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IN VITRO SEED GERMINATION OF *CALANTHE MASUCA* (D. DON) LINDL. (ORCHIDACEAE)[1]

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ABSTRACT

The paper describes effect of some of the growth substances on germination of seeds of *Calanthe masuca* (D. Don) Lindl. On Basal medium (VW) the percentage of germination was observed to be poor. However, a significant response was noted when coconut milk (10%) was added to the basal medium. Maximum percentage of germination was observed on Basal medium + Peptone (1 g/L) + Coconut milk (10%).

INTRODUCTION

Generally the orchid growers follow vegetative propagation for multiplication. However, of late the propagation of orchids has been successfully made through the seed culture rather than vegetative propagation. The growing of orchids through seeds has an interesting history. Till the beginning of the present century it was not possible to germinate orchid seeds under controlled conditions (Withner, 1959). In nature, the orchid seeds germiate only when they are in symbiotic relation with the mycorrhizal fungus. Kundson (1922) found that the only function of the fungus associated with the orchid seeds was to convert the complex starches in to simple sugars. The discovery that the orchid seeds can be germinated in asymbiotic condition by Knudson (1946) opened a new venue to the orchid propagationists. The orchid seeds which are produced in abundance are fragile sturctures having no stored food material. Seeds of *Calanthe masuca* (D. Don) Lindl., like those of several other orchids, offer ideal material to study the embryo development. The embryo contained within the seed at the time of shedding is morphologically simple and undeveloped corresponding to the globular stage of dicotyledonous embryo. Nutrition of orchid embryo has been studied extensively (Knudson, 1922; Burgeff, 1936; Withner, 1942; Thomale, 1954). The present investigation describes the effect of some of the growth substances on seed germination and growth of the seedlings in *Calanthe masuca* (D. Don) Lindl. *in vitro*.

MATERIALS AND METHODS

Seeds of *Calanthe masuca* (D. Don) Lindl. were obtained from plants growing in the orchidarium of Botany Department, Karnatak University, Dharwad. The plants were collected from Sirsi (North Kanara Dist.) of Karnataka State. They were first surface sterilized with saturated chlorine water for three minutes, washed three times with sterile distilled water and innoculated

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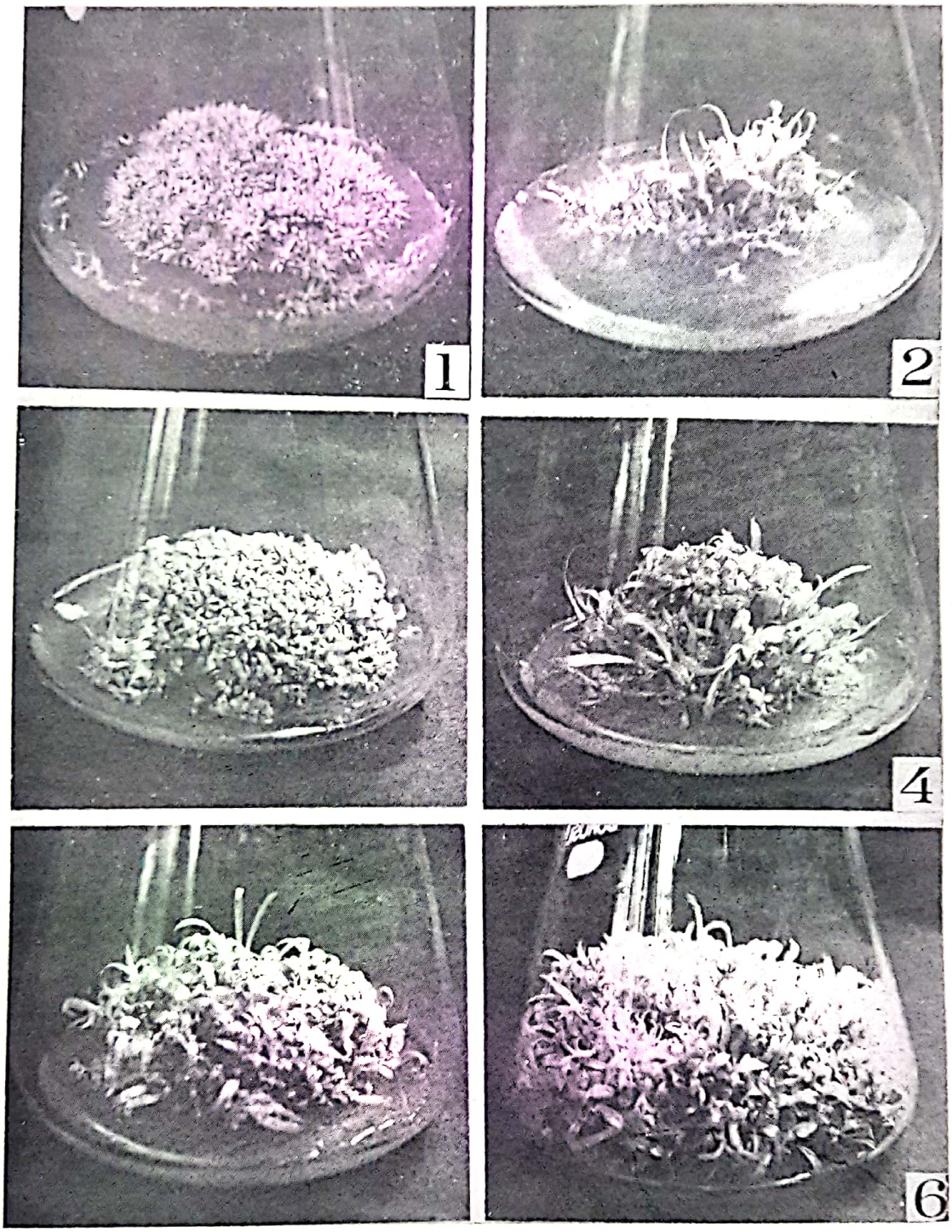

Figs. 1—6 Fig. 1. Showing protocorms on BM+Peptone (1g/L) + CM(10%) after 4 weeks. Fig. 2. Young seedlings on only Basal medium. Fig. 3 (mid. left) Young seedlings on BM+CM (10%). Fig. 4. Tuberoids and young seedlings on BM+Thaimine hydrochloride (0.2 mg/L) + Nicotinic acid (0.1 mg/L). Fig. 5 bottom left). Young seedlings on BM+Peptone (1g/L). Fig. 6. Ten week old culture on BM+Peptone (1g/L)+CM (10%) showing maximum percentage of germination.

Abbrevations

*1. BM (Basal medium) 2. CM (Coconut milk) 3. VW (Vacin and Went)

on solidified 'Vacin and Went' medium (1949). The medium was supplemented with Coconut milk (CM), Peptone, nicotinic acid and Thaimine hydrochloride. The pH of the medium was adjusted to 5.0-5.2. Cultures were maintained in 12 hour photoperiod from cool day light flourescent tubes giving a total intensity of 2000 lux at culture level and at a temperature of 25±2°C. Observations were made once in three days to detect the emergence of germinating embryo and the primordia of leaf and the root. When growth resumed they were transferred on to fresh medium.

RESULTS AND DISCUSSION

In majority of the cases the seeds were swollen within two weeks. During germination the swollen embryos emerge first from the seed coats as creamy white structures. These later develop into 'top-shaped' protocorms with numerous rhizoids (Fig. 1). After 8 weeks of culture, the protocorms differentiate into shoot apices which develop into shoots with 2 to 3 leaves. About 25% of seeds were observed to germinate on basal medium (Fig. 2). On the contrary,a significant positive response was observed on BM*+CM* (10%) (Fig. 3). According to Fast (1973), addition of peptone (2 g/L) and the milk of unripe Coconut (20-50 ml/L) to the culture medium stimulates seed germination. However, in the present study, it was observed that peptone alone and in combination with coconut milk results in maximum percentage of germination of seeds (Fig. 5 and 6). But, on BM+Thaimine hydrochloride (0.2mg/L)+Nicotinic acid (0.1mg/L) about 60% seed germination was noticed (Fig. 4). Maximum percentage of germination was observed on BM+Peptone (1g/L)+CM (10%) (Fig. 6). Peptone alone and in combination with coconut milk is ideally suited to result in the maximum percentage of germination of seeds and enhance the seedling growth in *Calanthe masuca* (D. Don) Lindl.

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