No. 41 November 1985

FUNGICIDAL INFLUENCE ON PEANUT SEED GERMINATION

P.G. Harrison, Seeds Agronomist

SUMMARY

Of six samples of peanut seed tested, with and without a fungicidal seed dressing, all showed improvements to germination, reduced abnormals and less dead seed in the presence of the seed dressing fungicide. Increases in germination ranged from 2% to 61%. Reference has been made to analogies with other grain legumes and the current commercial practices in Australia regarding fungicide dressings. The conclusion is that a fungicide should be used when peanut seed is routinely tested in the laboratory.

INTRODUCTION

The rules for seed testing state that seed should be tested as received in the laboratory, except when dormancy breaking treatments such as potassium nitrate or giberellic acid or such other treatments are permitted.

In the case of large seeded legumes, fungal growth can be a problem during germination testing, with the mycelial growth often obscuring seedling structures and preventing adequate evaluation.

With *Arachis hypogaea*, it is the common practice to use a fungicidal seed dressing before field sowing in Australia. This being the case, laboratory germination, if tested without use of a fungicide, could provide misleading results and could be at worst, totally unrepresentative of field planting values.

However, seed is often submitted for testing without a fungicidal dressing. This work has been designed to evaluate the need for a fungicidal dressing in germination testing of peanuts.

MATERIALS AND METHODS

Three recognised varieties of peanut were utilised, and samples from two lines of each variety were obtained from commercial sources, as representative of seed suitable for planting. The varieties were Virginia Bunch and Florunner, normally considered confectionery types and Red Spanish, an oil type. Samples 1 and 2 were Virginia Bunch, 3 and 4 were Red Spanish and 5 and 6 Florunner.

AGDEX 141/633 ISSN 0158-2755

Each of the six samples (3 varieties x 2 lines) were split, with a portion remaining untreated and another portion was dusted with Captan fungicide. The dressing was applied carefully, to ensure no mechanical damage occurred during treatment. Excess material was sieved from the seed.

Seed was then germinated in the laboratory. Four replicates of one hundred seeds were germinated on roll paper towel (Ekwip®) at an alternating temperature of 20/30°C. Final counts were made in ten days.

RESULTS

The results of the germination tests for normal seedlings are shown in Table 1. As can be seen, the samples differed substantially in germination capacity, with Samples 3 and 4 (Red Spanish) superior to both 1 and 2 (Virginia Bunch) and 5 sample 6 (Florunner).

TABLE 1: Normal Seedlings (%) - Laboratory Test

	Sample						
	1	2	3	4	5	6	Mean
Fungicide Treated	77	71	96	93	67	72	79.3
Untreated	29	10	94	91	62	65	58.5

lsd fungicide - 14.64
lsd sample - 13.73

The higher germinating lines did not show a major effect from a fungicidal treatment. However, on the others, the effects were pronounced, particularly for samples 1 and 2, where the untreated value was less than half of that obtained using a fungicide. Mean values over all samples were 79.3% for treated seed and 58.5% for untreated seed, a highly significant result.

The results for abnormal seedlings and dead seeds are shown in Tables 2 and 3. The major effect of the fungicide has been to prevent seed death during the test period. There was little change between treated and untreated seed for abnormal percentages over most samples, except one, where it was substantial, 25% for treated and 75% for untreated. This particular sample (2) also had a very low percentage of normal seedlings.

TABLE 2: Abnormal Seedlings (%) - Laboratory Test

	Sample						
	1	2	3	4	5	6	Mean
Fungicide Treated	18	25	3	7	12	12	12.83
Untreated	35	75	4	7	14	19	25.67

TABLE 3: Dead Seeds (%) - Laboratory Test

	Sample 1	2	3	4	5	6	Mean
Fungicide Treated	4	3	1	1	3	9	3.5
Untreated	36	15	3	2	18	12	14.33

The prevention of seed death has occurred both by the reduction of abnormalities, from a mean value of 25.67% to 12.83% and by dead seeds from 14.33% to 3.5%. It is an accepted fact that abnormal seedlings are often indicators of the decline of a seed line, or the presence of weakening factors.

The presence of the fungicidal dust has increased laboratory values in normal germination and reduced abnormal seedlings and dead seeds, over all samples. Where the laboratory germination figures have been excellent, these differences have not been substantial, but where values have been moderate, the increases have been significant.

Results similar to this have been recorded in the literature for soybeans, and other grain legumes. There is a general recommendation for soybean in the US that a fungicidal seed dressing will be beneficial if laboratory values for germination are below 85%. However these are only laboratory figures. The general assumption made is that field emergence values will be less than laboratory figures, with this figure varying as laboratory values decline.

As the practical application of the use of laboratory germination data is to determine planting value, the use of a fungicidal dust would appear warranted for field use, and this is in fact, the usual practice in peanuts. Data is available from Middleton and Mayer (1984) to support the view that satisfactory emergence under both stressed and normal emergence conditions is only obtained from treated seed. Under Northern Territory conditions, stress in the form of drought or high temperatures (or both) are commonly encountered.

As the use of treated seed for planting would be the recommended procedure, it would seem desirable to laboratory test only treated seed, even if seed is to be treated in the laboratory, after receipt.

There is a cautionary note. The fungicidal dressing used in this work has been Captan, as used by Middleton and Mayer (1984). Recently, the use of Captan has been restricted in Australia, and its use as a seed fungicidal dressing is to be phased out. No suitable alternate chemical has yet been proposed.

CONCLUSIONS

Two conclusions emerge from this work. Firstly, on a practical scale, peanut seed can be severely affected by fungi during germination and will require protection in the field. Secondly, as virtually all peanut seed is treated before sowing, seed testing should recognise this fact and treat (if necessary) and report results for treated peanut seed in laboratory germination work.

REFERENCES

Anon, (1985) 'International Rules for Testing Seed', Seed Science and Technology, Volume 13, No. 2.

Middleton, K.J. and Mayer, R.J. (1984) 'Liquid formulations of seed treatment fungicides suitable for use on peanuts, 'Crop Protection', 4:4, 494-500.