https://doi.org/10.29321/MAJ.10.A04826

layers. This renders the former more brittle and consequently more liable to breakage during milling than the germ of raw rice which is comparatively soft and pliable on account of its higher fat content.

Summary. 1. During milling, parboiled rice does not lose the embryo to any greater extent than raw rice. In raw rices, the germ is usually removed as a whole; in parboiled rice, it is removed only in fractions

2. The breakages of the embryo during milling of parboiled rice is due to its lower content of ether-extractives compared to the embryo of raw rice.

References.

1. Acton, H. W., Ghosh, S., and Dutt, A. *Ind. Jour. Med. Res.*, *21*, 103, 1933
2. Aykroyd, W. R. *Jour. Hygiene*, *22*, 184, 1932.
3. Codd, L. E. W., and Peterkin, E. M. *Brit. Guiana Dept. of Agric Rice Bull. 1*, 1933.
4. Douglas, C. E. *Empire Marksting Board*, Report 32, 1930.
5. Ghosh, S., and Dutt, A. *Ind. Jour. Med. Res. 20*, 863, 1933.
6. Iliffe, R. *Madras Agric. Stn.* Reports, p. 410, 1928—29.
7. McCarrison, R., and Norris, R V. *Int Med. Res. Memoirs*, *2*, 1924.
8. Ramiah, K. *Curr. Sci. 5*, 215, 1936.
9. Sreenivasan, A. *Progr. Report 'Quality in Rice'* I. C. A. R., p. 6, 1938.
10. Sreenivasan, A., and Das Gupta, H. P. *Curr. Sci 5*, 75, 1936.
11. Subrahmanyan, V., Sreenivasan, A. and Das Gupta, H. P. *Ind. Jour. Agric. Sci.*, 1938, (In the press).

A NOTE ON THE CRACK FILLING EXPERIMENT, AGRICULTURAL RESEARCH STATION, NANDYAL

BY A. C. EDMONDS, B.A.,

Dy. Director of Agriculture, Bellary,

and

P. SUBRAMANIAM, B. Sc. (Ag.)

Millets Assistant, Nandyal.

In recent years great prominence has been given by research workers to the role of soil Physics in the production of crops. The relation between physical properties of soil and cropping power is now known to be of paramount importance.

In the taluks of Nandikottur, Nandyal, Koilkuntla and Siruvel in Kurnool district a number of different types of clay soil are to be found. In appearance some of these resemble typical heavy black soil land in Bellary district. The figures of mechanical and chemical analyses of typical dryland on the stations at Hagari and Nandyal which are shown below indicate their common properties.

TABLE I

Mechanical Analysis of Dryland soils at the Nandyal and Hagari Stations.

(International ammonia method).

Heads of Analysis.	NANDYAL		HAGARI	
	Surface. 0—1′	Subsoil. 1′—2′	Surface. 0—1′	Subsoil. 1′—2′
Clay	45·7	48·3	46·2	49·7
Silt	23·3	23·0	23·7	23·1
Fine sand	14·9	13·8	17·6	16·0
Coarse sand	8·2	7·8	5·1	5·5
Loss on solution, by difference.	7·9	7·1	7·4	5·7

The results are expressed as percentages on oven dry basis.

Hygroscopic capacities at different relative humidities :

Rel. H. %	10	25	50	75	90	98
Hagari	3·2	5·0	7·3	9·4	11·3	14·8
Nandyal	3·2	4·9	7·6	9·6	12·0	14·9

Chemical analysis of dry land soil samples (1 foot depth) from the Hagari and Nandyal farms.

Heads of analysis.	Hagari.	Nandyal.
Moisture.	7·58	7·56
Loss on ignition.	5·05	4·44
Lime (CaO)	4·13	2·76
Magnesia (MgO).	0·53	1·46
Potash (K_2O).	0·42	0·49
Phosphoric acid total (P_2O_5)	0·040	0·057
Available potash (K_2O)	0·035	0·033
Available phosphoric acid (P_2O_5).	0·011	0·014
Nitrogen.	0·035	0·033
Carbon dioxide.	2·64	1·90
PH (average)	9·0	9·0

The rainfall, however, in these two areas varies widely, being on an average roughly 21″ spread over 50 days in many places in Bellary district as compared with about 29″ and 70 rainy days at Nandyal. In the Kundur valley in which Nandyal is situated the rainfall is earlier than in Bellary district.

In view of these differences one would expect to find some considerable variation between the yield of sorghum at Hagari, as compared with the field at Nandyal. Actually, the average per acre at the two stations is in the neighbourhood of 450 lb. and 200 lb. grain respectively. It seems reasonable to account for this in large measure by differences in the soil which are not revealed by analysis.

In contrast, if a comparison is made of the range in yield of cholam obtained on the station at Nandyal and on the same general type of land in the neighbourhood within seven miles the differences in some cases will be found to vary nearly 400 per cent. An examination of the manurial practice in these villages indicates that it varies little from that adopted on the farm. In view of the rainfall in quantity and distribution through a period of years being generally the same, one is compelled to conclude that the large differences in yield are due directly or indirectly to chemical or physical

soil properties or both. At the moment no figures of analyses are available for the purpose of comparison.

On the station at Nandyal and in the neighbourhood we are dealing with heavy clay soils having certain common physical properties. Two years ago a new line of investigation suggested itself which had for its purpose a change in the physical condition of the soil.

The black soils of the Ceded districts crack deeply during the hot weather which on the advent of rain is followed by rapid expansion. The contraction of the soil was taken advantage of to apply large quantities of groundnut husk which is available locally. In season 1937 the cracks in an area of land were filled completely by hand and in another case ordinary sand was used. The quantity applied in this way was 8·25 tons and 74·84 tons per acre respectively. The table given below illustrates the yield of cholam grain harvested per acre from treated and untreated land.

Strain N. 29/68
Area of Plot 1·0 cent.

TABLE II.
CRACKS FILLING EXPERIMENT
Summary of results
Grain yields in pounds per acre.

Each set.
Layout—Randomised Blocks.
Replications—12.
Variants—3.

Treatments and other details.	1936–37 Set. Filling once every two years		Set I. Filling every year.		1937–38 Set II. Filling every three years.		Set III. Filling every four years.	
	Grain lb.	% over control.	Grain lb.	% over control.	Grain lb.	% over control.	Grain lb.	% over control.
Control	550	100	808	100	802	100	739	100
Sand	594	108	790	98	789	93	780	106
Groundnut husk	888	161	1256	155	1186	148	1131	153
General mean	677	123	951	118	926	103	884	119
S. E. of treatment means	28	5·0	87·3	10 8	22·5	2·8	40·0	5·5
Whether significant by 'Z' test.	Yes.	P< 01	Yes.	P< 01	Yes	P< 01	Yes.	P< 01
Critical difference	80	15	246	30	64	8	113	16

It will be seen that in the first season the use of groundnut husk resulted in an increase in yield of 61 per cent and again in the following season there was an increment of 55 per cent over the control. Similarly, in the case of straw there were differences of 43 and 30 per cent.

During the past season cotton has been grown on plots treated with groundnut husk and sand in the previous year. Here again the differences in yield of kappas per acre in favour of the treatment is 21 and 18 per cent respectively. These figures indicate that the effect of applying groundnut husk persists at least into the second year and that cotton responds to such treatment.

At the end of the harvest season a beginning was made to examine a possible relation between soil moisture and cropping power. This work is being continued.