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STUDYING THE METHOD OF COTTON AGAINST INSECTS IN THE MOLECULAR GENETIC CONTEXT

Babazyanova Dildora Akramjonovna
Namangan State University, Biology major, 2nd year master's student
Gmail: dakramovna8806@gmail.com

Abstract:
The biggest threat to cotton in Uzbekistan is chatnik introduced winter cutworm (Agrotis segetum Den. and others Schiff), cotton spoon (Helicoverpa armigera Hbn.), spider mites (Tetranychus urticae Koch.), various types of aphids (Aphididae), insects are myridy (Miridae). This In the absence of effective control of pests, they destroy the cotton crop is losing, it can exceed 1.1 million tons per year due to the damage caused by these pests. This Special attention should be paid to pests, this type of insect is generative damages the organs. The period of their formation is the drying and immaturity of cotton brings.. In such growth, the exchange of body tissues is disturbed. From this besides, the nectar released from the cotton flower attracts aphids and insects. Sticky secretions winged flies cause mass development of the cellulose complex destroys microorganisms.

Keywords: Bt crops, genetic insect control, resistance management, self-limiting constructs, sterile insect technique

In recent years 1/3 of the national income of our republic is created at the expense of cotton fiber. Production of 3,350,000 tons of raw cotton per year in the Republic 3400.3 thousand tons of cotton raw materials were prepared in practice, the plan was 101.5 percent, this indicator has increased even more today. The average yield indicator for the republic is 26.5 s/ha organized. In the reporting year, 44.5 percent of farmers in the republic (total cotton 45.4% of cultivated areas have achieved productivity of 25-35 s/ha, 40 per hectare the number of farms with a harvest of more than 1 centner was 2547 (6.4%). The cotton plant is susceptible to insects and diseases quickly belongs to the category of plants that indicate damage. That's why him Pest and disease control measures should be maintained, otherwise the expected cotton yield cannot be achieved. Cotton is the main strategic of our country is one of the crops. In the conditions of Uzbekistan, cotton cultivation is the most harmful one of the contributing factors is the cotton planters. If aphid control measures are not taken in time, they are a pest reducing productivity by 30-50% in some cases causing the complete loss of young seedlings comes.56 [1].

There are many studies of valley fauna by researchers Research is being conducted, especially in the following years, on the study of various entomocenoses the scope of dedicated works has expanded. The degree of harmfulness of aphids depends on their number on plants and on the plant time is calculated, and the final result is determined by the change in productivity. At the moment biology of aphids, dynamics of development by most scientists systematics is well studied. Cotton pests are one of the most damaging factors in cotton production is considered In the conditions of Uzbekistan, there are more than 210 pests of cotton pests have been identified. One of them is when the sap is released from cotton it develops in the cotton before harvesting and causes damage. The result is a plant it stops growing and developing, the leaves do not expand and fall off, and the end of productivity decreases sharply. If aphid control measures are not taken in time, they cotton productivity up to 30-50% in some cases young sprouts in general leads to its disappearance.

Protecting plants from harmful organisms is important at the state level is one of the problems. At present, it has become clear that, on the one hand objective about pests, diseases and weeds of agricultural crops information, and on the other hand, about the environment and its changing trends without having objective knowledge, it is possible to use the means of protection in practical terms it's not. Scientifically and organizationally, this task is very difficult, but it has a wide scope requires the involvement of specialists from various fields of knowledge. And this in turn necessary concepts, terms and changes in trends in harmful organisms the need to compare and generalize and compare the obtained data does. But until now, the generally accepted concept is general monitoring program and methodology are not available.

The use of molecular genetic methods in cotton plant breeding is an urgent task, which makes it possible to reduce the time for creating varieties with economically valuable traits. The emergence of new breeding samples of hybrid origin (PGSSH 1, PGSSH 7) with a long-day photoperiodic reaction, resistance to diseases and sucking pests, high quality fiber requires genetic research. Their comparison with breeding samples of semi-cultivated cotton (with green, red, gray fibers) makes it possible to reveal differences and identify genetic markers that ensure the realization of the biological potential of plant development. The purpose of our study was to

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identify genetic markers of economically valuable traits of cotton for the creation of a new generation of breeding material for the northern regions of cultivation based on the molecular genetic polymorphism of the DNA (Deoxyribonucleic acid) of the studied samples. For research, we have selected two of the most effective methods for assessing genetic polymorphism using DNA markers. The first of these is the method of SSR markers -(English Simple Sequence Repeats), PCR (Polymerase chain reaction) with flanking primers to a short mini or microsatellite repeat. Another method using short random primers is RAPD analysis (Random Amplified Polymorphic DNA).

Genetic insect control methods need not be directly aimed at population suppression. The female-lethal, or male-selecting, versions could in principle be used to help manage resistance to other control methods. First, consider an example of another plant pest control method using GM technology: insecticidal crops. Transgenic Bt crops are engineered to express insecticidal toxins derived from Bacillus thuringiensis, causing mortality to susceptible insects eating the plant. Effective Bt crops are valuable and there is a strong economic threat from the propensity of insects to evolve resistance. The primary approach used to slow the evolution of resistance is known as the high-dose/refuge strategy and this is mandatory in some countries. The effectiveness and dominance of resistance to toxins is often dose-dependent. Commercial crop varieties are designed to express a 'high dose' of the relevant Bt protein, so that, if any allele in the population is able to confer resistance, the amount of toxin expressed will be sufficient to kill resistant heterozygotes. If this is achieved, the resistant allele is functionally recessive. Planting high-dose Bt crops across an entire landscape would likely lead to the rapid spread of resistance because the only individuals that could survive would be homozygous. The 'refuge' part of the strategy provides an area of nontransgenic plants (either a conventional variety of the crop or an alternative host plant species) to serve as a safe harbour for susceptible insects. This acts as a source of susceptible alleles and helps to dilute and slow the evolution of resistance by providing susceptible mates for resistant insects so that their progeny are heterozygous and are killed by the toxin.

In terms of the genetics, consider a resistant allele r, which is initially rare. The dominant allele S is susceptible to Bt. If the high dose assumption is achieved, only some rr individuals can survive a full life cycle on transgenic plants and emerge as adults to mate. In the refuge, most emerging adults will be susceptibleSS, especially if the r allele has fitness costs in the absence of the Bt toxin. If the refuge is located

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so that the two subpopulations are well-mixed, most resistant rr survivors will mate with susceptible SS insects from the refuge. Their resulting Sr progeny cannot survive on the Bt crops and so will not pass on the resistant allele to future generations. Unfortunately, a few insect species, such as the economically important pests Helicoverpazea (Boddie) and Helicoverpa armigera (Hübner) (both species, confusingly, known as both bollworm and corn earworm), have been identified in the past as 'moderate dose pests', where the toxins were unable to kill all heterozygotes. Even where its main assumptions appear to hold, the high-dose/refuge strategy is predicted only to delay resistance and, after two decades of commercially grown Bt cotton and Bt corn (maize), some field-evolved resistance has now been observed and reported in a variety of insect species.

In some cases, this has already led to reduced efficacy of crops, or even crop failures. A comprehensive review is provided. In economic terms, the high-dose/refuge strategy is aninter-temporal trade-off, sacrificing current value to retain value generated in future. Refuge plants will be damaged, which reduces their yield if they are crops, or reduces the area allotted to crop production if alternative host plants are used. This damage or lost production is tolerated, in return for prolonging the efficacy of the protection afforded by the Bt crops. In principle, a conventional crop refuge could be sprayed with another pesticide (one with no cross-resistance between its active ingredient and Bt), although doing so reduces its effectiveness as a refuge. Next, consider combining Bt plants with a female-lethal genetic insect control programme. The males to be released should carry two copies of the lethal construct and should also be homozygous susceptible to Bt, SS. This results in introgression of genes through the male line, with male progeny of released insects inheriting an S allele and therefore passing it on to their offspring, at least in the refuge. Viewing this as an alternative source of susceptible alleles, we investigated whether mass-release of these toxin-susceptible insects could substantially delay or reverse the spread of resistance to Bt and reduce the need for a refuge. Simulation models were used by the U.S. Environmental Protection Agency when developing the regulations for Bt crops, and specifying resistance management requirements including minimum refuge sizes and spatial restrictions. We used a population genetic model to investigate the effect of releases of susceptible female-lethal engineered males on the evolution of Bt resistance over time. With plausible parameter values, the r allele can spread. and spreads faster with a smaller refuge.

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Generally, a frequency of 0.5 is an indicator of a serious problem because resistance frequency increases rapidly once r becomes the more common allele. With a very modest ratioof released males to males emerging in the wild (sustained over time), our models predict that releases can slow or reverse the spread of resistance to Bt crops. Although a typical suppression programme might aim for a ratio of 10 : 1 or more, resistance management programmes could see an effect with ratios as small as 1 : 5 (i.e. where one-sixth of matings are with a modified male). Engineered insect releases allow an equivalent level of resistance management with a smaller refuge. If the initial r allele frequency is higher, more released males and/or a larger refuge are required to achieve a given effect. The release numbers and refuge size can be traded off, which would be at least in part an economic decision. The need for new innovations to deal with emerging agricultural pests and diseases has never been greater, and this is an interesting time for the science and research of genetic control of insects. Some of the GM technologies described in the present review are already being proven in the field. The next wave of molecular methods is being applied to disease-transmitting mosquitoes and this is beginning to reach over to agriculturally important species. Attention is being given to regulatory aspects to enable the safe and appropriate implementation of these biological, genetics-based strategies. Collectively, these developments advance the prospects for realizing tremendous agricultural and socio-economic benefits.

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References

1. Alphey, L. (2014) Genetic control of mosquitoes. Annual Review of Entomology, 59, 205–224. [PubMed] [Google Scholar]

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2. Burt, A. (2014) Heritable strategies for controlling insect vectors of disease. Philosophical Transactions of the Royal Society of London Series B: Biological Sciences, 369, 20130432. [PMC free article] [PubMed] [Google Scholar]
3. CABI (2016) Ceratitis capitata (Mediterranean fruit fly) Invasive Species Compendium. CAB International, U.K: [WWW document]. URL http://www.cabi.org/isc [accessed on 1 November 2016]. [Google Scholar]
4. Esvelt, K.M. , Smidler, A.L. , Catteruccia, F. & Church, G.M. (2014) Concerning RNA-guided gene drives for the alteration of wild populations. eLife, 3, e03401. [PMC free article] [PubMed] [Google Scholar]
5. European Food Safety Authority (2012) Guidance on the risk assessment of food and feed from genetically modified animals and on animal health and welfare aspects. EFSA Journal, 10, 2501. [Google Scholar]
6. Tabashnik, B.E. , Brevault, T. & Carriere, Y. (2013) Insect resistance to Bt crops: lessons from the first billion acres. Nature Biotechnology, 31, 510–521. [PubMed] [Google Scholar]