage increase or decrease in actual yields of green leaf over 1923-25. Pruning,
together with bushes in bearing and manures applied.

Plot	Acree	Bushes in bearing 1923-25	Percentage increase or decrease of 1925-27 over 1923-25 with <i>Indigofera</i>	Bushes in bearing 1925-27	Percentage increase or decrease of 1927-29 over 1923-25 with <i>Indigofera</i>	Bushes in bearing 1927-29	Percentage increase of 1929-31 over 1923-25 with <i>Indigofera</i>	Bushes in bearing 1929-31	Manures applied annually in April Pounds per acre
141A	$\frac{1}{2}$	938	-9	1028	+4	891	+24	944	Ground nut cake 286 Sulphate of potash 50
141B	$\frac{1}{2}$	946	-8	1051	+2 $\frac{1}{2}$	966	+22	928	Ground nut cake 286
142A	$\frac{1}{2}$	942	+ $\frac{1}{2}$	961	+10	941	+34	892	Ground nut cake 286 Superphosphate 111
142B	$\frac{1}{2}$	1055	-1	1148	+5	914	+32	956	Ground nut cake 286
143A	$\frac{1}{2}$	876	- $\frac{1}{2}$	758	+5	696	+46	685	Superphosphate 111
143B	$\frac{1}{2}$	778	-2	676	-4 $\frac{1}{2}$	674	+35	625	Sulphate of potash 50 Ground nut cake 286 Superphosphate 111
145	1	2286	-10	2036	-7	1918	+38	1963	Sulphate of potash 50
146A	$\frac{1}{2}$	1171	-3	1186	+4	1106	+19	1142	Ground nut cake 286 Sulphate of potash 50
146B	$\frac{1}{2}$	1134	- $\frac{1}{2}$	917	+3	1102	+14	1145	Ground nut cake 286
147A	$\frac{1}{2}$	954	-3	1056	+5	1056	+12	935	Ground nut cake 286 Superphosphate 111
147B	$\frac{1}{2}$	1018	+6	917	+9	1119	+22	1110	Ground nut cake 286
148A	$\frac{1}{2}$	877	+8	900	+20 $\frac{1}{2}$	1005	+57	868	Ground nut cake 286 Superphosphate 111
148B	$\frac{1}{2}$	999	+4	1062	+19	1130	+51	1104	Sulphate of potash 50 Ground nut cake 286 Superphosphate 111
149	1	2276	+5	2270	+4	2186	-2	2520	Ground nut cake 286 Sulphate of potash 50 Dadaps only
Total	8	16250	-1	14956	+4 $\frac{1}{2}$	15704	+25	15754	

150 1 2928 +6 — — -42 -21 2662 Albizzias. No *Indigofera*.
1923-25 1927-29 1929-31
Rainfall in inches 1925-27 1927-29 1929-31
for crop period 198.77 186.46 169.33 188.66
In addition to the above manures all plots receive 100 lb. of basic slag and 60 lb. of sulphate of potash per acre after pruning.

1923-25 1925-27 1927-29 1929-31
NO INDIGOFERA INDIGOFERA INDIGOFERA INDIGOFERA
 RAINFALL 198.80 186.46 169.33 188.66
 INCHES



Percentage Increase or Decrease in actual yields of Green Leaf after planting *Indigofera*.

Four points call for comment.

- (1) The number of bushes in bearing in the different plots has varied, increases being due to supplies coming into bearing and decreases to loss of bushes after pruning or from other causes. Increases or decreases in yield have not, however, been calculated according to the number of bushes in bearing since such a calculation would be based on the false assumption that the yield of all bushes is alike. The number of bushes in bearing in the middle of each period is, however, shown in the table. It is noteworthy that in nine out of the fourteen plots the number of bushes in bearing was less in 1929-31 than in 1923-25, the total showing a decrease of 496 bushes. The yield increases, therefore, cannot be ascribed to increase in number of bushes in bearing.
- (2) The 1929 pruning was, owing to a misunderstanding, done in September instead of in October, thus the 1927-29 period was deprived of a month's yield and the 1929-30 period gained a month. If this had not occurred the 1927-29 percentage increase would have been greater and the 1929-31 increase would have been less. In the graph the final sharp upward curves would have been to some extent flattened out.
- (3) It is somewhat remarkable that plot 149 is the only plot which has shown a decrease in the last period. It will be noticed that this is the only plot under dadaps and that it has received no manure other than the pruning mixture given at the foot of the table. Probably owing to the somewhat heavy shade of dadaps in this plot *Indigofera* has never become well-established and in parts of the plot the cover is negligible. This would appear to afford additional evidence that the increases in the other plots are due to the presence of the *Indigofera*.

- (4) The absence of proper control plots is regrettable. The nearest approach to a control is plot 150. This plot lies alongside plot 149. It is planted with *Albizzias*. Parts of the plot received various manures in 1927, 1928, and 1929 in the course of a manurial experiment in small plots. It is one of the best plots on the Station. The yields of plot 150 are shown at the foot of the table and in the graph, and it will be seen that its performance compares unfavourably with that of those under *Indigofera*.

It would be hard to ascribe the obvious improvement in soil conditions and the general increase in yields to any other cause than the presence of the *Indigofera*.

THE APPEARANCE AND HEALTH OF THE BUSHES

There has never been any indication at Peradeniya that the presence of a cover of *Indigofera* has had any adverse effect on the health and vigour of the bushes.

In a previous article (*The Tropical Agriculturist* of March, 1930) the writer stated "1929 was a particularly dry year and if any ill-effect was to have been observed as the result of undue absorption of moisture by the cover crop one would have expected to observe it in that year. The tea, however, remained vigorous and looked better than clean-weeded tea".

In the Progress Report of the Station for November and December, 1929, the following statement is found. "In August 1927, the Hillside tea was planted with six-row strips of *Indigofera endecaphylla* alternating with six clean-weeded rows. These strips have not been separately plucked but periodical inspections have been made to note any difference in the appearance of the tea. At the last inspection it appeared that the tea under *Indigofera* was slightly more vigorous, and certainly the young supplies in these strips appear healthier".

Again in the report for March and April, 1931, the following statement is made: "The tea in general suffered more severely from the drought than has been observed for a number of years. Though exact comparison is not possible owing to differentiation of treatment it may be stated that the tea which survived the drought best was that under *Albizzia* or *Gliricidia* with or without a cover crop, next tea under dadaps with *Indigofera endecaphylla*, next tea with *Indigofera* but no shade trees and lastly tea with no shade and no cover crops."

Nothing has occurred to alter these statements.

It has been repeatedly observed that supplies growing in *Indigofera* have a healthier appearance than those in clean weeded plots. It is, of course, necessary to keep them fairly clear of the creeper and it has been noticed that centred plants among *Indigofera* fail to bush out well.

WEEDING

Weeding was undoubtedly more expensive in the early stages of the establishment of the cover. Since a thick cover has been established weeding has certainly been cheaper than the weeding of clean-weeded plots. The writer, however, cannot subscribe to the statement that has been made that once the cover is established weeding is a thing of the past. Couch-grass, which has always been troublesome in some of these plots is certainly not effectively controlled by *Indigofera*. Other grasses always appear where the cover is at all thin, while *Mikania scandens* and other creepers have given a certain amount of trouble. Cora (*Cyperus rotundus*) has been effectively controlled as long as a thick cover is present but re-appears if the cover is removed.

The removal of strands of *Indigofera* which grow up through the bush to the plucking table is one of the most important duties of the weeders. Since they do not cling to the bush, however, such strands are very easily removed by hand, and in the writer's opinion the apprehension expressed by some planters on this account is quite unfounded.

DRAINS

The saving on upkeep work on drains is probably one of the largest items to be placed to the credit side of the cover crop account. After about a year the drains in the *Indigofera* plots were completely covered. Practically no further clearing has been done and it is now difficult to see where the drains are.

Erosion, if not entirely a thing of the past, has been reduced to negligible proportions.

SNAKES AND LEECHES

Three years ago two pluckers were bitten by snakes. Fortunately both recovered quickly. It was thought at the time that the question of snakes might form an almost insuperable objection to the growing of *Indigofera* in tea. An attempt was made to ameliorate the position by cutting the *Indigofera* close. The cover grew so fast again, however, that this attempt was

given up as impracticable. No further trouble has been experienced, however, and though the possibility of harbouring snakes forms possibly the most potent objection to growing a cover crop in tea it would hardly appear sufficient to outweigh the advantages to be gained.

Leeches are remarkably scarce, though the neighbouring jungle swarms with them, very few are found in the *Indigofera*—the writer, who has walked through this tea in all weathers can only recollect having picked up two leeches during the five years that the cover has been well established.

SOIL IMPROVEMENT

Analyses of soil samples from all plots have been carried out every two years in the Chemical Laboratory. The full results and conclusions are contained in a separate article. The results of this report are briefly summarised below.

The nitrogen and loss on ignition (organic matter) contents of the 1931 samples are on the average higher than the contents of any of the previous samples and there has been a steady increase in these constituents since 1925.

The average silt and clay percentages show a small fall since 1925 due perhaps to the washing away of a small proportion of the finer particles in spite of the *Indigofera* cover. The coarse sand and gravel figures, though somewhat variable, indicate that these constituents are well retained in position by the cover.

On the whole the chemical data, coupled with the yield results, indicate that the *Indigofera* is effectively preventing erosion and conserving and even increasing soil fertility.