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MAINTENANCE OF POLLEN GERMINATION CAPACITY OF *VITIS VINIFERA* L. (VITACEAE)

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Abstract

Pollen germination of *Vitis vinifera* L., of the family Vitaceae was examined in fresh and stored pollen upto 48 weeks at different temperature i.e., refrigerator (+4C), freezer (-20C, -30C) and freeze drier (-60C). Pollen stored at low temperature showed better germination percentage as compared to pollen stored at +4C and fresh. Freeze dried pollen (-60C) showed the highest germination percentage. Whereas lowering the storage temperature and moisture contents tends to increase the viability.

Introduction

Biopalynology refers to manipulation of various aspects of pollen biology for crop production and improvement. The important factors for pollen conservation are storage temperature and moisture content of the materials (King, 1961; Malik & Thind 1992). Pollen shows better germination capacity at low temperature than at high temperature and the ability of pollen to grow is dependent upon the inherent chemistry of the pollen (Stanley, 1971, Stanley & Linskens, 1974). Likewise, the pollen grains of different species required varying range of growth media like water, sugar solution, inorganic salts and vitamins for their successful germination (Iwanomy, 1971; Amma & Kulkarni, 1979). Piney & Polito (1990) reported germination of olive pollen improved markedly in storage conditions.

The preservation of viable pollen is the subject of numerous investigators such as, Niesenbaum (1999); Kopp *et al*., (2000), Panson *et al*., (2001), Candace & Maureen (2003) and Perveen *et al*., (2007). Similarly, Khan & Perveen (2008, 2009) studied the germination capacity of *Malus pumila* and *Magnifera indica* respectively. Present studies were carried out to examine the storage conditions and viability of *Vitis vinifera* pollen.

Materials and Methods

During the flowering period of *Vitis vinifera* pollen were collected in large quantity from farms. Fresh pollen were systematically subjected to preliminary viability tests (Alexander, 1996). Pollen culture media were prepared according to standard method of Brewbaker & Kwack (1963). Pollen tube equal to at least twice the diameter of pollen grains were considered as germinated, while burst pollen were not considered as germinated. The viability of stored pollen was assessed in terms of germination percentage. The stored pollen were germinated in humidity chamber in different sucrose solutions ranging from 20-70% to which10% boric acid was added. For light microscopy pollen grains were mounted in unstained glycerin jelly and observation were made with a Nikon type-2 microscope.

Table 1. Germination capacity of stored pollen of Vitis vinifera (Vitaceae) at different temperature and humidity conditions in sucrose and boric acid solutions.

Period in week	Different Temperature and Humidity condition							
	% of germination at 4°C	% of solutions	% of germination at -20°C	% of solutions	% of germination at -30°C	% of solutions	% of germination at 60°C	% of solutions
4	53.4	30	61.00	40	54.40	40	63.10	40
8	50.00	30	60.00	30	54.00	40	61.50	30
12	48.10	30	58.00	30	51.20	40	60.00	40
16	48.70	30	54.00	30	48.00	40	56.50	40
20	40.60	30	52.10	30	44.00	40	52.10	40
24	28.60	30	48.00	30	41.50	40	49.10	30
28	28.00	30	43.70	30	36.50	40	46.70	30
32	21.00	30	40.00	30	32.00	40	42.50	30
36	17.00	30	34.60	30	28.60	40	38.90	30
40	13.00	30	31.20	30	25.60	40	33.50	40
44	9.40	30	26.50	30	21.60	40	30.00	40
48	6.50	30	21.00	30	18.00	40	26.30	40

Results and Discussions

In the present investigation an attempt has been made to compare the efficiency of pollen storage in *Vitis vinifera* L. Pollen viability was examined up to 48 weeks in different storage conditions viz., refrigerator at (+4C), freezer (-20C-30C) and freeze drier (-60C). Pollen grains of *Vitis vinifera* are binucleate. Pollen at room temperature showed 54% germination in 40% sucrose solutions to which 10% boric acid was added.

This species showed better germination percentage in early 4 weeks, but the germination percentage decrease slowly after 4 weeks. Pollen stored at low temperature i.e., in a freeze drier showed better germination percentage in 30%-40% solutions in first 4-12 weeks, but after that germination percentage decreased slowly. This condition seems to have more potential to maintain viability as compared to other conditions. However, *Carica papaya* pollen showed more germination percentage after 48 weeks of storage i.e., 62.60 (Perveen *et al*., 2007). Pollen stored in freezer at -20C and -30C showed better germination but with the increase in time the germination percentage gradually decreased and at 48 weeks the germination was 21% and 18% respectively (Table 1). Present findings are also in agreement with those of Stanley & Linskens, (1974) where pollen stored at low temperature presented better germination capacity than high temperature. Similarly, Aslantus & Pirlak (2002) also reported that germination capacity of strawberry pollen increased in low temperature. However, germination percentage of +4C and fresh pollen was almost same in first week. Pollen stored at +4C showed 53.40-50% germination in early two weeks but germination further decreases rapidly and upto 48 weeks germination was very low i.e., 6.50%.

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