COTTON Innovate

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EXPLORATION SURVEY

Based on information given by farmers who attended “Krishi Vasant”, an exploratory survey was carried out by Dr.Saravanan, M scientist (Plant Breeding) and Mr.G.R. Kene, Technical Officer to collect tree cotton from Hinganghat and Wardha on 22.04.14. Two perennial *Gossypium barbadense* samples (Kidney- seeded) were collected during this survey.

LITERATURE SCAN

Spatiotemporal manipulation of auxin biosynthesis in cotton ovule epidermal cells enhances fiber yield and quality

Cotton fiber is a single elongated cell derived from the seed coat (ovule epidermis). Fibre yield improvement in cotton can be achieved either through increase in seed number or lint percentage. Improvement in lint percentage means more mature lint fibre per seed than short fuzz fibres. It is noted that only 25- 30% ovule epidermal cells develop in to fiber cells at anthesis (period during which a flower is fully open and functional). The epidermal cells that give rise to lint fibers appear before or on day of anthesis (0 days post anthesis, DPA) and cells that initiate after + 4 or 5 DPA become fuzz fibres. Phytohormones such as auxin and gibberlic acid plays key role in fibre intiation. It was known that exogenous application of Indole acetic acid (Auxin) on squares and flowers of cotton resulted in significant improvement in the fibre number per ovule (Seagull and Giavalis, 2004) but was not successful due to staggered flowering habit of cotton. Earlier effort to increase the auxin expression under fiber specific E6 promoter (active between 5 to 24 DPA) through transgenic approach resulted in no improvement in fiber quality or yield (John, 1999). But, Zhang et al. (2011) through their four year field trial data reported that more than 15% increase in lint yield and improvement in fibre fineness was possible by targeted expression of the IAA (auxin) biosynthetic gene *iaaM*, driven by the seedcoat and ovule specific promoter of the petunia MADS box gene Floral Binding protein 7 (FBP7) which is known to active between -2 to 10 DPA (Days Post Anthesis). It was clearly showed that increasing auxin expression at right time, place and right quantity during ovule and fibre development improves yield and quality of the fibre.

Reference:

John, M.E. 1999. Genetic engineering strategies of cotton fiber modification. In Cotton Fibers: *Developmental Biology, Quality Improvement and Textile Processing* (ed. Basra, A.S.). 271–292 (The Haworth Press, New York, USA).

Seagull, R.W and Giavalis, S. 2004. Pre- and post-Anthesis Application of Exogenous Hormones Alters Fiber Production in *Gossypium hirsutum* L. Cultivar Maxxa GTO. *The Journal of Cotton Science*, 8; 105–111

Zhang M, Zheng X, Song S, Zeng Q, Hou L, Li D, Zhao J, Wei Y, Li X, Luo M, Xiao Y, Luo X, Zhang J Xiang C, Pei Y (2011) Spatiotemporal manipulation of auxin biosynthesis in cotton ovule epidermal cells enhances fiber yield and quality. *Nat. Biotech. 29,* 453-458.

Contributed by Dr. K.P. Raghavendra, Scientist (Biotechnology), CICR, Nagpur

INNOVATION CLUB ACTIVITIES

As part of Innovation club lecture series, Shri. Milind R. Wadodkar, Scientist-SE, Regional Remote Sensing Centre-Central, National Remote Sensing Centre, ISRO, Department of Space, Nagpur delivered a talk on “Applications of Remote Sensing & GIS Techniques in Soils and Agriculture” on 26th April, 2014. Dr. K.R. Kranthi, Director, CICR presided over the function. Shri. Milind R.Wadodkar interacted with Director, senior scientists, research scholars & students of CICR on the topic. He initially briefed on basics of remote sensing & GIS and later on presented its various applications in agriculture field with examples drawn from national projects, case studies and R&D efforts.

He emphasized that Remote Sensing (RS) plays a significant role in the inventorying, monitoring and management of natural resources including soils & agriculture, by providing geo-information in a spatial format with repetitive and synoptic observations. Further with the advancement of the RS technology with availability of data in a variety of spatial, spectral and temporal resolutions along with use of Geographic Information System (GIS) and GPS (Global Positioning System) offer comprehensive geo-spatial tools for studying the natural resources in spatial domain. In fact, GIS techniques are now playing an increasing role in facilitating integration of multi-layer spatial information with statistical attribute data to arrive at alternate developmental scenarios, which can very well be applied to agriculture sector in India.

In conclusion he stated that, though the applications of geo-spatial techniques are varied and are being operationally used in our country, there is a further scope to increase its use in agriculture especially in areas like soil fertility, cropping system research, rain-fed agriculture, decision support services, watershed management & action plan monitoring and crop specific / site specific studies. Dr. Vinita Gotmare, Principal Scientist proposed vote of thanks.

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Central Institute for Cotton Research
Post Bag No. 2, Shankar Nagar PO, Nagpur 440010
Phone : 07103-275536 Fax : 07103-275529; email: cicrnagpur@gmail.com