SUMMARY
Presently, the embryos (seeds) from 11 species representing both the epiphytic and terrestrial habits, were germinated in different nutrient regimes. The present studies were conducted to assess the utility of "green pod culture" technique and to investigate their morphogenetic responses in and nutritional requirement of the embryos. The seeds were procured from the unripened green capsules ("pods") except in *Cymbidium insigne*, where these were obtained from mature capsules. The seeds were minute, non-endospermic and contained unorganized embryos within a more or less transparent seed coats. Though, mostly monoembryonate, they were occasionally biembryonate in *Zeuxine strateumatica*.

A comparative analysis of morphogenetic changes in the embryos prior to their development into seedlings, made an interesting study. In most of the taxa, their sequential development into spherules and protocorms was followed by differentiation of leaf and root primordia. Epidermal hairs developed profusely in the spherules and/or protocorms, along the surfaces in contact with the medium. The process of seedling development was also interrupted by an intervening rhizomatous phase as either spherules (*Zeuxine strateumatica*) or protocorms (*Nephelaphyllum cordifolium*) developed into rhizomatous bodies, prior to their differentiation into seedlings. However, in *Pleione maculata* and *Spiranthes sinensis*, the lower half of protocorm developed into fleshy rhizomatous structure, and the upper half into an embryonal shoot. The stage for chlorophyll development, also varied with the species and the nutrient regime as it was developed either prior to
(Acampe carinata, Aerides multiflorum, Cleisocentron trichromum, Cymbidium insigne, Gastrochilus calceolaris, Nephelaphyllum cordifolium, Phaius flavus)
or during (Pleione maculata, Rhynchostylis retusa) or after (Zeuxine strateumatica) protocorm development. Depending upon the genotype and the nutritional requirement, the protocorms exhibited direct or callus mediated multiplication, whereas in Spiranthes sinensis, proliferations were traced to the epidermal cells. The callus was fragile, cream-coloured (Acampe carinata, Gastrochilus calceolaris, Pleione maculata, Rhynchostylis retusa) or green compact (Cymbidium insigne) type masses. In Pleione maculata callus formation was greatly influenced by the medium composition: the protocorms callused in MS medium, but these failed to do so in M medium.

The epiphytic species germinated better than the terrestrials. The germination response varied with the age of the seeds after pollination and the earliest stage for their germination varied with the species and the nutrient regime. These germinated best when collected from fruits after about half of the total time (wap) they take to mature, and those collected later (Cymbidium insigne, Nephelaphyllum cordifolium, Phaius flavus) either germinated poorly or their germination remained arrested at spherule stage, unless cultured in growth adjunct enriched environment.

Except for Gastrochilus calceolaris and Nephelaphyllum cordifolium, where germination response of the embryos and their subsequent development into seedlings was tested in only M medium, in all other species, the said responses were assessed in more than one media formulations (M, $M^+$, MKC, MS, PDA). The role of various growth adjuncts was also analysed in each of these media in order to find out the most suited nutrition for each of the present species. Currently, however, PDA medium proved beneficial during
germination and seedling development in epiphytes but the terrestrials responded differentially to this medium. Among the chemically defined media, all the species germinated readily in M medium and did so selectively in MKC and MS media.

In the epiphytic taxa, Aerides multiflorum, Cleisocentron trichromum and Rhynchostylis retusa, the germination frequency, protocorm multiplication and subsequent development of seedlings was retarded unless vitamins were used in the medium, whereas in the ground growing Phaius flavus, the germination frequency improved in combination lacking vitamins, but the seedlings failed to differentiate. Besides vitamins, micronutrients and iron salts in the medium proved to be important for growth and development of orchid seedlings.

The effects of growth adjuncts on the germination, protocorm development and subsequent differentiation into seedlings also varied with the species, physiological age of the seeds/germinating entities, and the medium composition. Among the hormones, 2,4-D proved to be harmful during germination and seedling growth, while GA₃ favoured the development of elongated protocorms and etiolated seedlings. All the auxins affected detrimentally to the germination of Aerides multiflorum. Among the organic growth supplements, urea proved to be toxic during germination. YE proved obligatory for seedling differentiation as well as for in vitro flowering in Spiranthes sinensis, while in Zeuxine strateumatica, YE in addition to either AC/or Kn proved obligatory for the same. AC proved obligatory for root development in Cymbidium insigne, and seedling differentiation in Nephelaphyllum cordifolium. AC generally, supported better developed seedlings as compared to medium lacking AC.