

Saving white gold

Agriculture
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IJAZ AHMAD RAO suggests effective measures to combat cotton *sundi*

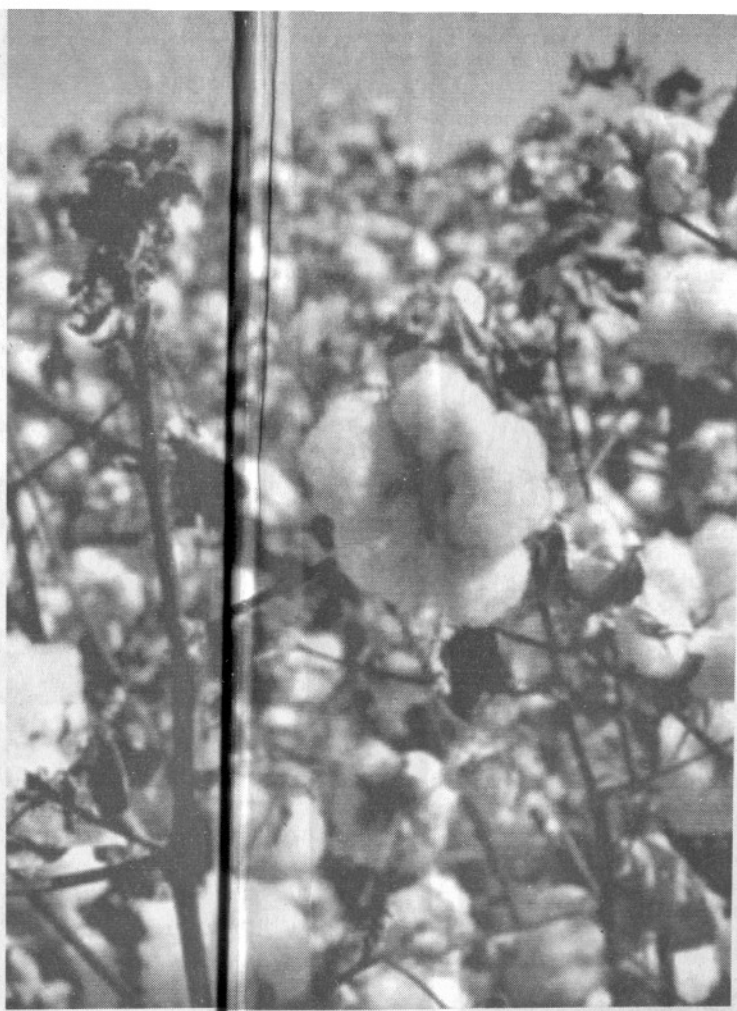
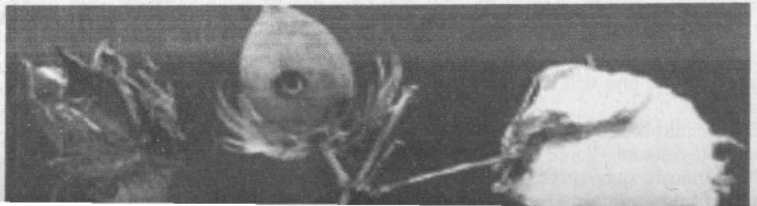
Cotton is an important cash crop known as our "white gold", covering an estimated 6.50 million acres this year as compared to 4.95 million acres in 2002-03. In Pakistan the life of millions of farmers is dependent on the fortunes of this crop, in addition millions of people are employed along the entire cotton value chain, from weaving to textile and garment exports.

Cotton crop was in a good condition in most parts of the country till the end of August despite the heavy rainfall in the cotton-growing belt. However, in first week of September many types of caterpillars known as "Sundies" like Pink, Spotted and American, have severely attacked on cotton crop in Sindh and Punjab provinces. So far the "Lashkari Sundi" and "American Sundi" have gone out of control and now destroying the cotton crop at an alarming rate. During the months of August and September often pressure of pests increased in the cotton growing regions, most of cotton growers would remember that in 1991-92 after picking an all time bumper crop of 12 million bales, the cotton crop had to confront with the challenge of cotton leaf curl virus (CLCV). Although the Cotton Bollworm (*Helioverpa Armigera*) known as "American Sundi" has long been an important pest of cotton in the last few years, unlike the Tobacco

insecticides, while this year especially "Lashkari Sundi", is very difficult and costly to control, because of the high levels of resistance that it may have developed to these classes of chemistry. It is natural that under regular exposure to insecticides, the insects are likely to develop resistance to different pesticides. Unfortunately, at present in Pakistan the use of pesticides is the only way out to keep these sundies under control, while rest of the world is exploring and adopting new technologies and technique to confront crop diseases.

One of them is use of Bt cotton, or cotton genetically spliced with toxic genes borrowed from *Bacillus thuringiensis* (Bt), a bacterium that is deadly to the "Sundies". In the case of cotton, the Bt protein acts on three major caterpillar pests - the tobacco budworm, the American bollworm and the pink bollworm. Bt has been used since the 1950s in the form of an insecticidal spray to combat insects though repeated applications are necessary and insect damage was still common. However, since the development and introduction of transgenic Bt-cotton seed "Bollgard I" in 1996

of bollworm treatments applied to Bt fields in Australia, India, China, USA has ranged from 0.27 to 1.22 treatments per field. Still, this is considerably lower than the 5 to 16 sprays per field that were applied to control bollworm/tobacco budworm on non-Bt fields. It is also very important to know that to control and reduce the chance that pests may develop resistance to "Bt" insecticidal proteins in "Bollgard I", Monsanto has also introduced another variety of Bt cottonseed called "Bollgard II" in USA and Australia. Although "Bollgard I" provides excellent, season-long control of "Lashkari Sundi" and pink bollworm, and a high level of suppression of the cotton bollworm, while "Bollgard II" provides fantastic control of most of the sundies and pests like "Lashkari Sundi", "American Sundi", pink bollworm, fall armyworm, beet armyworm, cabbage and soybean loopers, and other second day leaf- or fruit-feeding caterpillar in cotton. Both Bt-cotton varieties are as safe to the environment, humans or other non-target species, including beneficial predators and parasites, as other commercial cotton varieties.



about. It is note worthy that on the one hand excessive use of pesticides has caused shortage of pesticides in the market, on the other it has increased the costs of cotton production apart from the negative impact on the environment and human health. In the past one month the cotton price has increased more than 10 per cent because of the speculations regarding the damage caused by the sundies. Further more according to farmers this is the first time that sundies have been seen crawling in the village streets and

to 15 days and but can be longer when temperatures are cool, after that it enter into Pupa stage. Pupation occurs in the soil near the host plant on which the larva waits for favorable climatic conditions to develop. Therefore in the next cotton-growing season when these sundies or larva will develop how it can be handle by the available insecticides and technology, which have not shown any positive results this year? Plant biotechnology is helping today millions of farmers around

known as "Lashkari Sundi", which used to be considered as a 'secondary pest', but in this cotton-growing season it has appeared as a 'major sucking pest'. In non cotton season large numbers of these sundies often develop in fields of corn, grassy plants, sorghum vegetable like egg plant, Okra etc and then move to cotton in July and August.

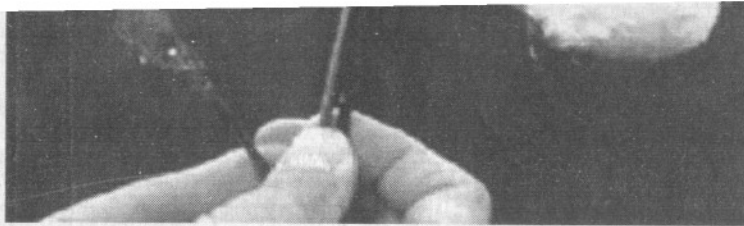
Cotton farmers and pesticides companies are witness that through out the month of July and August few or no "Sundies" were present in the fields. Today, cotton growers are the ones who are crying and losing hope in their battle against American and Lashkari sundies. They are asking where they have gone wrong? Would it be preventable now and in future? To whom they can blame for loses? To answer their concerns is not so simple.

The fact is that in past "Lashkari Sundi" and "American Sundi" were relatively easy to control, since they hadn't developed resistance to non-pyrethroids like Indoxacarb, Spinosad and Thiodicarb and other pyrethroid

by a multinational company Monsanto, the ability to more easily and effectively protect cotton from the damage of "Lashkari Sundi", "American Sundi" and other pests have increased considerably, because they are susceptible to the Bt toxin in these improved crops

Bt cotton, which is currently planted around the world covers over 70 per cent of area under cotton in the USA and 40 per cent in South Africa, and its percentage is increasing in China and India. At present Bt provides 100% control of "Lashkari Sundi". Although Bt cotton also provides significant control of bollworms but supplemental foliar insecticide sprays are occasionally required to keep bollworms from causing excessive damage in Bt fields. During the past few years, the average number

Other than USA and Australia, in China by adopting Bt cotton seeds against different sundies and pests, the average gross yields has increased by 15 per cent over conventional strains, in Spain, Bt cotton trial plots offered a 12 per cent yield advantage over conventional varieties sprayed with insecticides. Even in India it has showed a 14 to 38 per cent increase in cotton yield. The biggest benefit reported by farmers in these countries, most of whom have small-holdings like Pakistani farmers, is the health benefit to themselves and farm labor from the substantially reduced number of sprays to combat Lashkari sundi and American sundi. It is notable that danger of health risks from insecticides is considerably greater in Pakistan as compare to USA and Australia, where adulterated sprays



in the village streets and people are bitten by during cotton picking. It has also been reported by Victoria hospital Bahawalpur that "Lashkari Sundi" has killed a child aged three months as it tried to enter in the child's body through his belly button.

Although Government scientists have affirmed that at the laboratory level, Pakistan has developed Bt cotton, Bt soybean, Bt rice and Bt tomatoes so on, but these cannot be declared in the absence of Bio-Safety Guidelines, which need to be approved by the Ministry of Environment. So, in the view of claims made by our scientists, quantification and evaluation of these Bt crop varieties cannot be ascertained unless these Bt varieties are released and tested in the field.

Currently, a big concern rising among our farmers is on the life cycle of these sundies. The female moths of Lashkari sundi, and American sundi" produce from 800 to over 1000 eggs during an oviposition period that lasts approximately 8 to 12 days. Although the eggs hatch in three to five days, the larval stage lasts 12

today millions of farmers around the globe to get more and better food by controlling Sundies and other pests in their crops, it holds even greater promise for the future. Whether cotton farmers in China, India, America, Indonesia and South Africa, canola farmers in Canada, soybean farmers in Argentina or corn farmers in Spain and the United States, millions of farmers around the world are using biotech seeds to boost yields, improve their livelihoods and preserve the environment. Hence, one million dollar question remains in our farmers mind why government of Pakistan is not giving them a chance to decide if they want to keep the current practices or to use advance technology like Bt in their fields. Though every technology has its advantages and disadvantages and experience shows that the less savory aspects of a particular technology are remedied by further technological advancements and not by reverting to the imagined world of pristine naturalism, but closing doors on Biotechnology is a recipe for disaster for all of us. ●