https://doi.org/10.29321/MAJ.10.A04600

Some Preliminary Observations on the Effect of Drying the Sprouted Seed upon its Viability and Subsequent Plant Growth in Paddy

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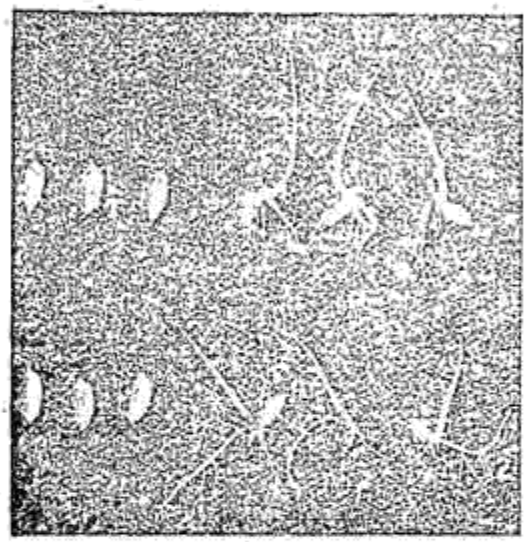
Sprouted paddy seeds were dried in the hot sun for two to three days. This caused complete wilting of the young plumule and radicle, but the seed on regermination produced new shoots and roots (Fig. 1 & 2). The same thing happened also when the young plumule and radicle were partly or fully scissored or injured, under similar conditions.

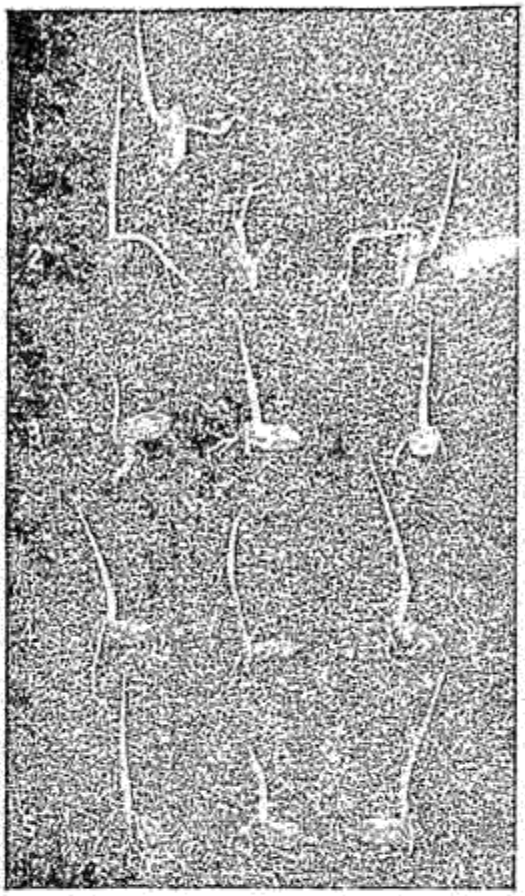


1. Sprouted and dried seed, regerminated.
2. Seedling from untreated seed.

Fig. 1.

It was observed during the course of the present studies that seeds dried and stored in cloth bags in the usual manner lost their viability rapidly. Similar observations have been recorded by previous workers. By retarding germination in cotton, Rangaswami Ayyangar found that the seeds were subject to fungal attack and impairment of viability. In all these cases, the immediate reason adduced for the low viability was mould, while the normal seed, not treated but subject to similar conditions of storage, gave no signs of deterioration. It was then presumed that the treated seed took mould on account of the atmospheric moisture having access to the embryonic region through the minute slit in the glume caused by the bursting out of the initial sprout. To make sure that the presumption was correct, small holes were pricked in the glume of the paddy seeds at the same place and in the same fashion as appeared in the germinated seeds. These were kept in a moist chamber along with the normal seeds with the glumes intact. The seeds were removed from the moist chamber after 48 hours and tested for viability. The treated seeds had lost their germination capacity while

the control seeds had retained it cent per cent. This is also confirmed by further direct evidence.



1. Normal seedling with primary radicle and plumule.
2. Lateral roots induced in the absorptive region by the removal of the tip of the primary radicle.
3. Secondary roots growing in the basic region after the removal of the primary radicle above the absorptive region.
4. Plumule regrown and secondary roots induced after the removal of the tip of the primary plumule and entire radicle.
5. Plumule regrown and secondary roots induced after the removal of the entire primary plumule and radicle.

Fig. 2.

The seeds of Co. 13 paddy were soaked initially for 24 hours and later incubated at 25°C. till the emerging young sprout just appeared as a feathery mass, in which neither the plumule nor radicle was distinctly distinguishable. Further growth was arrested by drying the seed. One lot was dried in the hot sun for two to three days. The sunshine was for about 7 hours every day, the range of temperature during this period being 23° to 31°C. The second lot was initially dried in the sun for 5 hours and later kept in a thermostat maintained at 30°C, till required for subsequent treatment. This lot had the advantage of the maintenance of a high temperature (30°C.) during this storage period, as also the complete exclusion of atmospheric moisture. These seeds were soaked for inducing re-germination and six to eight hours of soaking was found to be sufficient. The subsequent incubation period was regulated so that the germ was just reactivated and not allowed to increase the size of the sprout visibly. An interval of three days was allowed between the successive treatments, and the number of times the seeds were treated repeatedly ranged from one to five. The treated seeds were tested for viability and the results are presented below :

Viability tests of treated seeds

Treatment	Percentage of germination	
	Sun-dried	Sun-dried for 5 hours and kept in thermostat
Once treated	100	100
Twice treated	100	100
Treated 3 times	80	96
Treated 4 times	68	90
Treated 5 times	40	86

It is seen that the exclusion of moisture from the seed, as for instance by keeping in a thermostat, preserves fully the viability of the seed.

The treated seeds were sown in pans to study the reaction, if any, of these treatments on the resulting plant. Ordinary seed material was also sown under identical conditions to serve as control. Similar cultural treatments were given to all the treatments. Irrigation was stopped when the plants were two months old. Observations on growth and reaction to the artificially induced drought were recorded. Observations were also made in a second replicated trial, using similarly treated seeds of Co. 17 paddy. The plants from the treated seed had some extra vigour, in both the trials. The vigour gradually declined with the increase in the number of treatments the seeds received. Further, a certain degree of drought resistance was induced by this seed-treatment, the resistance being more pronounced with the increasing number of treatments. It may be mentioned that Parija (1942) found that the young seedlings from the paddy seeds, that were previously soaked to a stage when the midrib of the palea turned opaque near the base indicating the swelling of the embryo, exhibited certain drought resistance.

The phenomenon of germinal revival in seeds, subsequent to the complete wilting of the initial sprout or its injury, is not without significance to the ryot. His seed-paddy in the field is liable to get spoilt at times by inopportune rains and consequent sprouting. By properly drying such material and excluding moisture in storage, it is possible to maintain the viability of the seed stock, intended for the next season.

Abstract: Drying sprouted paddy seed or mutilation of the young plumule and radicle does not kill the germ of the seed. The same seed could be re-germinated and dried repeatedly a number of times without loss of viability.

2. Sprouted paddy seed loses its viability rapidly when stored in cloth bags in the usual manner. This is because atmospheric moisture has access to the embryonic region through the minute slit kept open in the glume during the bursting of the initial sprout; this induces mouldiness. Proper dryage of the sprouted seed and storage out of contact with atmospheric moisture ensure the viability of the treated seed being maintained for a long time.

3. The phenomenon of germinal revival after drying the sprouted seed is not without significance to the cultivator, whose seed-paddy in the

field is liable at times to get spoilt by inopportune rains and subsequent sprouting.

4. Some extra vigour is seen in the growth of the treated seed. The vigour is most when the seed is treated once and declines with the number of times the seed is re-treated.

5. Certain degree of drought resistance is induced by this treatment; this effect is more pronounced with seeds treated a larger number of times and tends to increase with the number of times the seed is re-treated.

Acknowledgements My grateful thanks are due to Mr. C. R. Sreenivasa Ayyangar, Paddy Specialist, for the many helpful suggestions given during the conduct of these studies.

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Accuracy of Estimates of Yields of Indian Cotton Forecasts with Special Reference to the Madras Cotton Crop

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Under the standing orders of the Government of India, the Director General of Commercial Intelligence and Statistics, Calcutta, issues for all India forecasts for cotton at intervals of two months—in August, October, December, February and April. The exact day and hour of the release of the forecast is announced in a Press Note about one week in advance and arrangements have been made for the publication of the information in Calcutta and Bombay simultaneously and then subsequently throughout the country in the quickest possible time.

Area The forecast is prepared on the basis of the formula — Estimates of yield = area × standard or normal outturn per acre × seasonal or condition factor. Though the acreage figures are considered to be accurate it may be noted that reliable data are lacking in the case of permanently settled areas, lands held on privileged tenure and unsurveyed tracts, though steps are being taken to make good the deficiencies.

Standard outturn Standard outturn per acre, the second element, has been defined as "the crop which past experience has shown to be the most generally recurring crop in a series of years". It is therefore the "mode" and not the average of a series of years' figures which is an arithmetical average or mean. It may be noted that the present standard outturn figures have not been worked out scientifically after a proper classification of soils and a statistical analysis of the various factors that influence yields on a series of years but are based more or less on empirical estimates prepared by the Agricultural and Revenue Departments of the normal or average yield per acre of land of average quality under the two major heads of irrigated and unirrigated land in each district. Crop-cutting experiments