In essence, reflection by trichome layers of incident radiation is quite variable. The factors determining this variability include the density and thickness of the trichome layer (Robberecht *et al.*, 1980), trichome shape (Baldini *et al.*, 1997) or the presence of air-filled, highly light-scattering trichomes (Ehleringer and Björkman, 1978).

Water and salt. Radiation can also be reflected by water droplets, from rain or hydathodes, residing on the top of plant surfaces. Reflection properties of water droplets on leaves have received little attention compared with their function as condensing lenses. Brewer *et al.* (1991) calculated that, in focal spots of water lenses, incident radiation is intensified 20-fold or more and, because some plant species retard water droplets on their leaf surfaces (Brewer *et al.*, 1991; Brewer and Smith, 1997), spots of deleteriously high radiation intensities can develop inside leaves when exposed to the sun. Both focusing and reflection of radiation are affected by the angle of incident radiation and by the ratio of collimated to diffuse radiation. More detailed information on the radiation microenvironment of wet surfaces is required to better comprehend the optical effects of surface water.

Salt deposits on leaves of salt-secreting mangrove species or of halophytic species of the genus *Atriplex* are responsible for another remarkable surface-optics phenomenon: salt deposits on such leaves increase their reflectance of radiation (Björkman and Demmig-Adams, 1995). In the desert shrub *Atriplex hymenelytra*, the relation between surface salt and reflectance was characterised in detail by Mooney *et al.* (1977). Leaves of *A. hymenelytra* are covered with salt-containing bladders which are hydrated when plants are well supplied with water; under drought stress, however, these bladders dry out and the salt crystallises. In the presence of salt crystals, reflectance at 550 nm approached values close to 60% but this value dropped below 30% in well-hydrated leaves. The changes in reflectance were related to dilution of surface salt which occurred without variations in the total amount of salt. Remarkably, the decrease of reflectance from highest to lowest values can occur within a couple of days after irrigation of drought-stressed plants.

The efficiency of surface reflection by salt crystals is approximately comparable to the extreme reflectance values of waxes and trichomes (described above); hence, salt deposits can shield the leaves from intense radiation. Compared with the more permanent and stable reflection of radiation by waxes and trichomes, reflective screening by salt deposits on leaves of *A. hymenelytra* varies rapidly in response to water availability, thus, permitting more flexible acclimation of light-harvesting to ambient conditions.

6.4.2 *Optical effects of surface architecture*

Lens effect. Many leaf epidermal cells have convexly shaped surfaces, which result in a pavement-like appearance of the plant surface. Because cell interiors exhibit higher refractive indices than air, these cells can act as condensing lenses (Vogelmann, 1993). The potential advantage of epidermal lens-type focusing in