

EFFECT OF DRUPE MATURITY ON SEED GERMINATION AND SEEDLING VIGOUR IN NEEM

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BHARATHI, A., UMARANI, R., KARIVARATHARAJU, T.V., VANANGAMUDI, K. & MANONMANI, V. 1996. Effect of drupe maturity on seed germination and seedling vigour in neem. A study was carried out with seeds obtained from a 20-y-old neem tree (*Azadirachta indica*) at different drupe maturity stages, namely green (G), greenish-yellow (GY) and yellow (Y). Germination percentage, root and shoot lengths, dry matter production (DMP), vigour index (VI) and germination value were assessed. The results of the study showed that among the maturity stages, greenish-yellow drupes registered superiority over yellow and green drupes. Hence, for maximum vigour and viability of neem seed, the drupes should be harvested when they turn greenish-yellow (GY) in colour.

Key words: Neem - drupe maturity - greenish-yellow - germination value

BHARATHI, A., UMARANI, R., KARIVARATHARAJU, T.V., VANANGAMUDI, K. & MANONMANI, V. 1996. Kesan kematangan drup ke atas percambahan biji benih dan kecergasan anak benih di dalam neem. Kajian dijalankan dengan biji benih daripada pokok neem (*Azadirachta indica*) berumur 20 tahun pada tahap kematangan drup yang berbeza, iaitu hijau (H), kuning kehijauan (KH) dan kuning (K). Peratus percambahan, panjang akar dan pucuk, penghasilan bahan kering (PBK), Indeks Cergas (IC) dan nilai percambahan telah dinilai. Keputusan kajian menunjukkan di antara tahap kematangan, drup kuning-kehijauan mencatatkan kelebihan berbanding dengan drup-drup kuning dan hijau. Oleh itu, bagi kecergasan dan viabiliti maksimum biji benih neem, drup harus tuai apabila warnanya berubah kepada kuning-kehijauan.

Introduction

Neem (*Azadirachta indica* A. Juss) is a common tree throughout India because it grows vigorously under arid, semi-arid as well as humid tropical conditions and responds to many needs. Native to India and Myanmar, the neem is a member of the family Meliaceae, the mahoganies. Owing to their many uses, neem seeds are considered important, foremost of which is the use of neem kernels as a source of biologically active substance for pest control, which is increasing world-wide.

Distinct colour changes associated with the attainment of fruit maturity in hardwoods have recently been revived as practical maturity indices particularly in the Southern United States. The main reason is that other indices offer no

advantage over this easily observed attribute. Bonner (1974), Oliver (1974) and Rietveld (1978) indicated that colour of mature fruit, germination percentage, seedling dry matter, root and hypocotyl lengths of seedlings were the best criteria in fixing the maturity stages. Colour changes have also been recommended as ripeness indicators in oak (Bonner 1974), in green ash (*Fraxinus pennsylvanica*) (Bonner 1973), in black cherry (*Prunus serotina*) and in yellow poplar (*Liviodendron tulipifera*) fruits (Bonner 1975). Pfister (1967) has also recommended fruit colour as an index.

This study on the effect of drupe maturity on seed germination and development in neem will help tree scientists to fix the optimum time of harvest and to have an insight into physiological aspects as causative factor for effective storage. Documentation of such aspects abounds on the temperate species, but not tropical tree species including the test species in the present study.

Materials and methods

From the existing tree stand at the Tamil Nadu Agricultural University, Coimbatore, a tree approximately 20 years old was selected. At flowering, a sufficient number of flowers were tagged on the same day for collection of drupes later for this study corresponding to the colour of the drupes. The drupes at different maturity stages, namely green (G), greenish-yellow (GY) and yellow (Y) were collected. The seeds were extracted by soaking in water for a day and the fruit wall and fleshy mesocarp were removed by hand pressing and thorough washing with water. The seeds were dried in the shade at ambient temperature (25 °C on an average) by spreading them in a single layer for three days.

Germination test was conducted with 4 × 100 seeds adopting the sand method at 25 ± 1 °C and 90 ± 3% relative humidity in the seed germinator. After 21 days, a count on normal seedlings was made and expressed as germination percentage (International Seed Testing Association 1985). Root and shoot lengths, dry matter production (DMP), vigour index (VI) (Abdul-Baki & Anderson 1973) and germination value (Czabator 1962) were assessed. The data recorded were subjected to analysis of variance using completely randomised design (Panse & Sukhatme 1967).

Results and discussion

The green, greenish-yellow and yellow drupes exhibited large differences in their germination potential. Germination percentage (Figure 1) was highest in the greenish-yellow drupes (95%) followed by the yellow drupes (92.5%). The germination value of the yellow drupes (52.9) was higher than that of the green (45.1) and green (20.6) drupes. Evaluation of drupe performance at three different stages of maturity reveals the superiority of greenish-yellow drupes. This may be attributed to maximum accumulation of storage food reserves during development and maturation of seed. Arisman and Powell (1986) reported that the seeds from

brown cones of *Pinus merkusii* recorded higher germination than from green cones. The change in fruit colour can be recommended as a visual index for the ripeness of seeds of *Ailanthus excelsa* (Ramakrishnan 1988) and *Casuarina equisetifolia* (Kajamaideen *et al.* 1990). A colour change from green to light brown in acorns of white oak (*Quercus alba*) and dark red brown in shumard oak (*Q.shumardii*) was found to be a very good maturity indicator (Bonner 1976).

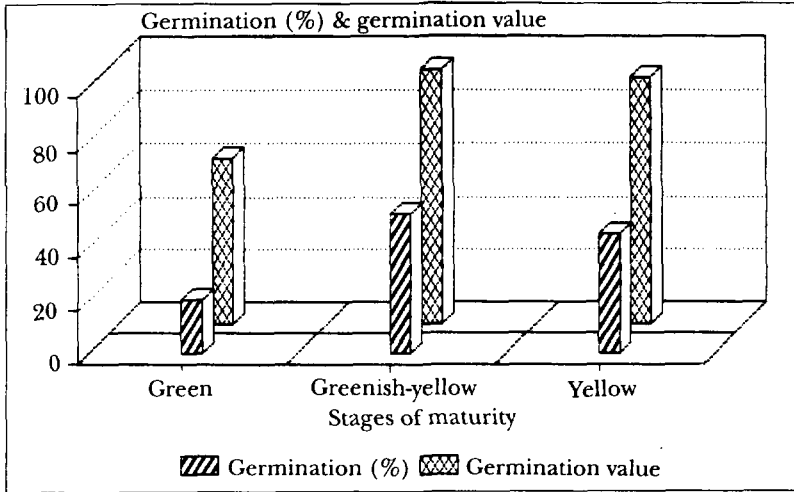


Figure 1. Effect of drupe maturity on germination of neem seed

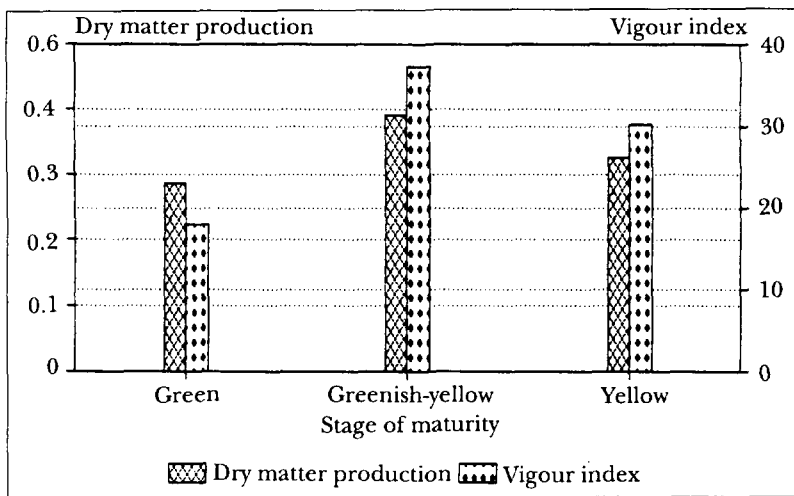


Figure 2. Effect of drupe maturity on vigour of neem seed

Root and shoot lengths ranged from 10.4 (green drupes) to 11.1 cm (greenish-yellow drupes), and from 17.4 to 18.3 cm respectively. The seedling dry matter and vigour index were highest in the seeds from the greenish-yellow drupes with respective values of 0.393 g and 37.84 while the corresponding values for the yellow drupes were 0.297 g and 17.85. It is well documented that the more mature seeds are when harvested, the greater their vigour and potential for establishment (Ching & Ching 1962, Pollock & Roos 1972).

From this study, it is concluded that neem drupes are best harvested at the greenish-yellow stage for optimal seed quality attributes.

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