An Investigation the Effect of Some Agricultural Applications on Plant Monitoring Parameters and Plant Mapping of Cotton

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The Objective of the Study

- In a cotton production area to reach maximum yield, the most important factor is balanced vegetative-generative growth of the plants. Crop management is as important as environmental factors to get vegetative-generative balance of the plants.
- Crop monitoring techniques lead to producers to decision timely application of fertilizer, irrigation and plant growth regulators for cotton and several crops.
- Traditional decisions on cotton plant according to symptoms as leaf and stem pigmentation causes the unbalanced plant growth.
- The objective of this study was to evaluate which can lead to more efficient management of inputs is the use of a feedback approach to input management depending on the different irrigation and fertilizer nitrogen (N) levels in Çukurova Region conditions for Çukurova-1518 cotton variety.

Materials and Methods

Experiments were conducted in the Research area of Çukurova Agricultural Research Institute during the growing periods of 2005 and 2006 in Adana, Turkey. Çukurova-1518 cotton variety used as a plant material in this investigation. The experiments were conducted in a randomized complete block design with four replications. Each plot consisted of eight rows 12 meters long, spaced 80 cm apart with a plant-to-plant distance of 20 cm.

In this investigation, three different growth subject composed;

a) Optimum growth plots (irrigation and nitrogen were applied as needed through the growing seasonaccording to standart cotton recommendations),

b) Stress growth plots (irrigation and nitrogen applied ½ less than the optimum application),

c) Excessive growth plot (irrigation and nitrogen level increased ½ of optimum application).

The optimum growth plots were irrigated to reach field capacity at a rate of %60 soil water deficit. Stress growth plots were watered 50% less than the optimum and excessive plots were watered 50% more than the optimum growth plots. 8 kg da-1 phosphorus applied each of three growth subject and 8, 16 and 24 kg da-1 nitrogen applied to the stress, optimum and excessiwe growth plots respectively.

Materials and Methods

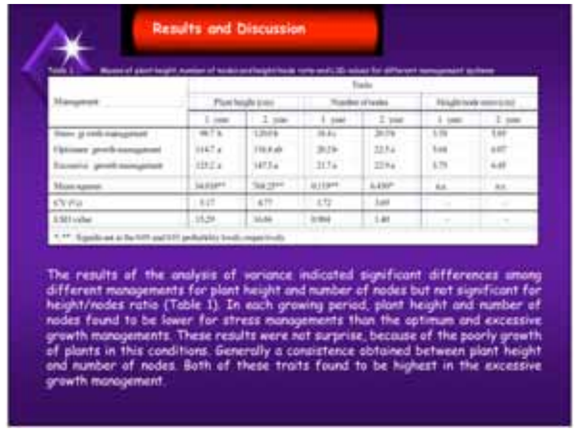
Observations conducted once a week on the 5 randomly selected plants in each plots, on the plant characters indicated below

- Plant height
- Node number
- Height/node ratio
- Length of upper 5th internode
- Number of bolls on the upper 5 sympodial branch
- NAWF

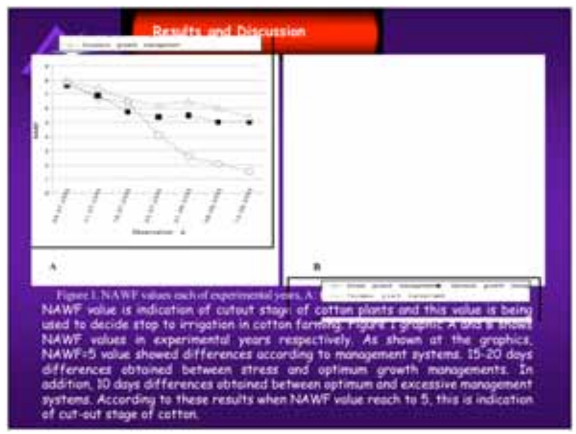
Detection of soil water content

Irrigation management

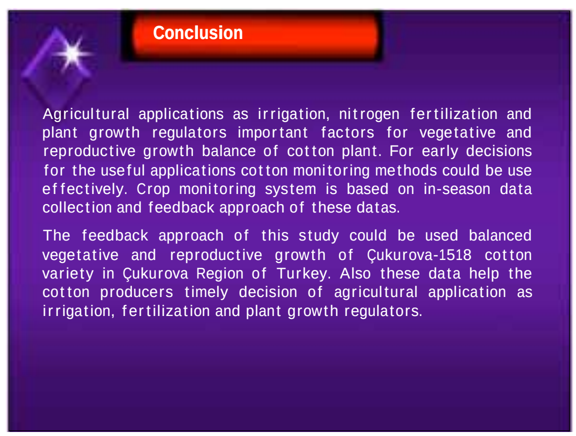

Irrigation management


Results and Discussion
The results of the analysis of variance indicated significant differences among different managements for plant height and number of nodes but not significant for height/nodes ratio (Table 1). In each growing period, plant height and number of nodes found to be lower for stress managements than the optimum and excessive growth managements. These results were not surprise, because of the poorly growth of plants in this conditions. Generally a consistence obtained between plant height and number of nodes. Both of these traits found to be highest in the excessive growth management.


Results and Discussion
The highest length of upper 5 internode was obtained at the stress growth managements for each of two growing periods. Optimum and excessive growth managements showed lower length of upper 5th internode than the poorly growth managements (Table 2). This result could be explained cut off the growth at the stress management plants at a stage, but continued at the optimum and excessive management plots. So, newly developed internode long was shorter than the old ones. Higher number of bolls on the upper 5 sympodial branch and NAWF values were optained for optimum and excessive growth managements than the poorly growth plots.


Results and Discussion
A
B
NAWF value is indication of cutout stage of cotton plants and this value is being used to decide stop to irrigation in cotton farming. Figure 1 graphic A and B shows NAWF values in experimental years respectively. As shown at the graphics, NAWF=5 value showed differences according to management systems. 15-20 days differences obtained between stress and optimum growth managements. In addition, 10 days differences obtained between optimum and excessive management systems. According to these results when NAWF value reach to 5, this is indication of cut-out stage of cotton.


Results and Discussion
A monitoring table composed to compare effect of different management system for important plant characters as plant height, node number, height/node ratio and NAWF value (Table 3). The observations on these plant characters indicated in this table starting from the second week of June until the third week of August.
This table could be used as a reference for Çukurova-1518 cotton variety in Çukurova Region of Turkey. For example; end of the July if plant height=115 cm, node number=21, height/node ratio=5.9 and NAWF value is 6, then an evaluation could be made as plant growth is close to optimum.


Conclusion
Agricultural applications as irrigation, nitrogen fertilization and plant growth regulators important factors for vegetative and reproductive growth balance of cotton plant. For early decisions for the useful applications cotton monitoring methods could be use effectively. Crop monitoring system is based on in-season data collection and feedback approach of these datas.
The feedback approach of this study could be used balanced vegetative and reproductive growth of Çukurova-1518 cotton variety in Çukurova Region of Turkey. Also these data help the cotton producers timely decision of agricultural application as irrigation, fertilization and plant growth regulators.


Plant height measurement (cm)
Cotyledon Node


Plant height (cm)
Stress
growth
management


Plant height (cm)
Optimum management plots

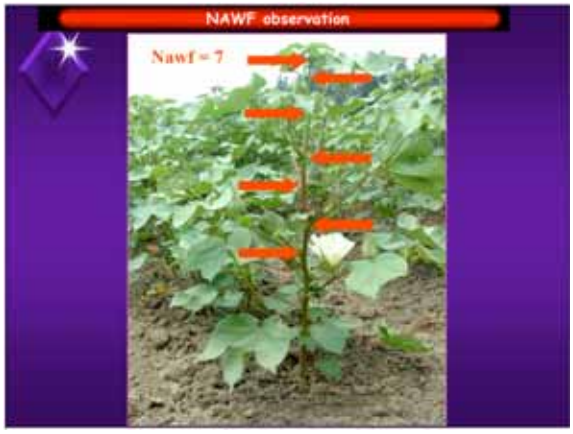

Node number observation


Length of upper five internode (cm)
1
2
3
4
5


Length of upper five internode (cm)
Stress
management


Length of upper five internode (cm)
Optimum management


Length of upper five internode (cm)
Excessive growth


NAWF observation
Nawf = 7


Excessive management
Optimum management


General appearance of plots


General appearance of plots (2006)


THANK YOU