

Due to the higher rainfall and the depleted nature of the soils in Guntur tract heavy manuring is practised there. But in the Nandyal tract which is comparatively new to this crop, the manuring may be as

*Basal:* Farmyard manure 10 cart-loads.

*Subsequently:* 112 lb. of Tobacco mixture. Heavier dosage than the above will adversely affect the quality of the leaf.

**Pests and Diseases:** No major pests or diseases were noticed during the three years of cropping. The absence of the plant parasite "*Orobanchae*" otherwise known as '*Tokra*' was one of the redeeming features here.

**Future Prospects:** The exploratory trials have shown that the crop can be successfully cultivated in the Nandyal tract. Given proper facilities, flue-curing can also be successfully managed. Otherwise sun-curing is the only alternative. During 1950-'51, enterprising cultivators in Cumbum taluk grew an area of nearly 300 acres under this crop. They experienced the same difficulty in matter of humidity for flue-curing purposes. The Imperial Leaf Tobacco Development Company—the premier purchasers of Virginia tobacco have already opened their branch at Nandyal and seem to be assuring a guaranteed purchase for sun-cured Virginia tobacco. The prospects of expansion of this crop therefore seem to be bright, especially when groundnuts, the main industrial crop of this district, is of late giving diminishing returns due to various pests and diseases.

Regular research work may have to be taken up in the years to come as the area under the crop expands and new problems arise.

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## Use of 'Cut Sets' and 'Whole Seed' for Planting Potato

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**Introduction:** The use of cut sets, i.e., seed tubers cut into two or three bits according to size, for planting the crop, has been common since the early days of the introduction of the potato as a cultivable food crop. The earliest record of this dates back to the year 1834 when Lindley (8) reported the development of seedlings even from mere potato peelings.

While a good amount of work on the use of cut sets has been done in the important potato growing countries, analysis of the data of the various workers reveals the difficulty of forming a definite conclusion of the superiority or otherwise of the whole seed over the cut set, since the yield from both these kinds of seed material seems to be conditioned by the nature of the soil, climate, facilities for irrigation, the variety used, size of the whole seed or cut set and possibly other factors.

During the years 1938 to 1941 trials were conducted at this station using whole seed and two kinds of cut sets viz., (1) tubers cut transversely with crown ends and heel ends. The findings of these earlier investigations, in relation to the more recent experiments conducted during the two years 1949 - '50 and 1950 - '51 reported in this paper, are discussed under the head 'Experimental Data and Results'. The trials were concluded in 1951.

**Review of Literature:** Working on irrigated conditions, Aicher (1) recorded better total yields with the use of whole seed, though the cut sets returned more marketable tubers, a finding which was confirmed by Welch (11).

Using the variety *Majestic*, Brandreth (4) found that the whole seed significantly outyielded the cut set in both total yield and yield of ware, while Rhynehart (10) reported that if sets cut on the day of planting were used, there would be no such loss in yields.

Arnold (2) has advocated the use of big cut sets weighing at least three to four ounces for hot and dry conditions prevailing in Rhodesia. Laumont and Robert (7) concluded that the economy effected by use of the cut set did not compensate for the fall in the crop, since the yields from the medium-sized whole seeds were consistently higher by 20%. Kapoor (6) preferred, in actual practice the use of cut sets of larger seed tubers.

Discussing the curing of cut sets before planting, Priestley and Woffenden (9) and Bell (3) stressed the need for healing of the cut surface by the deposition of a suberine layer, with avoidance of dry conditions and free access to atmospheric oxygen after cutting.

Delaney (5) described that the varieties that responded well to cutting had, in general, round tubers.

The object of the experiments at Nanjanad was to obtain data that would settle questions relative to the advisability of using whole or cut seed for planting. The trials were confined to the main and the second crops of the year 1950 and the main crop of 1951. Because of the close agreement of the results obtained during the two years for the main crop and in view of the greatest possible care taken to insure uniform soil conditions and provide uniform cultural methods, it was felt desirable to present in this paper only the average of the two seasons.

**Experimental Data and Results:** The potato variety used for the work was *Great Scot*, which is the most popular and the best suited for the Nilgiris because of its high yield, good round shape, earliness, good keeping quality and hardness when cooked. Four levels for size of seed, viz., half, one, one-and-a-half and two ounces by weight were used. Cut seed also conformed to the above weight levels and were made out of the apical end of the seed material, the transverse cutting being effected a week before planting. Directly after cutting, to prevent undue loss of moisture and to promote the deposition of suberin from the sap, the cut pieces were kept covered by wet hessian away from light in racks, for 48 hours. The treatments were replicated four times and, directly after sowing, were manured uniformly with Nanjanad mixture, providing 80 lb. nitrogen, 120 lb. potash and 200 lb. phosphoric acid, at the recommended dose of 1610 lb. by weight per acre, which has been found the right dose for optimum yield on the hills.

Detailed studies were made for germination counts, tillering, crop growth and the number of tubers per hill for the different treatments. The combined values for the two main crops of the years 1950 and 1951, are presented hereunder.

**TABLE I.**  
**Record of germination, growth and number of tubers per hill**  
(Average of the main crop, 1950 and 1951)

S. No.	Treatments	Percentage of germination	Mean number of tillers per seed.	Mean number of tubers per hill
1	A. Whole seed $\frac{1}{2}$ oz.	78.1	1.9	7.9
2	B. do. 1 oz.	89.9	2.3	8.0
3	C. do. $1\frac{1}{2}$ oz.	86.2	3.3	10.4
4	D. do. 2 oz.	82.4	4.1	11.0
5	E. Cut set $\frac{1}{2}$ oz.	81.2	1.3	5.0
6	F. do. 1 oz.	81.6	1.9	6.2
7	G. do. $1\frac{1}{2}$ oz.	76.2	1.9	6.5
8	H. do. 2 oz.	84.0	3.2	9.4

(Cut set = Seed tuber cut transversely and only apical ends used)

It is found that while the germination of the whole seed and cut sets was about equal, tillering and the number of tubers per hill were markedly greater for the whole seed. For both the whole and the cut seed, tillering and number of tubers increased with increase in the weight of seed used.

The yield figures, which were statistically significant in all cases, are given in the following.

TABLE II  
Acre yield data for the treatments

Season	Treatments								General Mean	'Z' test	Standard error	Critical difference (P=0.05)
	A.	B.	C.	D. (control)	E.	F.	G.	H.				
Main crop (1950-1951): acre yield in lb.	10,700	13,000	17,000	18,100	10,300	12,000	10,400	12,900	1,138	Satisfied	1,386	2,385
Percentage on (D) control (2 oz. whole seed)	59.1	72.4	93.9	100.0	56.9	60.6	57.5	71.3	72.6		7.5	12.9
Second crop (1950): acre yield in lb.	3,400	3,800	5,500	6,300	2,100	3,500	5,000	5,600	4,400	Satisfied	840	1,747
Percentage on (D) control (2 oz. whole seed)	54.0	60.3	87.3	100.0	33.3	55.6	79.4	88.9	69.8		13.1	27.3

Note: Main crop: Sown in April.

Second crop: Sown in September.

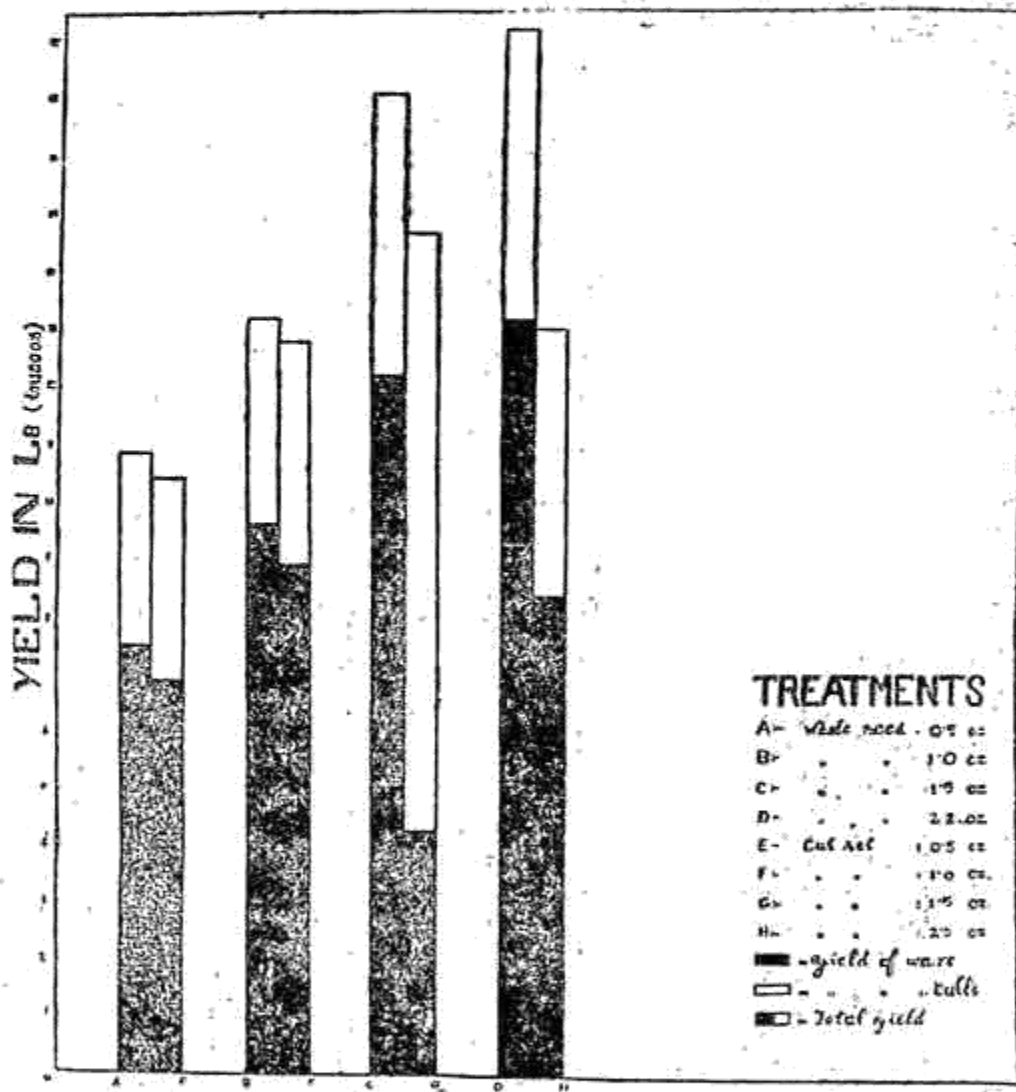
Conclusion:

(Main crop):

D, C, B, H, F, A, G, E

(Second crop):

D, H, C, G, B, F, A, E





A progressive increase in yield with increase in size of yield is evident with increase in size of seed, whether whole or cut. The highest yields were obtained with the seed material, cut or whole, weighing two ounces, which is the practice recommended for general adoption. Again, whole seeds invariably proved their definite superiority over cut sets, from the point of total yield.

The yields of ware and culls, are shown separately in the diagram. From this it is clear that not only the total yield, but the proportion of ware to total, is higher in the treatments with whole seed, in comparison to those raised from cut sets.

In the light of the above findings it is considered desirable to discuss the results of the work conducted earlier at Nanjanad during the four-year period 1938 - '39 to 1941 - '42.

For the irrigated crop in 1931 - '39, three types of seed material were used, viz., (A) whole seed; (B) transversely cut sets with crown only; and (C) transversely cut sets with heel ends only. The result was significantly in favour of the cut sets with crown ends (B). But, in the next year (1939 - '40), there were no significant differences among the three treatments in the main crop. For the second crop of the same year, a fourth treatment (D), cut sets with both the crown and the heel ends effected by cutting the tuber longitudinally, was included. The results disclosed that, while there were no differences among treatments A, B and D, all the three of them were significantly superior to treatment C.

During 1940 - 41, for the main and the irrigated crops, the results were significantly in favour of cut sets with crown ends only (B), but planting of the whole seed proved best for the second crop. In 1941 - '42, the last year of these early trials, treatment (B) proved its superiority for yield.

For all the above four years and during all the seasons, transversely cut sets with heel ends (C) returned the lowest values.

In all these earlier trials the quantity of seed material in terms of weight, was kept uniform and constant for every treatment, while in the later trials (1949 - '50 and 1950 - '51), four different levels for the weights of whole seed and cut set (the cut being effected transversely with the crown end for planting, since this proved best in the earlier work, ) viz., half, one, one-and-a-half and two ounces, were employed.

**Summary:** The experiments were conducted for two years over three crops. The results are in close agreement and as follow :

The crop from the whole seed, in general, had better tillering and number of tubers per hill than the ones from the set transversely cut to include the crown end, though there was little

difference in germination. For both the kinds of seed material, increase in tillering and tuber population followed the rise in weight of seed.

Total yield exhibited a progressive increase with the weight of seed, whole seed proved better for total return and yield of ware.

Under conditions which prevail on the average potato holdings in the Nilgiri hills, the planting of whole tubers averaging two ounces in weight is advisable to secure optimum returns. Economising seed material by utilising cut seed is not desirable, unless a dearth of seed compels the farmer to have recourse to it.

There exists a ready and profitable market for ware (larger-sized table potato) and hence the necessity to use it for seed after cutting is not great. Besides, cutting has to be done carefully, under controlled conditions of temperature and storage, to ensure optimum germination in the field, which are beyond the ordinary ryot. Hence, it is suggested that the whole seed, graded to conform to the recommended weight and size, will prove easier to handle by the farmer for growing the crop.

**Acknowledgment:** The earlier trials were started by Sri V. K. Subramanya Mudaliar, the then Superintendent in 1938 and followed up during the next three years, 1940 to 1942, under the direction of Mr. P. A. Nathan, Curator and District Agricultural Officer, Ooty, and the data relating to these periods refer to their valuable work recorded in the respective Station Reports. The more recent work, for the crop-years 1949-'50 and 1950-'51, was conducted under the guidance of Sri P. Uttaman, who was the Superintendent of this Station. The authors wish to acknowledge all their help in the conduct of these investigations.

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### Research Note

## *Gliricidia maculata* H. B. & K.

### *A Good Source of Nectar*

This is one of the quick-growing perennial shrubs, the cultivation of which is being actively popularised by the Department for the sake of the plentiful supply of green leaf it affords. The flowers of this shrub are also freely visited by honey bees for nectar.

The shrubs begin to bloom by December and continue upto March. A flowering branch has, on an average, over 20 racemes, each bearing about 200 flowers. It takes about a fortnight for an individual bud to develop to its full size and open out as a flower. The actual blossoming takes place during the afternoon between 3 and 5 p. m. and the flowers remain open for about 3 or 4 days. The nectary is situated at the base of the corolla surrounding the ovary. The freshly opened flowers generally contain little or no nectar on the first day, but appear to secrete appreciable quantities on the subsequent days. It is interesting to note that bees, by virtue of their selective capacity, favour only such flowers which contain this sweet fluid. The average quantity of nectar contained in a flower was 0.0016 grams. The secretion contains 9.62% of reducing sugars and 35.67% of sucrose. Bees visit these flowers practically throughout the day, with the maximum activity between 10 a. m. and 12 noon. The honey elaborated from this source was red yellow in colour with an agreeable taste and a mild aroma. The chemical composition of a sample consisted of 63.95% of reducing sugars, 7.95% of sucrose, 0.09% of free acid with a moisture content of 33.57%, the last mentioned being a high figure. The specific gravity was 1.206.

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