Occurrence of vivipary in *Capsicum annuum* L. cv. California Wonder

Vivipary is commonly observed in many mangroves[1], wherein the seeds germinate and seedlings grow while still attached to their mother plant before dropping down to establish themselves or be transported elsewhere. Morphological, ecological and physiological explanations have been put forward to explain why so many mangrove species demonstrate vivipary. However, vivipary is rarely reported in flowering plants accounting for less than 0.1% of the angiosperms[2,3]. Here, we document the occurrence of cryptovivipary in *Capsicum annuum* L. cv. California Wonder, and leave clues for further research on understanding the viviparous nature in capsicum and its ecological and evolutionary significance. Cryptovivipary (Greek *kryptos*, hidden) is the condition in which the embryo grows to break through the seed coat but not the fruit wall before it splits open.

Our Division is engaged in research on biofuels and, abiotic stress tolerance using biotechnological and conventional approaches. The potential of chemical seed priming is being studied to impart abiotic stress tolerance in crop plants[4]. In the seed priming experiment, capsicum seeds were treated with various chemical priming agents like calcium chloride (50 mM), hydrogen peroxide (1.5 mM), potassium nitrate (300 mM), abscisic acid (ABA, 100 μM), polyethylene glycol (PEG 6000; 16.7 mM), thiourea (1.3 mM), sodium chloride (50 mM) and copper sulphate (5 mM) for 24 h pregermination. The primed seeds in general exhibited faster germination and better seedling establishment as well as imparted tolerance to subsequent exposure to cold (4°C) stress than the control. The plants obtained from chemically primed seeds were grown inside a partially controlled (temperature 27 ± 2°C; relative humidity 50%) greenhouse situated at Haldwani (lat. 29.2°13′N, long. 79.5°31′E). The seeds in the fruits harvested from plants grown from seeds primed with potassium nitrate, hydrogen peroxide, ABA and calcium chloride exhibited viviparous germination. Whereas fruits harvested from the plant grown from control (non-primed), hydro-primed or other chemically primed seeds did not show vivipary. Seeds in several stages of germination, viz. tiny embryos emerging from the seed coat to young seedlings with small cotyledons, elongated hypocotyls and radicals were observed in mature fruits (Figure 1 *a–c*), while they were still attached to the mother plant. Earlier, Marrush *et al.*[3] had reported the incidence of vivipary in capsicum grown in nutrient solutions deficient in potassium than the seeds in fruits from plants grown with adequate potassium levels. However, in the present study, all the plants were optimally supplied with essential elements, including potassium and the occurrence of the vivipary was limited to some of the priming treatments. On transferring the germinating seedlings to a wet tissue paper placed in glass petri plate (Figure 1 *d*), the viviparous seedlings grew faster than their normal counterparts, indicating vivipary as an adaptive reproductive strategy enabling rapid establishment of the seedlings. However, the phenomenon does not seem to be economical, as the loss of dormancy will not allow seed storage, thus reducing the viable seed yield. The seedlings are being grown for further understanding of the viviparous nature in capsicum and its ecological and evolutionary significance.

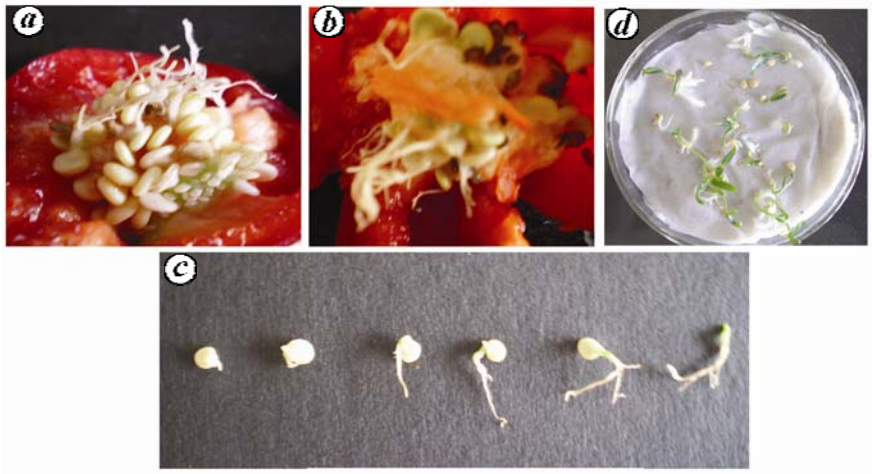

Figure 1. Viviparous germination in *Capsicum annuum* L. cv. California Wonder. ***a*** and ***b***, Seeds showing viviparous germination in fruits still attached to the mother plants. ***c***, Germinating viviparous seeds at various stages. ***d***, Plantlets developed from the viviparous seeds.

1. Cota-Sanchez, J. H., *Flora*, 2004, **199**, 481–490.
2. Farnsworth, E., *Annu. Rev. Ecol. Syst.*, 2000, **31**, 107–138.
3. Marrush, M., Yamaguchi, M. and Saltveit, M. E., *Am. Soc. Hortic. Sci.*, 1998, **123**, 925–930.
4. Patade, V. Y., Bhargava, S. and Suprasanna, P., *Agric. Ecosyst. Environ.*, 2009, **134**, 24–28.

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