Mepiquat chloride - a new growth regulant for cotton

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Cotton crops often produce excessive or prolonged vegetative growth which leads to a dense, high humidity crop canopy, conducive to the development of boll rot organisms. The dense canopy can also reduce the effectiveness of contact insecticides and leaf defoliants. Large cotton plants can also cause a reduction in picking efficiency. Prolonged growth of the cotton plant, continuing into winter months, may lead to delays in harvest and associated decline in lint quality.

Mepiquat chloride is the active ingredient in a cotton plant regulant Pix* (also referred to as DPG) developed by BASF Aktiengesellschaft and tested in field trials in Australia since 1976. The rate of application is 50 g a.i./ha, applied aerially or by ground rig when the first flowers appear in the crop. A second application of 35 g a.i./ha may be used if growth pressure requires it.

Mepiquat chloride leads to a reduction in lateral branch and main stem internode lengths and reduced leaf area. Treated leaves are thicker than normal with a higher concentration of chlorophyll per unit area. Consistent height reductions of the order of 25-30% and a more compact plant have occurred with trial applications. Darker green colouring and height differences are apparent 10-15 days after application.

Overseas trial data show a reduction in the incidence of boll rot, improved insecticide effectiveness and defoliation as a result of a smaller crop canopy. In some cases, an increase in the proportion of flowers that develop into bolls has been found as well as an increase in boll size. As a result of the reduced canopy size and leaf area, some increases in water use efficiency may be possible.

Applications of mepiquat chloride have reduced the time to first pick as well as increasing the proportion of cotton in the first pick. This is probably due to increased partitioning of photosynthate to boll production rather than to vegetative growth. Also the canopies of plants treated with mepiquat chloride may allow in more light to mature bolls. These earliness effects are only found where other factors such as nutrient supply (particularly nitrate nitrogen) and soil moisture do not first limit development.

The ability to control vegetative growth and allow earlier picking provides a means of managing nitrogen nutrition and irrigation. To date, low rates of nitrogen fertilizer and restricted waterings have been used to ensure that vegetative growth was controlled. However this control of vegetative growth was often achieved at the expense of cotton yield.