

species, including small angle shades and *Sthenopis auratus* (Wikipedia). Ma et al. (2010) reported the Chinese Pharmacopoeia (2005 version), which listed 51 species from 24 families as medicinal Pteridophyte species, in which *Bolbitis heteroclita* was included and analysed with five DNA sequence markers. The *Bolbitis heteroclita* is cultivated as an ornamental plant in aquariums and garden ponds (Wikipedia). Dried frond powder of *Cyclosorus tyloides* mixed with pounded rice and water is kept for at least 2 d, intended for fermentation to prepare local liquor, Apong (Srivastava and Adi community 2009).

11.4 PLANT HORMONES AND THE ROLE OF ABA IN VIVIPARY

Julius von Sachs, a German botanist (1832–1897) suggested that plants produce, transport and perceive ‘organ-forming substances’ which are responsible for the formation and growth of different plant organs. Plant hormones such as abscisic acid (ABA), gibberellins (GA), ethylene, brassinosteroids (BR), auxins, cytokinins and other signalling molecules have profound effects on plant development at low concentrations. Hormones are chemical messengers which are useful to communicate between cells, tissues and organs of higher plants. Plant seeds contain an embryo surrounded by covering layers and have the important function of ensuring the establishment of a new plant generation. Plant hormones are extremely important for the regulation of seed dormancy and germination (Koornneef et al. 2002; Finkelstein 2004). Moreover, plant hormones are a special group of chemical substances which control growth and development in plants. Hormones play a vital role in the plant’s life cycle, such as cell division and extension, seed and bud dormancy, seed germination, flowering, fruit set and ripening and cutting rooting (Preece and Read 1993; Unsal 1993; Foskett 1994; Eris 1995; Hartmann et al. 1997).

ABA has great importance in the developmental processes, induction of seed dormancy and protein and lipid synthesis, in which the desiccation and inhibition of an embryo is tolerated for vegetative development. In mature plants, ABA responds to drought through stomata aperture, which also acts on an adaptation to stress conditions like low temperature, salinity, hypoxia and pathogen attacks. In general, ABA is considered a hormone with an inhibitory activity on growth (Nambara and Marion-Poll 2005; Pozo et al. 2005). Thus, those plants deficient in ABA production or with increased sensitivity fail to enter quiescence resulting in precocious germination or vivipary, and are accompanied by a reduction of maturation and associated gene expression (Cao et al. 2007). Conversely, dry conditions increase the ABA levels (Rodriguez-Gacio et al. 2009), a condition not favourable for vivipary, which is linked to low, not high levels of ABA (Farnsworth and Farrant 1998). Different production levels and compartmentalization of phytohormones (ABA) as well as different physiological, genetic and ecological factors, individually or in concert, also play a major role in the rate of precocious germination (Cota-Sanchez et al. 2011). Moreover, ABA is a unique molecule found in organisms across kingdoms from bacteria to animals, which suggested its ubiquitous and versatile role in the physiological functions of various organisms. ABA is widely known to be one of the growth regulators of tracheophytes, and is also known universally for its hormonal