

Lenz, T.I. & Facelli, J.M. (2003). Shade facilitates an invasive stem succulent in a chenopod shrubland in South Australia. *Austral Ecology* 28(5): 480-490.

The invasive stem succulent *Orbea variegata* (L) Haw. (Asclepiadaceae) tends to be more abundant underneath shrubs than in open areas in chenopod shrublands near Whyalla, South Australia. To assess the role of facilitation in the life cycle of *O. variegata*, we investigated the effect of chenopod shrubs on different life stages of the species by experimentally manipulating temperature, light, soil moisture and nutrient levels. Experimental results suggest that the reduction in light and temperature under shrubs, but not increased nutrient levels, are the main facilitative mechanisms for *O. variegata*. Temperatures above 30 C, which are more likely to occur on the soil surface of open areas than under shrubs, inhibited seed germination. Seedling survival at low watering frequency and the growth of established ramets were increased by 75-80% shade cloth. Ramets growing in full light contained a high concentration of anthocyanin pigments. One of the functions of these pigments is to absorb excess radiation, suggesting that *O. variegata* experiences radiation stress in full light. In the field *O. variegata* performed considerably better under *Atriplex vesicaria* Heward ex Benth. (Chenopodiaceae) or under 75-80% shade cloth than in full light. Monthly irrigation of 20 mm did not reduce this positive effect of the *A. vesicaria* canopy on *O. variegata*, suggesting that *O. variegata* is inhibited by high light intensities or temperatures, independent of water availability. In conclusion, whereas shrub canopies do not seem to be required for the establishment or survival of *O. variegata*, shrubs improve adult growth and can improve establishment. The possibility of exotic plants being facilitated by other plants has to be taken into account when assessing the probability and rate of invasion.