STUB COTTON IN ARIZONA
A Three Year Program Summary

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In 1978, the commissioners of Agriculture and Horticulture relaxed the quarantine previously placed on stub cotton production in 1965. The quarantine was relaxed at the request of cotton growers in Arizona following a series of open meetings.

The commissioners of Agriculture and Horticulture and the Arizona Cotton Growers Association requested the University of Arizona and the United States Department of Agriculture to develop a formal research program to evaluate the impact of stub cotton on the incidence of weeds, insects, and diseases and the profitability of the culture system.

In 1978, the first year of stub cotton evaluation, about 200 cotton farmers cultivated approximately 40,000 acres of stub cotton.

In late 1978, December night time temperatures dropped to at least 20 degrees in most stub cotton areas. As a result, stub cotton acreage was limited to about 1500 acres during the 1979 season.

Data collection by the stub cotton research group during 1979 was restricted to insects and diseases. Limited stub cotton acreage and poor stands precluded collecting cultural practice information and making an economic analysis.

The winter of 1979-80 was favorable to stub cotton production and approximately 60,000 acres were cultivated.

In 1980, members of the Stub Cotton Research Committee arranged to monitor five separate sites where stub cotton was grown adjacent to regular planted cotton fields.

In addition, entomologists on the committee collected insect information from planted and stub cotton fields at the Arizona State University Farm. They also closely monitored the incidence of boll weevil in cotton fields in the stub cotton producing area.

The mild winter of 1977-1978 contributed to substantial overwintering populations of most cotton insects. Early spring observations indicated unusually high survival of over-wintering pink bollworm, the bollworm-budworm complex, other insect pests as well as insect predators.

In early season, pink bollworm populations were markedly greater in stub fields than in planted fields. This is not surprising since stub cotton fields produced squares, flowers and bolls approximately one month earlier than comparison planted fields. As the season progressed, the adult populations of pink bollworms leveled out so that by late June, trap readings were similar between the two cultures. No doubt, insecticide spray programs were helpful in reducing and thus stabilizing populations in the two cultures.

The common bollworm-budworm complex populations developed early in June in stub cotton. They were observed in planted cotton at similar levels about three weeks later.

During 1979, stub cotton fruited three to four weeks earlier than planted cotton. This is the same pattern observed in 1978.

The early development of stub cotton produced larger populations of most pests and beneficial insects. This influx of insects increased the insect pressure on adjacent planted cotton. It appears as though pink bollworms produced about one generation in stub cotton fields before reproduction began in adjacent planted fields.

During 1980, pink bollworm infestations were found in stub cotton four weeks earlier than in comparison planted cotton.

The three year study indicates that pink bollworm infestations occur in conjunction with the development of the cotton plant. We observed squares, flowers and bolls in stub cotton approximately four weeks earlier than in planted cotton. We also observed pink bollworm infestations in early fruiting forms.

The four week period corresponds closely to the time period required to produce one pink bollworm generation.

Although bollworm-budworm activity was observed in stub cotton earlier than in planted cotton, a larger population of insect predators was also observed in stub compared to planted cotton. The high populations of insect predators probably accounts for the low number of bollworm-budworm damaged terminals in stub cotton early in the fruiting season.

It is interesting to note that the number of insecticide applications were greater in 1978 than in 1979 or 1980.

In 1979, only about half the number of applications were recorded as in 1980.

In 1978, insecticides were applied on an average of about 12 times to all fields in the program. In comparison, about 5 applications were made in 1979 and about 10 applications in 1980.

The boll weevil, although not a newcomer to Arizona, was found in each of the three years during the stub cotton program. During 1980, relatively large numbers of boll weevil infested a localized area in the stub cotton production region.

This insect proved difficult to control. Apparently, successful boll weevil control will require new techniques.

Successful handling of the boll weevil may prove to be the pivotal stub cotton production evaluator.

During the 1978 season, 11.7 applications of insecticide were applied to planted cotton and 13.3 applications to stub cotton. The average cost per acre for insecticides applied to planted cotton in 1978 was $148.00 compared to $141.00 for stub cotton. The relative discrepancy between number of applications and cost per acre is explained by stating that cotton farmers began spraying stub cotton earlier in the season. They also stopped spraying stub cotton fields earlier in the fall. Historically, insects such as the tobacco budworm that occur in late season are more difficult to control and cotton farmers select more expensive insecticides to control this insect.

In 1980, preliminary data suggest cotton farmers used an average of 9.6 insecticide applications to control insects in planted cotton compared to 11.1 applications to stub cotton. Insect control in planted cotton cost an average of $100.00 per acre compared to $110.00 for stub cotton.

The same application number-acre cost discrepancy that occurred in 1978 was recorded in 1980. In late season when planted cotton received a greater number of insecticide applications compared to stub cotton, the cost of each application was more expensive than those applied in early or midsummer.

During 1979, each planted and stub cotton field received an average of 5.2 insecticide applications. Cost data are not available.

Water, the item we thought would be the second most costly production input, turned out to be the most costly during 1980.

During 1978, planted cotton received an average of 12.1 irrigations compared to 13.6 for stub cotton. Planted cotton received a total average of 79.6 acre inches of water compared to 90.8 for stub cotton. The cost of water averaged $137.00 per acre for planted cotton compared to $153.00 for stub cotton.

In 1980, planted cotton received an average of 14.1 irrigations per acre compared to 17.0 for stub cotton. Planted cotton received a total average of 94.7 acre inches of water compared to 121 acre inches for stub cotton. The cost of water averaged $175.00 per acre for planted cotton compared to $222.00 for stub cotton.

Differing strategies and requirements for producing planted and stub cotton account for the differences in number of irrigations, amounts, and cost of water per acre. Cotton farmers irrigated stub cotton earlier in the season and more frequently in early season than planted cotton. They terminated both cottons at about the same time in the fall.

Additional late season applications of water in 1980 compared to 1978 accounts for the differences in number of applications between the two years. The warm temperatures during September and October prompted cotton farmers to irrigate and control insects later into the fall in 1980 compared to 1978. In 1980, the average amount of water applied at each application date was greater than during 1978. Thus accounting for part of the difference in total water use between the two years.

Although the total amount of water used during both years by cotton growers may seem excessive, all farms utilized tail water through a pumpback or another redistribution system. It is estimated that pumpback systems generally redistributed 20-25 percent of the total water applied.

Weed control continues to be a problem for stub cotton producers. Although cotton growers were more selective of fields to stub in 1980 than 1978; control of bermudagrass, blueweed, Johnsongrass, winter annuals and the normal broadleaf and grassy weeds were costly.

The key to a successful stub cotton production system rests with the growers ability to maintain stands, select weed free fields, especially those free of bermudagrass and blueweed. Early season herbicide applications may be risky and the spatial arrangement of branches on stub cotton plants make cultivations difficult. Meanwhile, we did not note a buildup of known diseases nor observe new diseases in stub cotton during the three program years. Crumple leaf, an insect vectored disease,

associated with the stub cotton culture in the late 1950's was expected to occur, but symptoms on plants were rarely observed.

In summary, the cost of producing a planted or stub cotton crop was similar each year.

It is interesting to note that the 1980 crop cost about 19 percent more to produce than the 1978 crop.

Stub cotton during 1978 was much more profitable to grow than planted cotton. Yields of stub cotton in 1978 were 416 pounds lint per acre greater than planted fields. Seedcotton from our 1980 program have not been ginned and therefore, results are not available.

The economic advantage and greater yields resulting from the longer growing season of stub cotton must be weighed against the additional generation of pink bollworms produced each year.

Still, the boll weevil may be the pivotal evaluator of stub cotton.