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Image analysis technique to evaluate mechanical and chinch-bugs damages in beans seeds

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Research was carried out at the Image Analysis and Seed Analysis Laboratories, Crop Science Department, ESALQ/USP, in Piracicaba-SP, Brazil,with the purpose of studying the use of image analysis technique (X-ray) to identify mechanical and chinch-bugs damage, which results in losses of germination and vigor. The treatments were carried out with seeds of different lots of one cultivar (Pérola). The samples were submitted to the X-ray test and destined to the germination test, in order to determine the possible relationship between cause and effect. Simultaneously, the X-ray test was compared with the tetrazolium test. For the interpretation of the X-ray test, the severity and location of mechanical and chinch-bugs damage were considered. The results allowed the conclusion that the X-ray test is efficient to detect these types of damage in bean seeds.

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Germination rate monitoring, a useful way for seed vigour testing on maize (*Zea mays* L.)

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In spite of being a wide cultivated crop in the world, few standardised methods are available for maize to range seed lots according to their field emergence performance. Recent data show that mean germination time (MGT) could be an alternative assessment for vigour to the cold test. Our work deals with the comparison of different quality tests (cold test, conductivity test, accelerated ageing test, standard germination, germination kinetics at 13°C and 20°C) in order to rank same samples and to evaluate them as potential indicators of field emergence.The results were obtained for five seed lots, with three samples of each lot: one untreated (the control), one treated with fungicide and one treated with a combination of insecticide and fungicides to determine the influence of chemical treatment on seed vigour assessment. The link to emergence performance was clearly obtained with mean germination times at both temperatures rather than with the other vigour tests.
Nevertheless, seed lots ranking was the quite same between the different tests and seed treatments did not affect this ranking. But chemical treatments had a significative influence on vigour data: a depressive effect on accelerated ageing and, with a less degree, on conductivity and, on the other hand, a slight enhancement on MGT at 20°C and cold test.

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Electrical conductivity provides a rapid assessment of quality in chickpea seeds produced in Iran

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Ten seed lots of chickpea produced in 3 locations in Iran over 4 seasons, followed by warehouse storage, were tested in the laboratory and the field from September 2005. The normal germinations (%) ranged from 40 to 98% and were closely related to mean germination time (R^2=0.63, $p< 0.01$) and mean seedling dry weight (R^2= 0.88, $p< 0.01$). Field emergence ranged from 27 to 95% for all lots and from 42 to 95% for lots with > 70% germination. Two lots included > 40 % immature (small, green or shrunken) seeds, indicating an early harvest in the hot, dry 2005 season. The conductivity of seed soak water (after 4, 8, 12, 20 and 24h) was significantly related to normal seedlings (%) (e.g. R^2= 0.62 for 24h, $p< 0.01$).

Conductivity was even more closely related to field emergence for all lots (R^2= 0.92 for 24h) and for lots with > 70% germination (R^2= 0.87 for 24h). Higher levels of leakage were seen for lots with non-germinating seed, abnormal seedlings, and seeds that produced normal seedlings but had poor field emergence i.e. low vigour seed. Low germinating lots contained a large proportion of immature seeds but as both immature and mature seeds had low germination the lots could not be improved by sorting. Conductivity testing detected poor quality seed by detecting dead and deteriorated tissues, often resulting from harvest conditions, and presents the possibility of a test that takes just 24h, or even 4h, with an inexpensive conductivity meter. Such a test could be readily used to monitor seed quality during seed production in the absence of germination testing facilities.

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Effect of aged seed lots and invigoration treatments on plant growth, development and yield in cotton hybrids

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Four cotton hybrids NHH-44, Savita, PKVHY-2, H-8 aged lots of 2 ½, 1 ½ years and ½ year fresh seed were used. The seeds were invigorated by soaking them in double quantity of distilled water and a aqueous solutions of KNO_3 (0.2 %) and Na_2HPO_4 (10¬ -3 m) for six hours at 30±10 °C followed by drying back to original seed moisture content under shade. The invigorated seeds along with the untreated seeds (control) were used for sowing in field in order to find out effect of aged seed lots and invigoration treatments on plant growth, development and yield in cotton. Irrespective of the hybrids, plants established from aged lots, especially 2 ½ years aged lots recorded lower field emergence index, plant height, leaf area, dry matter production, number of bolls per plant, boll weight and yield per plant as against the plants grown from fresh seed lot. Plants established from fresh seeds and 1 ½ year aged seeds exhibited marginal differences in the above traits. Plants established from invigorated seeds especially with KNO_3 recorded higher values in growth parameters and yield attributes as compared to untreated (control seeds) in all hybrids. The additional improvement in growth parameters due to invigoration treatments was high in aged seeds. Savita recorded maximum seed cotton yield per hectare (34.88 Q). It was significantly superior than NHH-44 (33.52 Q), PKVHy-2 (31.69 Q) and H8 (28.25 Q). Crop raised from fresh seed gave higher yield (35.67 Q) than aged seeds of 2 ½ (27.13 Q) and 1½ years (33.46 Q). All hybrids responded well to invigoration treatments, particularly with KNO_3, obtaining higher yield. Seed invigoration with KNO_3 significantly improved yield by 19.5, 19.2 and 22.5% over the control in fresh (1/2 year), 1 ½ and 2 ½ years aged seeds. It was concluded that use of fresh or 1 ½ year aged seeds invigorated with KNO_3 is advisable for obtaining higher yields. However, use of 2 ½ years aged seeds even with seed invigoration is not advisable because of drastic reduction of yield.

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Effect of carry over seed and invigoration treatments on seedling vigour and storability in four cotton hybrids

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The demand for seed fluctuates and sometimes there may be a large surplus of seeds, which need to be stored up to 2-3 sowing seasons. The seed is initially certified for a validity period of nine months and further extended to six months each time as long as the seed meets prescribed standard germination. The use of validated carry over seed is a practice due to increase in seed cost and shortage or non availability or delay in supply of freshly produced seeds. Although the seed may meet germination standards, the biological entity may not be capable of protecting and nourishing the young seedling in the field due to ageing /deterioration in storage and the performance of validated seed may not be as satisfactory as that of fresh seed. Therefore maintenance of good germinability and vigour of carry over seed is of great importance of seed producer, supplier and the farmer. The present investigation was taken up in order to find out the effect of seed vigour and invigoration treatments (distillation, KNO_3 @0.2 % and Na_2HPO_4) along with untreated seed (control) on seedling vigour and shelf life in cotton hybrids (NHH-44, Savita, PKVHY-2, H-8). The germination percentage was high in fresh seeds as compared to aged seeds in test