



GROWTH MONITORING

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Annotation

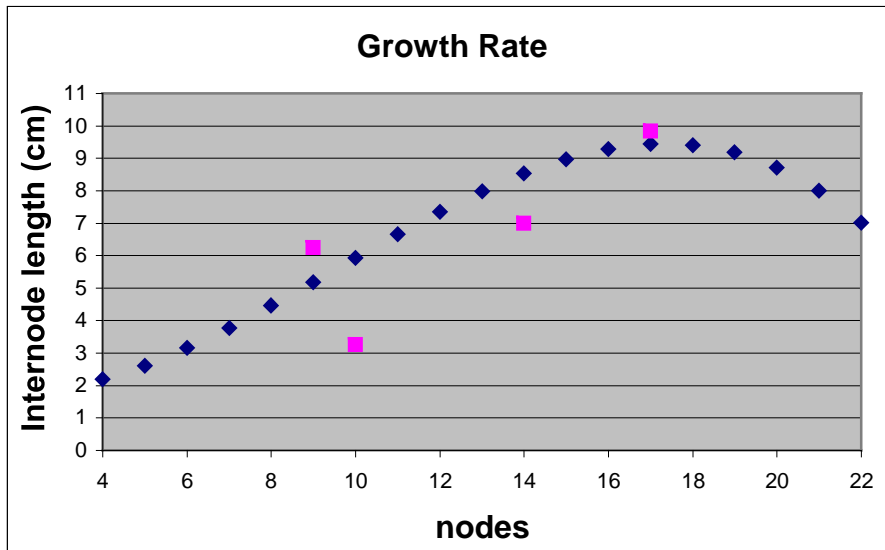
Cotton plant is an excellent teacher, if you can translate its language". When agronomists and farmers can learn this "language", they get the most valuable tool, a very useful input, to obtain a sustainable and more efficient production, and specially, more predictable. Cotton management concept involves different aspects such as weed and insect control, plant growth monitoring, use of PGR's and harvest aids. In this circumstance focus will be directed to the measuring techniques required for the success of the crop according its growth stages. In this paper, the most relevant or easiest indexes will be mentioned, only for time and space reasons, we exclude other existing, also important

Key words: Cotton, Growth rate, NAWF, nodes, flower.

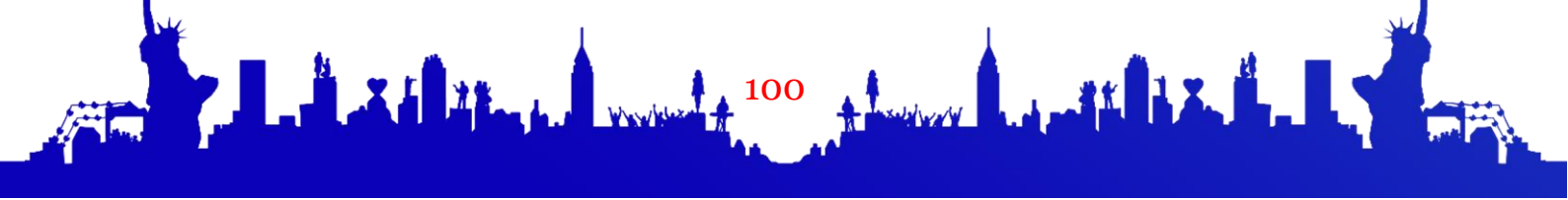
Growth rate: Another useful index to weigh crop evolution is Growth Rate. When field data, considering height and node number, is picked in a regular base (7 to 10 days intervals), the change in the figures between subsequent evaluations give a valuable instant information about the growth rhythm. To know this we have to calculate the differences between present and previous values of height, and in the same way with the node numbers, then we work out the rate between height and node number differences. The result is a figure that represents the average length of newly made nodes. This value must be graphed in the Y-axis of the reference curve, referred to the exact middle point between both nodes monitored (present and previous) in the X-axis. It is desirable that the real value obtained is equal or very close to optimal situation.

The growth rate declines after flowering, due to various factors, like boll setting, and loading, diseases, fertility, irrigation, management, pests. But we have to consider this is also a natural plant process to give way to yield definition, despite all those factors. At this moment, HN R and GR cease to be sensitive indexes to monitor crop progress.



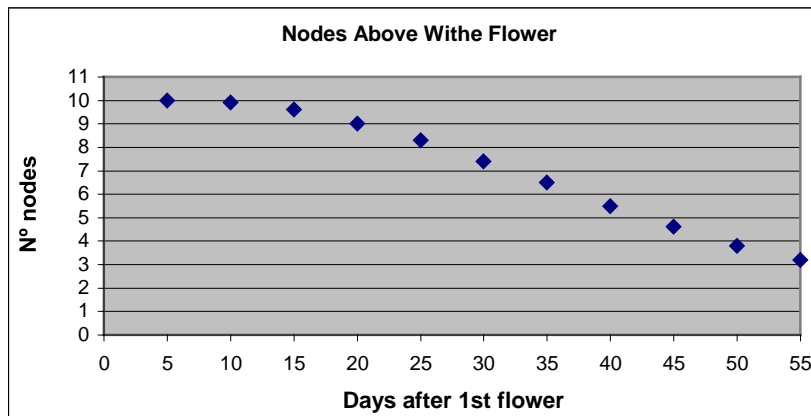


Nodes Above White Flower (NAWF): During vegetative growth, cotton plant can develop a new node each 40-50 day degrees; when fruiting positions start to compete with stems for carbohydrates the node production rate decreases. This begins at about node fifteenth. At this moment squares turn into flowers at a regular rate, generally, a 3 day interval between first position flowers of successive branches can be expected. To determine NAWF, we consider the node associated with first position open flower in the first fruiting branch as node 0 and count successive nodes to the top, considering the last to be counted the one associated with a leaf of at least 2,5 cm of diameter. In this stage the fruiting development increases the carbohydrates demand over the vegetative growth; the NAWF gives the difference between each new node rate and an idea of the movement of the first position flower through the main stem. The NAWF values obtained when the first blooms appear or even when first position flower gets close to the top are still good indexes to estimate the balance between vegetative growth and development. The first flower in non stressed crop is commonly associated with 8 to 9 NAWF. If the value is less than 8 there are evidences of limiting circumstances, most times related with water status, soil compaction layers, salt, diseases or nematodes. In optimum environments the NAWF initial value decreases normally at a rate of one node each 8.3 days. The crop cut-out occurs at about 5 nodes above the white flower. It is suggested that insect protection must extend until two weeks after crop reaches 4 nodes above white flower, at least. With 5 nodes above the white flower, 95% of all harvestable first position bolls are considered to be at flower stage. The common crop practices that can affect this index, we can mention





early boll setting, irrigation schedule (or water availability), nitrogen rates, and PGR use.



CONCLUSIONS

In a few words, to weigh the value of Crop Growth Monitoring and its indexes in cotton production, we can affirm that its use and validation makes it possible to:

- Interpret each of one of the phenological crop phases and their momentarily demands.
- Project crop growth trends and be able to predict them.
- Fine-tune the field operations management and timing.
- Minimize random factors to the least in the production (more predictability)

Increase sustainability of the whole production system

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