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**S U M M A R Y**

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It is believed that the present preliminary investigation on stomatal movements in purple pigmented leaves has opened a new chapter in field of stomatal physiology of plants under drought stress. In this investigation the author has made an attempt to understand the role of purple pigments in the subsidiary cells of guard cells in the regulation of stomatal movements in plants under water stress.

Euphorbia hirta, a C<sub>4</sub> plant was found accumulating purple pigments in leaves. The purple pigmentation, the anthocyanin, was observed in leaves of plants growing on soils with low moisture levels, while the leaves are green in plants growing on soils with high moisture levels.

The purple pigmented plants were classified as light, moderate and heavy pigmented plants. An inverse correlation was observed between purple pigmentation intensity and soil and leaf moisture content and chlorophyll content. The pigmentation levels increased with decrease in soil moisture content.

Anatomical studies revealed the presence of purple pigments in subsidiary and other epidermal cells.

Purple pigments were conspicuously absent in guard cells.

In the light pigmented leaves the pigmentation was seen in a group of epidermal cells surrounding the stomata.

The frequency of stomata with one or two subsidiary pigmented cells was high in light and moderate pigmented leaves and it was low in heavy pigmented leaves. In heavy pigmented leaves, the frequency of stomata with 3 subsidiary pigmented cells was high.

Defunct guard cells have been observed in purple pigmented leaves and their frequency increased with increase in the pigmentation intensity.

The significance of accumulation of purple pigments in subsidiary cells and their absence in guard cells was discussed in the light of turgor regulation of stomatal movements.

NORMAL GREEN PLANT

guard cell turgor > Subsidiary cell turgor → Stomata open

WATER STRESSED PURPLE PIGMENTED PLANT

guard cell turgor < Subsidiary cell turgor → Stomata closed/  
 (because of presence of water soluble purple pigments) Partially opened

Low transpirational rates in purple pigmented plants were observed.

A tendency towards dark opening of stomata was observed in purple pigmented plants. Higher levels of free acids in purple pigmented leaves were observed. But low levels of malic acid in purple pigmented plants and absence of dark accumulation of malic acid were noticed.

Higher concentrations of KCl were required to observe maximum stomatal opening in purple pigmented leaves. This indirectly revealed higher turgor pressure of subsidiary cells, because of the presence of water soluble anthocyanins.

From the above observations in this preliminary investigation it may be concluded that the accumulation of anthocyanins in subsidiary and other epidermal cells has a role in controlling the water loss. Further it may be stated that the purple pigmentation in leaves may be adaptation of the survival of the plant under drought conditions.