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GERMINATION CAPACITY, VIABILITY AND MAINTENENCE OF STORED POLLEN OF *VIGNA MUNGO* L.

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ABSTRACT

Germination and viability of stored pollen of *Vigna mungo* L., was examined up to 48 weeks in different concentrations of sucrose and boric acid solutions. Viability under storage was determined by storing pollen in different conditions as refrigerator (+4°C), freezer (-20°C, -30°C), freeze drier (-60°C), in vacuum and in organic solvents. Pollen stored at low temperature showed better germination percentage compared to pollen stored at +4°C and fresh. Freeze dried pollen (-60°C) showed the highest germination percentage, while in vacuum pollen showed good germination compared to organic solvents, where benzene showed reasonable germination in early hours but later lost viability.

Key-words: *Vigna mungo*, low temperature, freeze drier, germination, viability, pollen grains.

INTRODUCTION

Palynology is concerned with both the structure and formation of pollen and spores, and also with their dispersal and preservation under certain conditions. Recently pollen physiology especially germination and viability has received considerable attention for its application in plant breeding, conservation, adaptation and understanding physiology behavior. There are several reports on pollen germination and viability of different taxa (Nair and Singh, 1972; Vijay, 1972; Mehan and Malik, 1975; Kapoor, 1976) with varied aims and objectives. Maintained the germination capacity of stored pollen can be useful in time saving in hybridization programs, and also in crops improvement. Pinny and Polito (1990) reported germination of Olive pollen improved markedly in storage conditions. According to Aslantus and Pirlak (2002), the germination capacity of strawberry pollen increased in low temperature. Pollen must be stored to protect the male gamete on their journey. Long-term storage has been achieved in many taxa by freeze-drying method (King, 1965). The pollen are of two types Trinucleate and Binucleate, the former one is very hard to germinate on artificial media while the later one is easy to handle. At low temperature the pollen shows germination capacity better than at high temperature (Stanley and Linskens, 1974). Recently extensive studies have been carried out on pollen storage; various methods have been tried for successful storage of different taxa, (Johri and Vasil, 1965; Gill, 1992; Malik and Thind, 1992; Shivanna and Rangaswamy, 1992; Thomas, 2000; Roger, 2001). Storage of pollen in vacuum and in organic solvents reported by different workers (Datta and Chaudhary, 1965; Iwanomi, 1971; Hanson and Campbell, 1972; Amma and Kulkarni, 1979).

Present investigations are the first attempt to analyze storage conditions of *Vigna mungo* L., no reports are available on germination capacity of stored pollen of this economically important plant.

MATERIALS AND METHODS

During the peak of flowering period of *Vigna mungo* polliniferous material was collected in large quantity from cultivated fields and green house. Fresh pollen was systematically subjected to preliminary viability tests (Alexander, 1996). Pollen culture media was prepared according to standard method of Brewbaker and Kwack (1963). The germination was scored after 3-6 h of incubation at room temperature in humid chambers using different solutions. Pollen grains equal to at least twice the diameter of pollen grains counted as germinated pollen while burst pollen was not counted as germinated pollen. The viability of stored pollen was assessed in terms of percent germination. The pollen grains slides were also prepared for light (LM) and scanning (SEM) microscopy using the standard methods of Erdtman (1952), for light microscope the pollen grains were mounted in unstained glycerin jelly and observation were made with a Nikon type- 2 microscope.

RESULTS AND DISCUSSION

Pollen viability of stored pollen of *Vigna mungo* L., (Papilionaceae) has been examined up to 48 weeks stored at different conditions refrigerator, freezer, freeze drier, vacuum and in organic solvents. Pollen stored at low temperature freeze drier showed the better germination percentage in concentration solutions (60%, 80%)in first

three weeks, but with the time germination was decrease. This method seems to have more potential to maintaine viability compared to other conditions. Freezer conditions (-20°C, -30°C) showed good germination but as the time proceeds the germination percentage gradually decreases and after 48 weeks the germination was 11.6% and 31.1% respectively (Fig. 1). The germination percentage of +4°C and fresh pollen was almost same in first week. Pollen stored at +4°C showed above 65% germination in early weeks but then germination decreased rapidly and after 48 weeks germination was only 6.7%. Among solvents benzene showed good germination up 15 h of soaking compared to acetone and chloroform, where pollen lost viability very early. Pollen treated in vacuum over silica jel, this condition showed good germination up to 15 h but decreased at the end, here germination was higher compared to organic solvents. Conclusively temperature and humidity are the major influencing factors in pollen behavior of different conditions.

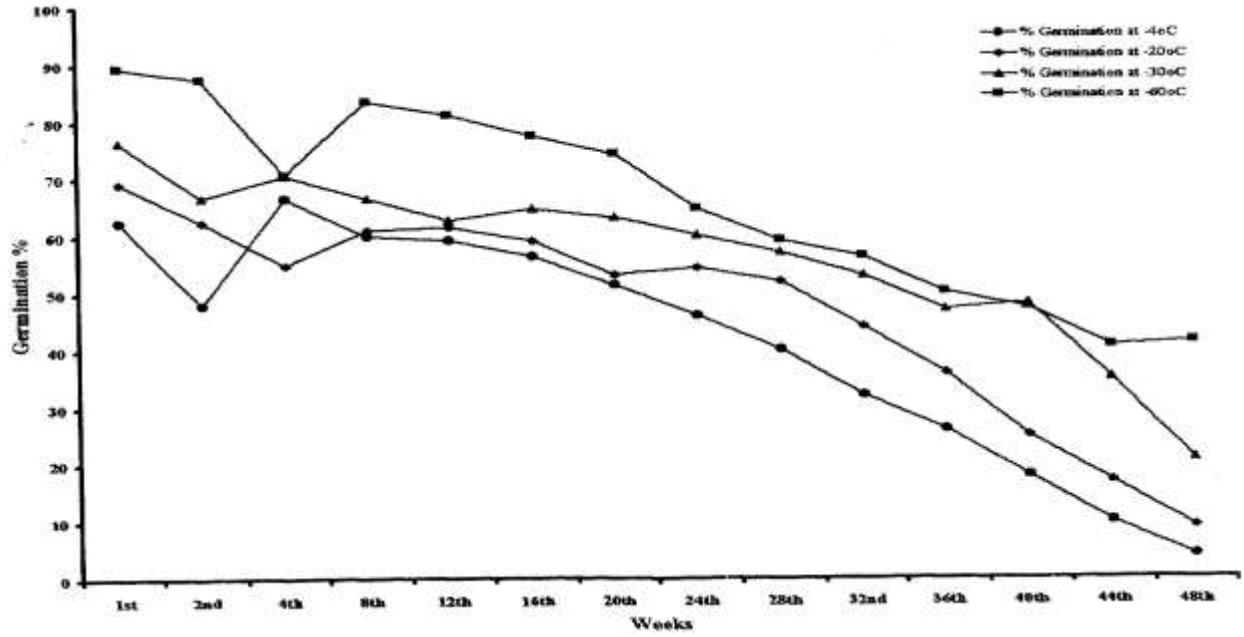

Fig.1. Germination capacity of stored pollen of *Vigna mungo* L. at different temperature conditions.

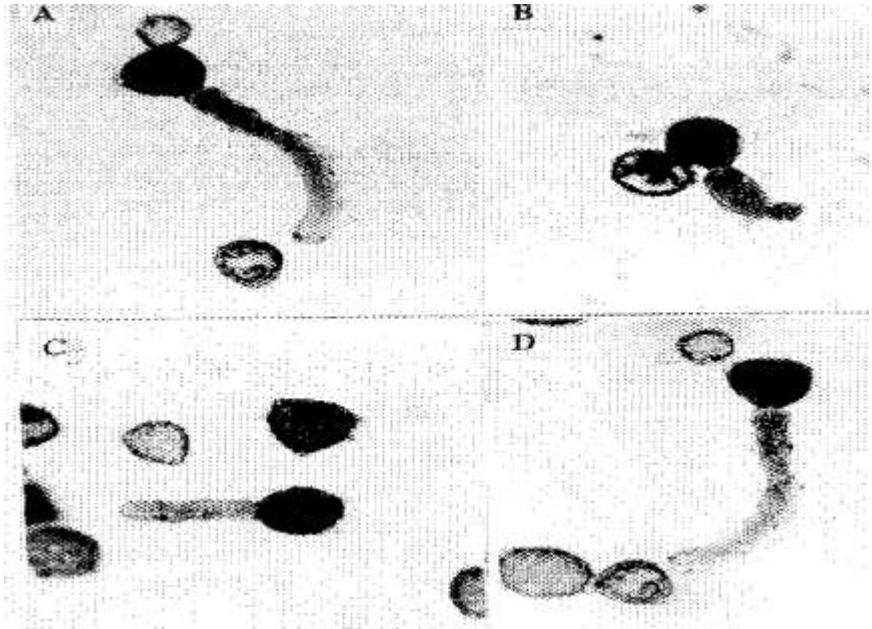

Fig.2. Light micrograph of A: germinating pollen grain at +4 C; B: germinating pollen grain at -20C; C: germinating pollen grain at -30C; D: germinating pollen grain at -60C.

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