12th Meeting of the

Inter-Regional Cooperative Research Network on Cotton for the Mediterranean and Middle East Regions

ABSTRACTS

SCIENCE – BASED TECHNOLOGICAL INNOVATIONS FOR TEXTILE DEVELOPMENT

Prof. Dr. A. Hebeish
National Research Centre, Textile Research Division
Dokki, Cairo, Egypt

Preamble

- Over the last fifty years, we have been involved in research and development pertaining to the chemistry of fibrous textile and nonfibrous textile materials.
- Of the textile materials investigated mention is particularly made of cellulose, wool, polyamide and polyester.
- It is certain, however, the great attention is given to cotton cellulose.
- Research area of cotton cellulose covers degradative treatments, mechanisms of degradation of cotton and effects of mercerization restretching upon

❑ the course of these mechanisms,
❑ chemical reactions entailed in:

- functionalization of cellulose,
- vinyl graft,
- copolymerization,
- coloration,
- easy care cotton finishing

biotechnology for developmentof wet processing of cotton textiles

- Equally brought into focus was our work concerned with the chemistry of nonfibrous textile materials.
- Studies on synthesis, characterization and application of many polymeric materials were undertaken. Among these materials were:

➢ Starch	➢ Carboxymethyl cellulose (CMC)
➢ Chitosan	➢ β - cyclodextrin

- Apart of their different etherification products, these materials arouse much attention when they were graft copolymerized with various vinyl monomers. This is exemplified by:
  - ➢ Starch –poly(AA) composite
  - ➢ Starch –poly(Aam) composite
  - ➢ β – cyclodextrin –poly(AA) copolymer

- Particularly notable was the loading of β–cyclodextrin copolymers with metal nanoparticles, for example, silver nanoparticles.
- CMC based hydrogels with and without nano-sized metal particles were the subject of intensive investigation concerning their synthesis, characterization and application especially in the medical domains.
- Research was also directed towards synthesis of polymeric materials that are environment-friendly for use as reducing agent converting the silver ion to silver atom and stabilizing agent through capping of silver nanoparticles which represent clusters of silver atom.

Egyptian Cotton Breeding Program

Hasan Al-Adly

Cotton Research Institute, Giza-Egypt

All the Egyptian cotton varieties belong to *Gossypium barbadense L.* Egyptian cotton breeding program is unique and depends onbreeding pure progeny lines, therefore Egyptian cotton varieties have higher stability and continues for several years in common agricultural.

Cotton breeding research section CRI- ARC in Egypt is responsible for the production and breeding of cotton varieties .more than 80 cotton varieties were bred and introduced by artificial crossing followed by single plant selection from one generation to another accompanied by the selfing of flowers of the selected plants (Pedigree method).

Pedigree breeding starts with the crossing of two genotypes, each of which have one or more desirable characters lacked by the other and obtained the hybrid progeny of the first generation (F1). No selection is made within the plants of the first generation because they are genotypically the same.

The F2 generation:

The breeder planted about 500 plants wide spaced because the segregation is at the maximum and most of traits are quantitative characters. At the flowering time selection in the field depend on the plant type, earliness and boll size. After picking, selection in the Lab depends on, boll weight, lint percentage, fineness and fiber length and strength.

In F3 generation:

Selfed seed for each F2 selected plant is sown as individual plants (20 single plants) and natural seed of the same plants selected grown as a bulk family (3 rows). The selection process is done between families and then inside individual plants of the selected families. Selection eliminates undesirable families and individual plants which below in seed cotton yield.

In F4 generation:

Superior plants selected from F3 generation are grown as F3 generation and selection method reduce the number of families.

In F5 generation:

F5 is grown as F4, with selection of the superior plants and best families. By the F5 generation the pure-breeding condition

(homozygosity) is extensive, and emphasis shifts almost entirely to selection between families.

In F6 generation:

Selfed and natural seeds of the individual plants selected in F5 are grown as the same in last generation and in addition to preliminary strain test yield trial A, which is sown from F5 selected families seed which grown a bulk (five ridge, sown at normal spacing from the a natural seed of the parental plant) .selection process was done between bulk families, inside individual plants families and between strains in trail A.

In F7 generation:

Grown as F6 (single plants, bulk families and strains) for every selected family in addition to testing of the selected strains in the yield trail (Trail B) which grown in different locations. In this stage all levels of the breeding program are presented (single plants, families, preliminary strain test yield trial A and yield trails in different locations B).

In F8 generation: As in F7.

In F9 generation: As in F8.

In F10 generation:

If a new cross proves its superiority compared with commercial varieties in yield (trial B) it will be planted in isolated field and build the nucleus seed which is the source of pure seed (breeder seed).

Isolated field

In F10, the breeder selected50 single plants from F9.

The selfed seed from 50 single plants are sown in isolated field in 50 families as individual plants. Isolated field for the new promising cross continue to long period nearly 5 - 6 years until the breeder seed could be planting in 5000 Acer. It’s to be released as a new commercial variety.

Maintaining Scheme of The Egyptian Cotton varieties

Gaber M. Hemaida

Cotton Research Institute, ARC, Egypt.

Abstract

In Egypt, the problem of cotton varieties deterioration has been the subject of concern since the early days of Egyptian cotton cultivation. It appears to be true, that many varieties in the early years of this century went out of cultivation because they were mixed by “strange” cotton-seed and deteriorated, rather than they were valueless in their pure state. Naturally, the economic losses incurred by deterioration led Egyptian government to pay attention to this problem and means to maintain the cottonseed production areas of such high quality varieties.

Realizing the objective:

There are two main approaches are taken to maintain the cottonseed propagation areas of the Egyptian cotton varieties:

1. Providing the cottonseed area, annually, by new waves of, the "genetically purified, cottonseed stocks". This objective is realized through the maintaining programs that are carried out at the governmental farms under control of Maintaining Research Section, Cotton Res. Inst., Cotton.
2. Implementation of the governmental regulations to control and maintain the propagated areas at general farms in Egypt. This objective is implemented by several governmental authorities.

MOLECULAR BREEDING: COTTON TRANSCRIPTOME ANALYSIS, CHARACTERISATION AND VALIDATION OF FIBRE STRENGTH GENES ASSISTIVE IN MARKER ASSISTED SELECTION

B.R.Patil,I.S. Katageri,B.M Khadi, G. Balasubramani, K.P.Raghvendra, J.Amudha, S.K.Deshpande

Abstract

The relative gene expression of GhcesA1, GhcesA2, and GhcesA7 orthologus of AtcesA8, AtcesA4, and AtcesA7 respectively, Ghcobl4, Ghfla3 and GhMT1genes using Recombinant Inbred Lines mapping population was studied through q PCR. The results showed that GhcesA1, GhcesA2, Ghfla3 and Ghcobl4 were strongly associated with secondary wall synthesis and hence the plan is to prepare the gene construct with an appropriate fibre specific promoter to transform a suitable genotype. To validate the q PCR analysis, Scanning Electron Microscope study was conducted to confirm that cellulose is a key entity for conferring high fibre strength. The high fiber strength line HBS144 (28.0 g/tex) and low fiber strength line, HBS 187 (20.0 g/tex) fiber's micrograph showed that HBS 144 had strong series of fibrillar structure which was found less in HBS 187.A fibre diameter of 17µm was observed in HBS144 while ,a 10 µm fiber diameter was recorded in HBS 187.The fibrils which relate to deposition of cellulose had a diameter of 0.2 µm for HBS 144 and 0.1 µm for HBS 187 respectively. The RNA sequence analysis of HBS 144 and 187 revealed 74.6 million and 53.4 million raw reads respectively through Illumina. The number of unigenes expressed for genotype HBS-144 were 11328 while , 6866 unigenes were observed for HBS-187. A total of 14828 unigenes were up regulated while, a total of 13468 unigenes were down regulated in both genotypes employed for the study.The total number of identified SSR's for HBS 144 were 29868 while, 21680 **SSR's** were identified for HBS 187.The total number of variants **(SNP)** were 90857 for HBS 144 while, 74161 variants were observed for HBS 187.The plan is to utilize these **SSR' s and SNP** 's for Marker assisted selection after validation by **Gold standard linkage map.**

LEAF REDDENING INDEX AS AN INDICATOR OF LEAF REDDENING MALADY IN BT COTTON HYBRIDS: CAUSES AND REMEDIES

B. Y. Rakshitha1, B. S. Janagoudar* and A. Amaregouda2

Abstract

In the recent past, leaf reddening has been a major problem in Bt-cotton and this is an outcome of interaction of location, variety, environmental condition and nutrients. In general, inter and intra specific tetraploid Bt hybrids are more sensitive and vulnerable to this malady may be because of Bt gene interaction. Leaf reddening may occur at any growth stage of the crop. At grand growth phase (flowering and boll development) any hindrance in the assimilate production, translocation and distribution intensifies the leaf reddening effect and symptoms are prolific in nature under extreme stress situations (Poongothai et al., 2010).

Considering the above facts, an experiment was laid out at Agricultural College Farm, Raichur during Kharif 2014-15 in a split plot design comprising three Bt-cotton hybrids and four nutrient treatments to find out the cause and curative measures of leaf reddening malady in Bt-cotton hybrids. The results revealed that among Bt-cotton hybrid, Bindaas BGII 7213-2 recorded lower leaf reddening index (LRI) (0.96 and 1.48) and anthocyanin pigment (0.149 and 0.236 mg g-1 fresh weight) at 90 & 120 DAS, respectively as compared to other Bt-cotton hybrids. Among different nutrient treatments, application of 125% RDF and soil application of MgSO4 @ 25 kg ha-1 along with foliar sprays of 1% MgSO4 and 1% 19:19:19 (T2) at 70, 85 and 100 DAS recorded significantly lower LRI (0.91 and 1.67) and anthocyanin pigment (0.164 and 0.247 mg g-1 fresh weight) at 90 & 120 DAS, respectively as compared to other nutrient treatments. While, significantly lower LRI and anthocyanin pigment was recorded in Bunny NCS 145 BGII and 100% RDF, respectively. Further, Bt-cotton hybrid Bindaas BGII 7213-2 and nutrient treatment with application of 125% RDF and soil application of MgSO4 @ 25 kg ha-1 along with foliar sprays of 1% MgSO4 and 1% 19:19:19 (T2) at 70, 85 and 100 DAS recorded significantly higher a, b and total chlorophyll content as well as higher seed cotton yield as compared to other treatments. Thus, it could be concluded that the treatment T2: 125% RDF and soil application of MgSO4 @ 25 kg ha-1 along with foliar application of MgSO4 @ 1% and 19:19:19 @ 1% is effective in controlling leaf reddening in Bt-cotton. While, among different Bt-cotton hybrids, Bindaas BGII 7213-2 found to be tolerant to

leaf reddening malady.

[1] Postgraduate scholar, [2] Professor of Crop Physiology
* Correspondence : Dr. B. S. Janagoudar, Dean (Agri), College of Agriculture, University of Agricultural Sciences, Dharwad – 580 005, Karnataka, India
e-mail : bjanagoudar56@gmail.com, deanacd@uasd.in

EFFECTS OF INTERSPECIFIC HYBRIDIZATION ON COTTON

(*Gossypium hirsutum* L.**Gossypium Barbadense* L.)

Mehmet ÇOBAN[1], Aydın ÜNAY[2], Hakan ÇİFCİ[3],Birnur İLHAN[4]

[1]Cotton Research Institute, 09800 Nazilli, Turkey
[2]Department of Crop Science, Adnan Menderes University, 09100 Aydin, Turkey
[3]Sheep Breeding Research Institute, 10200 Bandırma, Turkey
[4]General Directorate of Agricultural Research and Policies, 06171 Ankara, Turkey

Abstract

The experimental material Claudia, Candia, Şahin 2000, BA 308, Naz 07 and Fantom (Gossypium hirsutum L.) were used as a female parents and Giza 45 and Avesto (Gossypium barbadense L.) used as a male parents. The selected cotton genotypes were crossed by line tester method. An experiment was carried out in randomized complete block design with four replications to assess hereditary and heterotic effects on yield components and fiber quality traits. The research was carried outat Cotton Research Station Nazilli during the year 2011. Positive heterosis percentage was obtained from all hybrids for fiber length and fiber strength. Standard heterosis values were positive and significant for fiber length, fiber strength and micronaire.The performance of all combinations for yield and fiber quality traits at F_1 generations showed that Claudia x Giza 45, Candia x Giza 45, Şahin 2000 x Giza 45, BA 308 x Avesto, Naz 07 x Giza 45 and Fantom x Avesto hybrid populations would be used for improve cotton lines having enhanced for fiber length with acceptable yield potentials.

A GRAPHICAL METHOD TO DETERMINE DOMINANT AND RECESSIVE GENE PERCENTS USING DIALLEL ANALYSIS IN COTTON

Ercan EFE

KahramanmarasSutcuimam University, TURKEY

Abstract

In diallel analysis widely used by plant breeders, WrvsVr graph gives important knowledge about the parents. In this graph, it's possible to interpret distribution of dominant and recessive genes among the parents by investigating the relations between $W*r=[Volo \times Vr]^{1/2}$ parabola and unit slope regression line.

In this study, finding intercept of unit slope line and the values corresponding the two points where parabola is cut by this regression lineand dividing the distance between those points into four equal parts are given with a numerical sample in cotton.

ECOPHYSIOLOGICAL ANALYSIS AND MODELING OF GENOTYPE BY ENVIRONMENT BY CROP MANAGEMENT INTERACTIONS ON COTTON (*Gossypium hirsutum L.*) IN CAMEROON FOR THE DESIGN OF IDEOTYPES

ROMAIN LOISON
CIRAD – France

Abstract

Cotton lint is the first natural fiber used in the world. Cotton provides income to more than 10 million people in West and Central Africa. In Cameroon, it is produced in rainfed conditions and water shortage is the major abiotic factor limiting yield and lint quality. In this context, a breeding program was initiated in 1950 to increase lint yield, fiber quality and disease resistance. After 60 years, this program has released more than 20 cultivars. However, seed cotton yield has been levelling off for more than thirty years. This study analyzed growth and development of main cultivars released from 1950 to-date to evaluate genetic gain including drought adaptation traits indirectly bred for. It also analyzed genotype by environment by crop management interactions (GEI) under water limited conditions in order to use a cotton simulation model in Cameroonian conditions. Then, crop simulation model was used to design cotton ideotypes under Cameroonian cropping conditions. An application of this work was in providing key drought adaptation traits to breed for cultivars that better withstand water stress. Firstly, phenotype evolution over breeding time and its interaction with cropping conditions in Cameroon was evaluated on cotton development, growth (including roots), yield, and fiber quality. Ten major cultivars were studied under rainfed conditions (field) and controlled conditions (greenhouse and phytotron). Classical GEI analysis of variance of cultivars and regression over their respective year of release were done. The results showed that the breeding program succeeded in improving cotton lint yield and the potential of fiber quality when the crop reached physiological maturity before the end of the rainy season. In late season drought, breeding reduced the fiber quality (fiber length, uniformity and strength). Most of the development and growth variables did not change with time, except the number of leaves which reduced. Breeding created cultivars with better potential fiber production and quality, but with reduced plasticity to sub-optimal environments and access to soil water. Secondly, an analysis of GEI for ecophysiological traits conferring a good response to drought was done in good and water limited conditions for a subset of four cultivars. The

results indicated that water deficit had a negative impact on almost all plant functions, both under field and controlled environments. The recent cultivar L484 bred for the driest production area had the fastest development, thickest leaves with most chlorophyll and thus maintained the highest level of photosynthesis and transpiration per unit of leaf area in water-limited conditions. In these conditions, L484 had the highest radiation use efficiency and water use efficiency maintenances. Despite these traits this cultivar did not show any improvement in terms of biomass, harvest index and cotton yield across water conditions. Cotton breeding program in Cameroon succeeded in providing a cultivar (L484) better adapted to local conditions, with a higher stability and faster development coupled with a strategy of growth maintenance, without any improvement in yield. Thirdly, the crop simulation model DSSAT CROPGRO-Cotton was used in order to design ideotypes with higher yield than existing cultivars. Field experiments in Cameroon were used to constitute the minimum dataset for the crop model calibration. Then, cultivars AC, L484 and forty-two virtual cultivars with ±20% from L484 parameter values were compared across 99 years of generated weather in two locations. Compared to L484, the cotton ideotypes in Cameroonian rainfed conditions had reduced emergence to anthesis duration, longer reproductive duration, higher level of photosynthesis maximum with thicker leaves, and smaller leaves for Far North region or bigger ones for North region.

Sixty Years Of Cotton Breeding In Cameroon: Interaction Between Genetic Improvement And Rainfed Cropping Conditions

ROMAIN LOISON
CIRAD – France

Abstract

Seed cotton (Gossypiumhirsutum L) yield in Northern Cameroon has been declining since the 80s despite breeding efforts. We used a set of widely grown cotton cultivars released at different dates to study genetic improvement under different cropping conditions in Cameroon, and in controlled conditions. The genetic gain was estimated with a linear regression of the variety mean on its year of release (YR). Contrasts between genetic gains observed with different planting dates were estimated and tested. Our results revealed a genetic improvement on fiber yield of 3.3 kg ha-1 year-1 due to increased ginning out-turn. However, there was no genetic improvement on aerial biomass, harvest index or seed cotton yield. At the early stage of development, aerial and root biomass, and potential root extraction ratio of nutrients decreased with YR. So did leaf number and hairiness at the beginning of flowering. Carbon dioxide assimilation was not affected by YR. Neither were crop cycle duration and phyllochron. Although the potential of almost all fiber technological characteristics was improved under favorable water conditions, some (upper half mean length, short fiber index, uniformity index, and strength) were reduced in water-limited conditions. We concluded that cotton breeding efforts in Cameroon have successfully improved cotton fiber yield and the potential of most fiber technological characteristics. However, in water-limited conditions, fiber quality tended to decrease with the YR. There is still some room for seed cotton yield improvement.

MORPHO-PHYSIOLOGICAL TRAITS CONFERRING DROUGHT ADAPTATION AMONG COTTON GENOTYPES IN CAMEROON

ROMAIN LOISON
CIRAD – France

Abstract

In Cameroon, water shortage is the major abiotic factor limiting cotton (Gossypiumhirsutum L) yield and lint quality. Understanding cotton physiological responses to water supply and their consequences on growth and development therefore provides insight into the problem of yield stagnation. The underlying strategies for yield maintenance under water deficit in Cameroon have not been well understood. The objective of this paper is to evaluate which ecophysiological traits could confer a good response to drought among a panel of cotton genotypes used in Cameroon. These genotypes were compared in field and greenhouse trials under potential and water-limited conditions (fraction of soil transpirable water range: 0.39 to 0.83). Water deficit had a negative impact on almost all the plant functions, both under field and controlled environments. The recent cultivar L484 bred for the driest production area responded quite differently from the other cultivars in this study. L484 had the fastest development, thickest leaves with the most chlorophyll and thus maintained the highest level of photosynthesis and transpiration per unit of leaf area in water-limited conditions. In these conditions, L484 had the highest radiation use efficiency and water use efficiency maintenances. However, despite the advances in cotton breeding in Cameroon, no significant improvement between old cultivars and recently released ones were found on biomass, harvest index and cotton yield across water conditions. The lint percentage was the only yield component significantly enhanced, irrespective of water status.

Determination of Some Agricultural and Technological Properties of Cotton Planted As Second-Crop in Wheat-Cotton Cultivation System

Sema Basbag* Remzi Ekinci*
*Dicle University Faculty of Agriculture, Field Crops Department 21280-Diyarbakır, sbasbag@dicle.edu.tr

Abstract

The opportunity to increase agricultural areas is limited so that increasing demands can be achieved by producing more products from existent agricultural areas. Double cropping is a sustainable practice in which more than one crop is grown and harvested at the same time, on the same ground. This study was carried out to determined fiber technological properties of growing cotton (*Gossypium hirsutum* L.) as second crop on sttuble of ridge planted wheat in Diyarbakır in 2012. The experiment was conducted of the experimental area of Dicle University Agricultural Faculty as Randomize Complete Block Design with three replications. Eight cotton lines/varieties (Berke, Lachata, BA 119, STV 468, STV 373, Özbek 100, Fantom and DP 396) were used as material. The results indicated that STV 468,Fantomand Berke in terms of seed cotton yield; Fantom, Berke in terms of fiber length; DP 396 and Berke in terms of fiber strength had given highest values. However results showed that whether very early cotton varieties are grown, cotton will be grown as second crop after ridge planted wheat in the stubble seedling under Diyarbakir ecological condition.

Keywords: Cotton, stubble, cultivar, yield, second crop

Association mapping for seed cotton yield, its contributing and fiber quality traits in Upland Cotton (*G. hirsutum* L.) germplasm lines.

Suresh handi and I.S.Katageri*
***Professor and Head,**
Institute of Agribiotechnology, University of Agricultural Sciences, Dharwad, Karnataka, INDIA, katageriis@uasd.in

Abstract

Determination of the genetic basis of complex quantitative traits has been one of the major scientific challenges in the process of crop improvement. To assist in this effort, an increasing number of genomic and genetic resources are today exploitable, including genome sequences, germplasm collections and public databases of genomic information. The availability of these resources, the recent advances in high-throughput genomic platforms and the increasing interest in exploring natural genetic diversity, make association mapping an appealing and affordable approach to identify genes responsible for quantitative variation of complex traits. Association mapping requires high-density oligonucleotide arrays to efficiently identify SNPs distributed across the genome at a density that accurately reflects genome wide LD structure and haplotype diversity. For Cotton, a high-density infinium array (63K SNP array) was recently built (Hulse-Kemp *et al*., 2015), with 63058 SNPs developed from different species which resulted in suitability for genome wide association analysis.

Association or linkage disequilibrium (LD) mapping revolutionized genetic mapping in humans, and is increasingly used to examine in plant genetics; it is an efficient way of determining the genetic basis of complex traits. In the present study, association mapping was examined with the use 201 germplasm of *G. hirsutum* lines evaluated for yield, yield components and fiber quality traits. Results from fastSTRCUTURE identified 12 subgroups in the population. The critical value of R^2 was set to 0.243 was taken as a threshold to claim LD between two loci. About 3.13 % marker pairs showed significant high LD (R^2=1) and about 82.72 percent pairs of loci were in linkage equilibrium with R^2 values less than 0.3. Mixed linear model accounting for population structure and kinship has identified 349 significant marker trait associations for yield, yield components and

fiber quality traits effectively controlling false positives reported in GLM (642 markers). More number of markers showing significant association were situated on D genome indicates than 'A' genome indicates detection of diverse SNP markers than 'D' genome or this may also because of the dense marker coverage in the D genome. The phenotypic variation explained by makers in this study was smaller suggesting minor QTLs or polygenic nature of these traits.

ADVANTAGES OF THE PIVOTS IRRIGATIONS SYSTEME ON ELS COTTON VARIETIES

Manuel Lopez Garcia
(Departamento de algodon de C.I.F.A. Las Torres SPAIN)
Felipe Rey Montero
(Director de investigación de Semillas Sostenibles Iberica)

Abstract

This study aims at a better understanding of yield and quality of fiber ELS varieties, using irrigation systems LEPA (low energie aplications precision) comparing system Pivots and Drip system.

In Spain the Mediterranean climate in the Guadalquivir Valley is highly variable during the growing season (April-October) with maximum temperatures ranging from 15 ° C to just 47 ° C under these conditions most decisive factor to maximize get optimal performance and high fiber quality is achieving excellent irrigation management.

The production of ELS fiber in Spain, began in 2007 and in 2015 first reached 5,500 hectares, with a production of ELS fiber of 1,386 kg / ha, whereas fiber production in Upland varieties was 1,277 kg / ha

For this work we used interspecific hybrid varieties from crossing (Gossypium barbadense x Gossypium hirsutum) the cycle of these varieties from emergence to harvest is about 155/170 days, about 1.250-1.350 GD-15,5º

The use of hybrid varieties is motivated by the hybrid heterosis, lower cycle and higher DSI (drought susceptibility index) than regular varieties marketed of open pollinations of barbadenses varieties.

The study shows that the Pivot system was significantly more efficient, both in kg / ha of fiber yield and fiber quality parameters in length and strength.

Most physiological difference between the two systems occurred in the first 45 days as measured by CWSI (toilet crop stress index) and by monitoring during this period

Center Pivots "Applications & Management"

Khaled Shalabi

Agricultural Research Engineering Institute-ARC-Giza, Egypt

Abstract

The presentation sheds the lights on the importance of theirrigation applications and irrigation management. Irrigation applications that could be configured by center pivot and its sprinkler packagesto match the different soil types, water quality and crops.Moreover, the irrigation management technique when irrigating crops by center pivot and arrange its irrigation schedule according to the readings of the weather station and soil moisture units.

The application research is conducted at Sakha Agricultural Research Station during the growing season of cotton 2010, the center pivot and its sprinkler package are configured to irrigate cotton crop and match low infiltration rate of heavy clay soil.

In order to achieve better irrigation management another research has been conducted at El-Menia region during the growing season of Sugar beet crop. The research aims to come up with the proper center pivot configuration that matches the sandy soil and Sugar beet crop, plus applying the irrigation management technique using weather station and soil moisture units.

Weather station is used to measure the climatic conditions and daily Evapotranspiration (ETo) whilst moisture unit is used to measure the volumetric water content, soil soluble salinity and water suction pressure.

The results revealed that selecting the proper center pivot configuration with applying the irrigation management technique have increased the distribution uniformity and reduced the operating hours during the growing from 4,000 hours to 2,500 hours compared to previous season, which contributes positively in reducing the operating cost, and increase the net return on investment.

Cotton Cultivation in Non-traditional areas of Bangladesh

Md. Farid Uddin
Executive Director
Cotton Development Board, Khamarbari, Dhaka
Bangladesh

Abstract

Bangladesh is the 2nd apparel producer of the world after China. The contribution of GDP and employment is the highest by Textile and Clothing sector of Bangladesh. There are 5000 RMG, 407 spinning mill, 396 knitwear garments and other weaving mills in Bangladesh. Around 5 million people are working in this sector, 80% of which is rural woman. Bangladesh is the 2nd cotton importer and 5th cotton consumer of the world. The country invests Twenty thousand crore taka expending foreign exchange to import this big quantity of raw cotton from different countries like India, Uzbekistan, USA, other CIS, and many African countries.

Bangladesh is a highly populated country and our Government is highly attentive to grow food crops to feed those populations. There is 8.5 million ha of cultivated land for growing different crops in Bangladesh. Cotton is an important cash crop for the farmers of our country after jute. As cotton is a long duration it requires six months up to harvesting. Within this time farmers of our country can grow two short duration crops. So, cotton is highly competitive with short duration crops like vegetables, maize, banana etc. So it was difficult to increase the cotton production in the country though our raw cotton requirement is very high.

Through our research we have identified some of the areas where food crops are not profitable. These lands could be utilized for producing cotton. As cotton is a drought tolerant crop so the northern area i.e. drought prone areas of Bangladesh where rice and other crops are not so profitable for the farmers but cotton is profitable for those farmers as seed cotton yield is more than 3 tons per ha. There are 200,000 ha of drought prone land in the northern part of Bangladesh. Out of that cotton could be grown under 100,000 ha.

As you know cotton is a salinity tolerant crop, we have an area of 0.1 million ha of saline area in the southern part of the country where other crops cannot grow well after Transplanted Aman of rice which will be irrigated cotton. Vast land remains fallow, out of that 50,000 ha of land are possible to take under cotton. But yield of cotton is good and

economically profitable for the farmers. But those area will under cotton during December-April which will summer and short duration variety like India. There is a big hilly area in Bangladesh which covers 10% of our country. In those hilly area is also drought which suitable for growing cotton. Earlier it was under jhum cultivation (mixed cropping) where cotton is one of the item of jhum. Jhum provided very low yield of different crops including cotton. We have developed a technology called rice -cotton intercropping by conducting trial for several years instead of jhum which is providing three times more income than traditional jhum cultivation. Through adaptive trial it has been shown that *G. hirsutum* is performing much better than that of *G. arboreum.* At least 50,000 ha could be possible under cotton cultivation.

Char (river basin) is also one of the non-traditional areas of Bangladesh where main crops are growing well. Other food crops are not growing well in the char area but hybrid and local variety of cotton produces 3 tons per ha of seed cotton as cotton is deep rooted crop. There is a area 20,000 ha where cotton could be grown successfully as it is a deep rooted. Hybrid is also performing better in those hilly areas.

Tobacco cultivation has negative impact on soil health which kills the soil micro organism and it is also create health hazard for the farmers but farmers grow tobacco as they get some special incentives from the tobacco company but they want to replace tobacco if they get the suitable crop which is profitable for them. Cotton is one of the important alternative options for tobacco replacement. There are 70 thousand ha of land in different area which is under tobacco cultivation and gradually we can replace this tobacco area under cotton cultivation. The replacement of tobacco has already started in different areas in upland areas as well as in three hill districts. Based on the above information it is revealed that 200,000 ha of land from non- traditional (low yield of other crops) areas could be taken under cotton cultivation. We have been conducting Research and Development for increasing cotton production in the non-traditional areas of Bangladesh without hampering the food production. By using these non-traditional areas 800,000-10,000 bales of cotton could be grown in Bangladesh which can fulfill 20-25% of our requirement as well as by producing cotton seed oil, Bangladesh can save exchange.

COTTON RESEARCH ASPECTS IN GREECE

E. Tsaliki and A. Kalivas

Hellenic Agricultural Organization – DEMETER
Plant Breeding and Genetic Resources Institute, Thermi Thessaloniki – Greece

Abstract

Cotton is a major agricultural crop in Greece, accounting for more than 8 percent of total agricultural output. More than 55,000 farmers grow cotton, producing about 80 percent of the EU production. The cultivated area in Greece fluctuates last years among 250000 – 300000 ha and the average seed-cotton yield is 3000 kg/ha. According to European Union's Common Agricultural Policy, sustainable production techniques are followed and more precisely the System of Integrated Management in Cotton Agro 2- 2/2.

Greece is a major cotton exporter. Domestic spinners consume approximately 10 percent of lint production and the remainder is exported mainly to Turkey but also to Egypt, Sri Lanka and the United Kingdom. There are roughly 30 ginning companies in Greece with a total of about 65 ginning units.

The Greek Universities (Aristotelian University of Thessaloniki - Faculty of Agriculture, Agriculture University of Athens, the University of Thessaly -Faculty of Agriculture and the Democritus University of Thrace - Faculty of Agricultural Development) and the former Cotton and Industrial Plants Institute (now Plant Breeding and Genetic Resources Institute belonging to Hellenic Agricultural Organization - DEMETER) are occupied with research cotton matters funded mainly by National and European Union programmes, also with private companies research departments.

The research sectors of our Institute aimed not only to technical innovations resulting in cotton varieties adapted in Greek climate and environment with high yield and extremely good quality but also to cover all the aspects of the cultivation and production of cotton like co-cultivation of cotton with legumes, non tillage and strip tillage cultivation of cotton and irrigation of cotton with municipal waste water.

EXTRA-FINE COTTON IMPROVEMENT IN SUDAN

Ahmed M. Mustafa, Maria Abdalla Abdelrahman Musa and Abdrahman H. Abdellatif

Agricultural Research Corporation, Wad Medani, Sudan

Abstract:

New Extra-fine cotton (*Gossypium barbadense* L.) lines have been developed with intermediate reaction to bacterial blight disease. The advantage seed cotton yield of the lines over Barakat 90 was in the range of 4-28 per cent. They had longer, stronger and finer fibers compared to Barakat-90. The lines were earlier cropping and gave 45.6-61.2 per cent of their yield in the first pick compared to 43.5 for Barakat-90. Hence these lines signify improvement in seed cotton yield, fiber quality, earliness of maturity and reaction to bacterial blight in Sudan extra-fine cotton.

DEVELOPMENT OF BETTER NATURALLY COLORED COTTON LİNES (*GOSSYPİUM HİRSUTUM* L.) REGARDİNG SEED COTTON YİELD, GİNNİNG OUTTURN AND FİBER TECHNOLOGİCAL PROPERTİES UNDER KAHRAMANMARAS CONDİTİONS

Lale Efe

Kahramanmaras Sutcu Imam University, Faculty of Agriculture, Field Crops Department

Abstract

The aim of this project carried out in 2011-2013 under Kahramanmaras conditions was to develop superior lines for seed cotton yield, ginning outturn and fiber technological properties from four naturally coloured cotton populations (*Gossypium hirsutum* L.) crossing naturally and having genetic variation using method of pedigree selection. Naturally coloured cotton populations used as materials had fibers coloured light brown, dark brown, green and creamy.

In 2011 year, 100 individual plants were selected from each coloured population according to field observations such as fiber colour, plant form, boll and leaf form, plant height, number of monopodia, number of sympodia, boll number per plant (for four colour 4x100=400 plants). Each plant was harvested separately. In 100 plants (for each colour) seed cotton yield, ginning outturn, 100 seed weight, boll weight, seed cotton weight per boll, fiber length, fiber fineness, fiber strength, fiber elongation, fiber uniformity, short fiber index, trash area, trash count, trash degree were recorded. According to seed cotton yield, ginning outturn, 100 seed weight, boll and fiber traits 50 individual plants were selected to be sown in next year. In 2012 year, self pollinated seeds of 50 plants selected from four populations having different fiber colours were sown in the separate rows 5 m in length. Thus, 200 progeny rows were formed in total (50 dark brown, 50 light brown, 50 green, 50 creamy). The all plants in rows were self pollinated during flowering period. Individual plant selection were repeated in progeny rows according to field observations. 2 or 3 plants selected according to field observations in each row were harvested separately (For each colour 50x2=100 plants, in total 100x4=400 plants). For each colour in 100 plants seed cotton yield, ginning outturn, 100 seed weight, boll and fiber traits were recorded. According to these traits 50 individual plants were selected. Self pollinated seeds of these plants were sown in the next year. In 2013 year these steps were replicated.

As a result, in each colour individual plants higher yielding and

having higher lint properties were obtained. Second part of this project continuous to obtain homozygous and pure lines using self pollination from 2014 to 2016.

Effect of Plant Growth Promoting Rhizobacteria (PGPR) on Verticillium Wilt of Cotton

Hamdullah Korhan[1], Lale Efe[2], Yuksel Bolek[3] and Mustafa Kusek[4]

[1]Kahramanmaras Sutcu ımam university, graduate school of natural and applied sciences, Kahramanmaras, Turkey
[2]Kahramanmaras Sutcu Imam University, Faculty of Agriculture, Department of Field Crops, Kahramanmaras, Turkey,
[3]Kahramanmaras Sutcu Imam University Faculty of Agriculture, Department of Agricultural Biotechnology, Kahramanmaras, Turkey
[4]Kahramanmaras Sutcu Imam University Faculty of Agriculture, Department of Plant Protection, Kahramanmaras, Turkey

Abstract

Verticillium wilt of cotton is a destructive disease that causes considerable yield losses on the crop. There is no effective method for controlling Verticillium wilt of cotton that is one of the world's most devastating diseases except breeding resistant varieties. Due to environmental concerns of chemicals used in the control of this disease in which using antagonistic bacteria as a biocontrol agent to suppress the disease is very important. In addition, bacteria converting phosphorus to a form that is useful for the plant can offer an advantage for plant growth and disease resistance. Isolation the bacteria from the soil and use as plant growth regulation are the focus of some research has been going on.

Starting by 2014, this study will continue for 3 years. Starting, soil samples were collected at different vegetative periods of plant from 25 different cotton producing areas (from July to September) and pure strain cultivars were obtained from 650 soil samples. Tests applied to these strains are Hypersensitive Reaction on Tobacco, Levan Formation, Oxidase, Hydrogen Peroxide And Potassium Hydroxide. Resulting of identification tests, isolates that doesn't have pathogenicity were tested for the ability to convert the phosphorus obtainable for by the plants, resulting of identification tests, isolates that doesn't have pathogenicity will be used to antimicrobial activity in both greenhouse and in the field trials.

COTTON GINNING TECHNOLOGIES - SELECTION CRITERIA FOR OPTIMUM RESULTS

M. K. Sharma
President, Bajaj Steel Industries Ltd., Nagpur India

Preface:

Ginning is the mechanical process for separating cotton into its constituents namely lint (Cotton Fibre) and Cotton Seed. The Seed Cotton that comes from the field has to be subjected to various treatments in the ginning factories depending upon its inherent characteristics such as trash contents, moisture contents, length of the fibre, variety of seed i.e. fuzzy or black, method of seed cotton transportation, storage practices, handling practices inside the ginning factories and finally subjected to ginning process for separation of fibre and seed before packing into bales etc. Ideally the quality of the constituents i.e. cotton fibre and cotton seed before ginning and after ginning must be more or less same however it is
seen that substantial damage is caused to quality parameters during processes in the ginning factories. The selection of cotton for spinning is made on the basis of fibre quality and any damage in the same during the process of ginning reduces the value of the fibre and results in lowering down of value in total textile value chain.

The development of high speed spinning and weaving machinery has necessitated requirement of better cotton fibre parameters and any damage in quality caused while ginning cannot be rectified later and the defect is carried forward to yarn and fabrics during spinning and weaving process.

The economics of ginning operation is greatly affected by the damage in the quality of the constituents i.e. cotton fibre and cotton seed and lower realization due to same affects down the line to the farmer / grower as the pressure of the lower realization by ginners results in lower price for seed cotton being paid to him.

The economics of ginning operation depends upon the proper selection of ginning technology suitable for various characteristics of the seed cotton to optimize the quality parameters and operational costs, thus the selection of suitable ginning technology is of paramount importance.

COMPETITION AND EFFICIENCY WITHIN THE EQUITY MARKETS

Wagdy Hendy Ibrahim El-Desouky
Patco Cotton Co. Alexandria-EGYPT

Introduction

As from late Eighties of the last century, what's called technical equity markets exist as spread of internet system in which make it possible that both supply and demand for goods and services are available within 24 hours a day. But so far a little attention has been given to improving the accuracy of price determination resulting from demand for immediacy and for too much importance has been attached to the supply of immediacy (the ability to trade at any time in the continues market). Unfortunately, participants pay price to trade whenever they wish during trading section the components include the bid-ask spread, market impact and commissions. In addition the temporal fragmental of orders in one continuous market makes the market more opaque.

Thus for the assumption that participants demand transactional immediacy has gone practically unquestionable would some asset managers choose not paying the price of immediacy of the truly understood the cost of the service and if they had an alternative . Immediacy clearly important to a participant seeking to trade on information that has not yet been reflected in market prices and many participants most notably the mutual funds, do have to trade certain amount each day because of deposits redemptions or their cash flow needs. This does not mean however that they must be able to trade at any given moment in the day. It is conceivable that the provision of immediacy because it temporally fragments orders actually

makes it more difficult for these participants to "get the job done" at a reasonable cost by the end of the day.

On this presentation concentration will be devoted to the following topics

1- Transparency
2- Price Discovery
3-Taking decisions for immediacy demand
4-Consideration of the order flow
5-Market structure

RECYCLING OF THE COTTON STALKS TO ECONOMIC PRODUCTS BETWEEN THE IMPORTANCE AND APPLICATION

Amal S. Owis
Cotton Research Institute, ARC, Giza, Egypt

Abstract

Cotton is the most important strategic crops in Egypt and plays a major role in the Egyptian national economy, because it is an important source of raw material in cotton textile industry as well as being a source for the production of cottonseed oil and used in animal feeding. Cotton stalks produced as a byproduct of post-harvest with large quantities of thousands of tons annually, causing many problems such as: 1. the farmer storing it on the roofs of the houses, causing fires when the wind coming, 2. or burning it causing significant environmental problems, which lead to spread of many human diseases, 3. on the other hand, cotton stalks contain eggs and larvae of pink boll worm, which remain dormant until cultivating the next crop, causing serious damage on the cotton crop.

Globally perception of the plant wastes during the past decades was changed, the thinking is shifting from search for ways to control it and minimize its damage to use it as source of income. Nowadays control of the plant waste does by using different treatment types such as biological or chemical or physical methods.

In Egypt the common way to get rid of cotton stalks are by burning it, which causing environmental problems. So this article will show how nowadays in Egypt thought regarding transforming it to some useful and economical products such as organic fertilizer (compost) , animal feed (silage) , Wood , cellulose derivatives and Charcoal, …..etc.

Key word: Cotton stalks, organic fertilizer, animal feed, wood sheets, Charcoal, cellulose derivatives, environmental impact …etc.

Producing yarn with durable properties via cotton blends with regenerated cellulosic fibers using ring and compact spinning systems

El-Banna, M.N. [1], M.A.M. Negm , A.A.A. El-Banna[1], M.I. El-Bagoury[3], Dalia M. N. Hanna[3]
[1] Fac. Agric., Saba Basha, Alex. Univ., Egypt.
[2]Cotton Research Institute, Giza-Egypt
[3]Cotton Arbitration & Testing General Organization

Nowadays, with rising life standards and the effect of fashion trend, comfort has become an important factor in choosing clothes, and under the title of "Back to Nature", people is always looking for natural raw materials. In this research paper, the properties of cotton/bamboo, cotton /lyocell, cotton /modal blended yarns as well as 100% cotton, 100% bamboo, 100% lyocell, and 100% modal yarns, have been studied.

It is observed that the studied properties : Evenness (C.V%), thin places /400 m, thick places / 400 m, number of neps / 400 m, are significantly affected by fibre type, spinning system and blending percentage. However, strength (RKM) and elongation (100%) are significantly affected only by fiber type and blending percentage.

The highest reading for strength was for 100 % lyocell yarns while the lowest reading was for 50% bamboo/50% cotton yarns.

The highest reading for elongation was for 100 % bamboo yarns while the lowest reading was for 33% bamboo/67% cotton yarns.

It is found that the highest reading of the evenness (C.V%) was for 67% bamboo/33%cotton compact spinning yarns while the lowest reading was for 100% modal compact spinning.

The highest reading of thin places was for 33% bamboo/67%cotton ring spinning yarns while the lowest reading was for 100% modal ring and compact spinning yarns.

The highest reading of thick places was for 33% bamboo/67%cotton ring spinning yarns while the lowest reading was for 33% modal/ 67% cotton ring and compact spinning yarns.

Evaluation of Egyptian cotton variety (Giza 90) and promising cotton Cross for yarn characters

El-Banna, M.N. [1], A.A.A. El-Banna[1], M.A.A. Nassar[1], M.I. El-Bagoury[2], Rasha M. Abdou[2]

[1] Fac. Agric., Saba Basha, Alex. Univ., Egypt.

[2]Cotton Arbitration & Testing General Organization

Abstract

This investigation was carried out at Plant Production Department, Faculty of Agriculture (Saba Basha), Alexandria University, Egypt to study the effect of cotton genotypes and twist multiplier on yarn properties of commercial cultivar, Giza 90 and new hybrid namely: H (G.83(G.75x5844) G80) as long staple (LS) were used. The two twist multiplier i.e. (3.6 and 4 T.M.) and the four yarn counts (24, 30, 36 and 40 Ne) on the same spinning systems (ring spinning) were used. The obtained results indicated that the long staple cotton new hybrid namely: H (G.83(G.75x5844) G80) and twist multiplier (4) recorded the highest mean values of the most importance of yarn properties. The strongest, longest and finest cottons produced the best yarn quality and were capable of acceptable spinning performance, in addition to the priorities. Yarn manufacturers are asking for higher fiber strength.

Key words: Egyptian cotton variety, Cotton properties, Giza; LS, twist multiplier, Yarn count, yarn properties

EFFECT OF SOME SPINNING METHODS ON SPINNING EFFICIENCY OF EGYPTIAN COTTON

Nassar, M.A.A.[1], M.A.M. Negm[2], E.I. Ibrahim Abbas [1]., M. I. El Bagoury[3] and Eslam E. El –Sayed[3]

[1]Fac. Agric., Saba Basha, Alex. Univ., Egypt.

[2]Cotton Research Institute, Agric. Res. Center, Giza, Egypt

[3] Cotton Arbitration and Testing General Organization

Abstract

The main objective of the present investigation is to evaluate the spinning efficiency for different commercial cotton varieties in addition to a new promising of Egyptian cotton using two spinning systems i.e., ring and compact spinning. Two Egyptian cotton categories were tested in this study, ElS & LS categories. The first one is an Egyptian cotton genotypes named Giza 88, Giza 92 belong to the category of Extra-long staple varieties in addition to a new promising variety Giza 93 which also belong to the same category . The second is the long staple commercial genotypes named Giza 86 and new promising cross namely Giza 86X10229 (New cross). The Egyptian commercial cotton varieties and promising crosses were spun into two different spinning systems (compact and conventional ring spinning) and four different yarn counts (60's, 80's, 100's, 120's and 140's on the same twist multiplier (4.2).

The results obtained that compact spinning system offers better utilization of fibers and increases the spinability of the Egyptian cotton. In addition, there is a high correlation between the spinning system and yarn count on its physical and mechanical properties.

The new promising cross Giza 93 recorded the highest values of Single yarn strength (g/tex), elongation (%), yarn evenness (C.V. %) and Lea Count Strength Product which gained by the compact spinning system at yarn count 80'S compared with the cotton variety Giza 88 at the same yarn count and spinning system. However, the highest imperfections yarn values (thin places, thick places and neps count /1000 m) were positively associated by the cotton variety Giza 88 which spun at the 140'S yarn count and the ring spinning system.

The second experiment indicated that the best yarn quality for strength (g/tex), elongation (%), yarn evenness (C.V. %) and Lea Count Strength Product were recorded by compact spinning system of the cotton new cross namely Giza 86X10229 when spun at 40'S yarn count. On the other hand, the lowest values of the same traits were possessed by the cotton variety Giza 86. Meanwhile, the cotton

variety Giza 86 supposed the highest imperfections yarn values (thin places, thick places and neps count /1000 m) with ring spinning system and 100'S yarn count.

A Comparison of HVI, AFIS and CCS Cotton Testing Method

Mohamed A. Negm[1] , Suzan H. Sanad[1] and G. Kugler[2]
[1]Cotton Research Institute. Agric. Res. Center, Giza, Egypt.
[2]Textechno Herbert Stein- Mönchengladbach-Germany

Abstract

Six Egyptian cotton varieties and two Upland cottons (Burkina Faso and Uzbekistan) based on a wide range of fiber properties i.e., fiber length, fiber strength, fiber elongation, short fiber content and micronaire reading measured by HVI, AFIS " as High Volume Instrument" and new device Cotton Classification System (CCS-Textechno) "as Medium Volume Instrument" were analyzed and compared. The correlation among the three cotton testing methods was determined. The results indicated that both HVI, AFIS measurements were found to be comparable to the CCS except fiber elongation property.

Developing a DNA -based Technology for Identifying the presence and percentage of Egyptian cotton fibers in various textile products

Mohamed A. Negm and Suzan H. Sanad
Cotton Research Institute. Agric. Res. Center, Giza, Egypt.

Abstract

Deoxyribonucleic acid (DNA) is a complex molecule found in almost all cells of the human body as well as other living organisms. DNA carries the genetic code that is needed for human cells and the organism as a whole. It is also the means by which genetic information is passed from one generation to the next.

In the past two decades, advances in forensic genetics have made it possible to perform paternity diagnoses involving solely the alleged father's genetic information and that of his descendant when there is a high enough degree of biomathematical certainty in order to consider the results reliable. DNA technology becomes one of the forefront sciences in parallel with Nanotechnology.

The commercially grown cotton varieties used in production of textile products belong two different species, Gossypium barbadense, known as Egyptian cotton, and characterized by higher quality and price, and Gossypium hirsutum known as Upland or American cotton, and characterized by lower quality and price. Textile made from world-wide known Extra-Long & Long Staple Egyptian cotton varieties are of higher quality and price than those produced by Upland cotton. Thus, textiles produced from ELS Egyptian Cotton fibers are considered more valuable in the textile marketplace. In last time, there is no real method to indentify (differentiate) between the expensive cotton "Egyptian cotton" and cheap cotton "Upland cotton" in yarns, fabric, particularly, if the fabric made of blending the two cottons.

The aim of current research paper is to establish a DNA databases and technical methods which can be used at as powerful tools in the identification of Egyptian cotton and foreign cottons. The latter include many cotton species. Research output of the study would certainly guarantee protection of distinguished of Egyptian

cotton, and reduces the counterfeits.

The study, indeed, address methods of isolating biological macromolecules particularly nucleic acids from mature cotton fibers. The cotton fibers are processed into yarns, woven or knitted to fabric or finished apparel, prior to the isolation of the biological macromolecules.