Specimens of *Morchella esculenta* were collected during March-May and September-October at diverse habitats in different locations of Himachal Pradesh. Isolate I and VI were designated as ‘Pre-Winter’ and ‘Post-Winter’ strains, respectively, on the basis of mycelial growth and per cent sclerotial production biological efficiency. Mycelial growth of both the strains was found to be optimum on Coon’s medium at pH 6.0 and a temperature range of 20-25°C. Heterokaryons were generated by mating monoascosporous cultures of two different strains in all possible combinations. Monokaryons and heterokaryons exhibited variations in growth characteristics. ‘Post-Winter’ strain gave maximum per cent sclerotial production biological efficiency. Monokaryotic mycelia and their sclerotia showed multinucleate hyphae. Tissue cultured mycelia of ascocarps and their sclerotia and generated heterokaryons and their sclerotia possessed nuclei mostly in pairs. Soil moisture level of 40 to 50 per cent, soil depth of 0.5 cm, complete darkness and supplementation of soybean meal (5-7%) in the forest soil supported extensive myceliogenic germination of sclerotia. Chilling treatment for a short duration at 0°C resulted in the formation of small mycelial knots on the sclerotia derived from ascocarp mycelia and heterokaryotic mycelia. Mycelial knots did not develop on sclerotia obtained from monokaryotic mycelia. Thus, establishing the role of heterokaryosis in morel’s life cycle.