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PREDICTION OF SEED STORABILITY IN NEEM (*AZADIRACHTA INDICA*) AND JAMUN (*SYZYGIUM CUMINII*) THROUGH ACCELERATED AGEING TEST

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VANANGAMUDI, K., VENKATESH, A., BALAJI, B., MALLIKA VANANGAMUDI & VINAYA RAI, R. S. 2000. Prediction of seed storability in neem (*Azadirachta indica*) and jamun (*Syzygium cuminii*) through accelerated ageing test. Seeds of neem (*Azadirachta indica*) and jamun (*Syzygium cuminii*) were subjected to accelerated ageing conditions of high temperature (41 ± 0.5 °C) and relative humidity (100%) to assess their storability. Seed samples drawn at 24-h intervals were tested for germination and seedling vigour in terms of root and shoot lengths, vigour index and dry weight. The reduction in germination below 50% occurred earlier in jamun (4th day of ageing) than in neem (6th day). However, seedling vigour deteriorated much quicker in neem than in jamun. Therefore, it is concluded that seeds of both these species should be sown in the nursery immediately after collection.

Key words: Neem - jamun - accelerated ageing - storability

VANANGAMUDI, K., VENKATESH, A., BALAJI, B., MALLIKA VANANGAMUDI & VINAYA RAI, R. S. 2000. Ramalan penyimpanan benih dalam neem (*Azadirachta indica*) dan jamun (*Syzygium cumini*) melalui ujian penuaan dipercepat. Biji benih neem (*Azadirachta indica*) dan jamun (*Syzygium cuminii*) tertakluk kepada keadaan penuaan dipercepat daripada suhu tinggi (41 ± 0.5 °C) dan kelembapan bandingan (100%) untuk menaksirkan penyimpanannya. Sampel biji benih yang diambil pada selang 24 jam diuji untuk percambahan dan kecergasan anak benih iaitu dari segi panjang akar dan pucuk, indeks kecergasan dan berat kering. Pengurangan dalam percambahan di bawah 50% terjadi lebih awal dalam jamun (hari keempat penuaan) berbanding dalam neem (hari keenam). Bagaimanapun, kecergasan anak benih berkurangan dengan lebih cepat dalam neem daripada dalam jamun. Kesimpulannya biji benih kedua-dua spesies mestilah disemai di tapak semaian dengan segera selepas kutipan.

Introduction

Neem (*Azadirachta indica* A. Juss) is one of the most valuable of all arid zone trees, endowed with a wide spectrum of uses, one of which is its pesticidal properties. Whether neem is a genuine recalcitrant or short-lived orthodox species still remains polemical. According to Chaney and Knudson (1988), it is not a

recalcitrant species but according to Willan (1985), it is a short-lived orthodox. Similarly, reports on the storability of neem seeds are contradictory. Most reports indicate a storability of two to three weeks (NAS 1980, Kamweti 1982), but there are also reports that neem seeds could be stored up to two months (Ponnusamy *et al.* 1994), five years (Roederer & Bellefontaine 1989) and even ten years (Tompsett & Smith 1991) without loss of viability. Jamun [*Syzygium cuminii* (L.) Skeels], native to India, is another important arid zone tree with many uses. Its fruits are edible, leaves used as fodder, blossoms a source of honey and bark used in dyeing and tanning (Singh *et al.* 1983, Agarwal 1986). Its seeds have been reported to be recalcitrant (Troup 1921). The optimal depth of sowing (Singh & Singhrot 1984) and date of sowing (Singh & Singhrot 1985) for the species have been reported. The accelerated ageing test according to AOSA (1983) might be a reliable test to assess whether seeds should be sown immediately or could be stored. Though used extensively in arable crops, this test has been applied in only a few tree species (Bonner 1974, Pitel 1980, Blanche *et al.* 1988, Malta & Blanche 1989). This paper reports results of the accelerated ageing test in neem and jamun.

Materials and methods

Fresh fruits of neem and jamun collected in the vicinity of the Forest College and Research Institute, Tamil Nadu, India, (11° 20'N, 76° 57'E; 300 m above sea-level; annual rainfall 830 mm; soil pH 7.1), were depulped and after surface sterilisation in 2% NaOCl followed by rinsing in sterile distilled water, the seeds were subjected to ageing in an accelerated ageing chamber maintained at 41 ± 0.5 °C and 100% RH. The seeds were spread in a single layer on bronze-wire mesh seed holders held in plastic boxes (12 × 12 × 5.5 cm) holding water to a depth of 1 cm. The boxes were tightly covered with lids and then transferred to the ageing chamber. Seed samples were taken at 0 h (prior to ageing), and at 24-h intervals and tested for germination. At each sampling, four lots (replications) of 100 seeds each were drawn. The sampling continued until the germination dropped to zero. Two months after sowing the following parameters were recorded on ten random seedlings per replication: (i) shoot length, (ii) root length, (iii) vigour index (Abdul-Baki & Anderson 1973), and (iv) seedling dry weight. Vigour index is the integral of germination and seedling length. The data were subjected to an analysis of variance (Panse & Sukhatme 1967).

Results and discussion

It has been reported that accelerated ageing causes a decline in germination capacity in all tree seeds but the rate of decline varies with the species (Blanche *et al.* 1988, Malta & Blanche 1989). This was found to be true in the present study as well. In both species, a significant reduction in germination was evident on the 3rd day of ageing. However, in neem a reduction below 50% was noticeable on the 6th day, and in jamun on the 4th day (Figure 1). In jamun, germination

dropped to zero on the 7th day, whereas in neem it did so only on the 11th day. But the neem seeds had a much higher initial viability. Thus from the standpoint of viability, neem is indicated to be slightly more viable and resistant to accelerated ageing conditions than jamun.

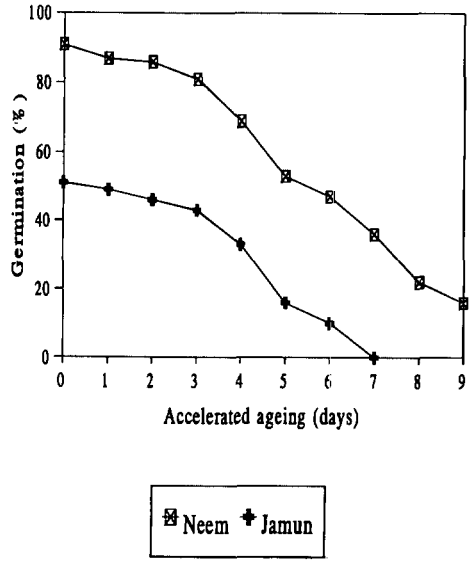

Figure 1. Effect of accelerated ageing on seed germination in neem and jamun

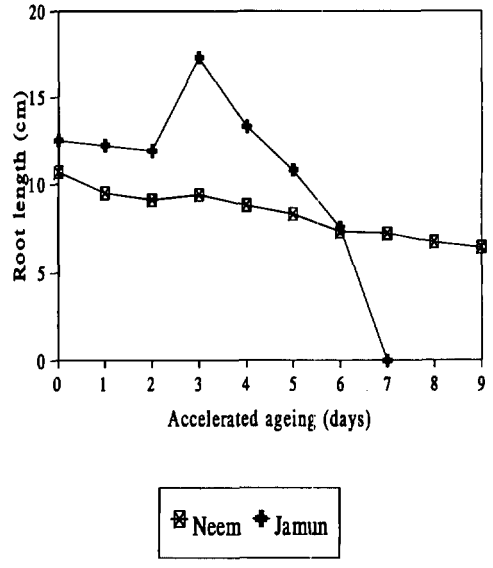

Figure 2. Effect of accelerated ageing on root length of seedlings in neem and jamun

However, considering vigour parameters like seedling size, vigour index and dry matter, deterioration started earlier in neem than in jamun. In neem, all these parameters sustained a significant debilitation already on the first day but in jamun root length showed no loss up to five days (Figure 2), shoot length up to four days (Figure 3) and vigour index up to three days (Figure 4). Dry matter production in fact showed an upward trend up to four days in jamun, while a reduction in this variable was evident on the first day in neem (Figure 5). But the reduction in neem was relatively small.

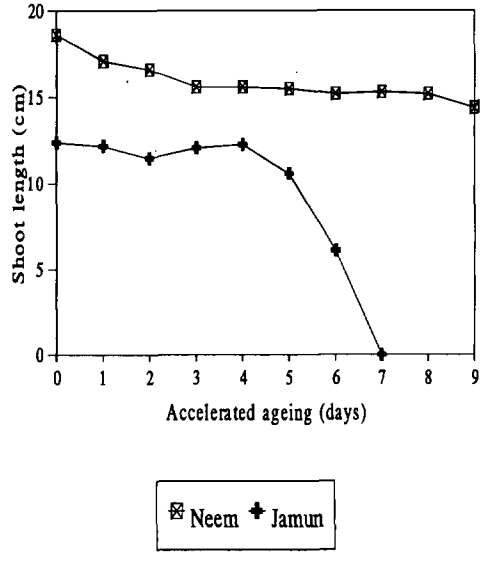

Figure 3. Effect of accelerated ageing on shoot length of seedlings in neem and jamun

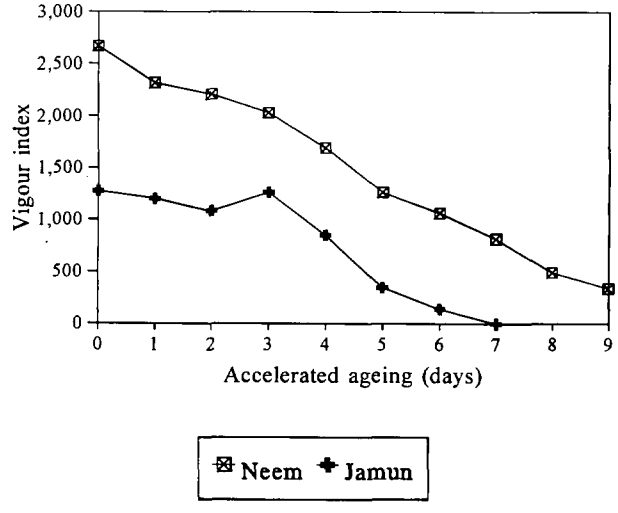

Figure 4. Effect of accelerated ageing on vigour index of seedlings in neem and jamun

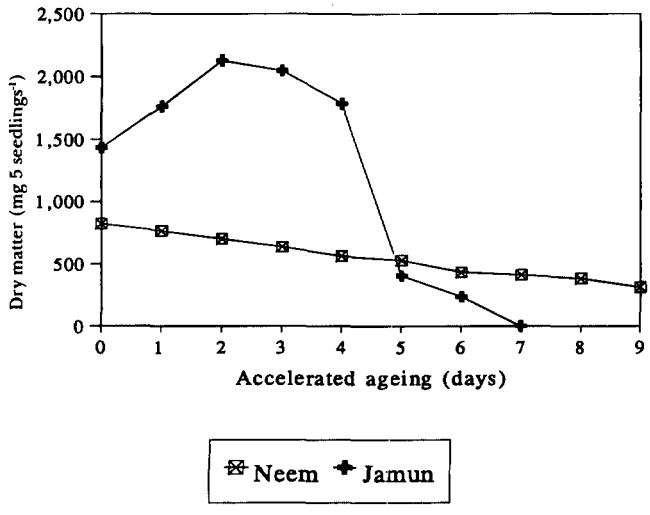

Figure 5. Effect of accelerated ageing on dry matter of seedlings in neem and jamun

Since both viability and vigour are important, it is suggested that seeds of both these species should be sown immediately after collection and storage, and if necessary, kept to a minimum.

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