

# Grain Sorghum . . .

## A Source of Insect Predators for Insects on Cotton

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Arizona cotton growers are becoming increasingly aware of the need to reduce production costs. A potential way for reducing costs is by interplanting cotton and other crops on the farm to make the best use possible of naturally occurring predators of cotton pests.

Grain sorghum planted with cotton offers one potential beneficial crop association. Aphids feeding on the grain sorghum provide food for a large array of predators of injurious cotton insects and the large predator populations in the sorghum overflow into the cotton. The aphids on the sorghum

do not attack the cotton, lygus bug populations on sorghum are negligible and with the exception of the bollworm, which generally causes little damage to cotton in the early growing season, the insects associated with sorghum do not present a hazard to cotton. Therefore interplanting of

Table 1. Insect predator populations in selected fields of cotton and grain sorghum. Avra Valley, Arizona 1970.

Predator	No. per acre (thousands) during the weekending:										
	May 29 <sup>1</sup>	June 5	June 12	June 19	June 26	July 3	July 10	July 17 <sup>2</sup>	July 24 <sup>2</sup>	July 31 <sup>2</sup>	Aug. 7 <sup>2</sup>
	<i>Cotton</i>										
Lacewing eggs		2.2	3.6	4.9	12.5	12.0	23.0	3.6	3.6	18.8	12.0
Lacewing adults		0.6	0.1	0.2	0.2	0.2	2.7	1.0	0.8	2.8	2.8
<i>Active Predators:</i>											
Collops beetle adults		0.3	1.1	1.0	3.9	10.6	11.5	1.8	0.3	0.5	0.9
Ladybird beetle larvae and adults			0.5		0.1	1.8	10.5	16.0	3.6	1.0	2.3
Big-eyed bug nymphs and adults	0.3		2.6	6.7	10.8	11.9	19.5	0.3		0.3	
Spiders		3.0	1.0	1.7	1.9	2.5	2.2	1.3	0.5	0.3	0.1
Other <sup>3</sup>		0.3	8.7	9.8	12.5	4.4	3.6	0.5	0.5	1.3	1.4
<b>Total active predators</b>	<b>0.3</b>	<b>3.3</b>	<b>13.9</b>	<b>19.2</b>	<b>29.2</b>	<b>31.2</b>	<b>47.3</b>	<b>19.9</b>	<b>4.9</b>	<b>3.4</b>	<b>4.7</b>
	<i>Grain sorghum</i>										
Lacewing eggs	18.1	74.8	207.2	34.9	326.6	267.1	95.9	102.3	10.3	76.2	55.6
Lacewing adults	30.7	38.7	24.9	19.7	53.6	44.8	28.0	41.3	7.9	9.8	7.4
<i>Active Predators:</i>											
Collops beetle adults		7.2	4.6	19.2	21.1	11.3	17.2	11.3	2.5	5.9	8.8
Ladybird beetle larvae and adults	63.7	74.8	103.0	56.6	86.1	1463.9	514.0	306.5	145.6	62.0	43.3
Big-eyed bug nymphs and adults			0.7	2.9	6.4	12.8	3.4	3.9	4.4	3.4	1.5
Spiders				3.4	1.0	3.4	12.8	18.2	22.1	25.6	19.7
Other <sup>3</sup>	1.5	3.3	1.4	5.5	8.4	11.8	2.0	4.0	1.0	1.0	0.5
<b>Total active predators</b>	<b>65.2</b>	<b>85.3</b>	<b>109.7</b>	<b>87.6</b>	<b>123.0</b>	<b>1503.2</b>	<b>549.4</b>	<b>343.9</b>	<b>175.6</b>	<b>97.9</b>	<b>73.8</b>

<sup>1</sup> Grain sorghum sprayed with dimethoate 0.3 lb/acre on April 23.

<sup>2</sup> Cotton sprayed with 4 lb. toxaphene + 1 lb. methyl parathion/acre on July 15, 21, 27 and August 3

<sup>3</sup> Nabids, reduviids, minute pirate bugs (*Orius* spp.) and lacewing larvae.



Figure 1. An interplanting of cotton with grain sorghum. Is this in the future for cotton production in Arizona? asks the author.

cotton and sorghum should be highly beneficial.

A study was made in 1970 in the Avra Valley to determine the extent of the interchange of predators between adjacent grain sorghum and cotton fields.

A 100 acre field of grain sorghum planted in early spring became heavily infested with aphids. First, the corn leaf aphid, *Rhopalosiphum maidis* (Fitch), infested the whorls of the grain sorghum and dimethoate was applied for its control on April 23. However, the infestation persisted and later in the season was replaced by an extremely heavy infestation of a biotype of the greenbug, *Schizaphis graminum* (Rondani), which has occurred in increasing populations in grain sorghum in Arizona in the past 4-5 years. Concurrently, large numbers of predators developed on the greenbugs in the grain sorghum. The data in table 1 show the populations of predators in the grain sorghum from late May until harvest on August 7. At all times during the growing period of the grain sorghum the potential for a large lacewing (*Chrysopa* spp.) population was present in the field as

indicated by the counts of eggs and adults. The impact of the lacewing population was difficult to assess because the larvae remain well hidden and are difficult to count. Throughout the growing season the active predator population ranged from almost 1 to 15 predators per plant with the stand averaging 98,000 plants per acre. In early July the active predator population, consisting primarily of ladybird beetle adults and larvae, exceeded 1 to 1.5 million predators per acre. Large populations of *Collops* beetles and big-eyed bugs, *Geocoris* spp., also were in the field through most of the season. As the season progressed the populations of spiders in the grain sorghum increased and levelled off at about 1 spider for every 4 plants.

Migration of the mobile forms of the predators from the grain sorghum is evident in the population data taken on the far side (0.25 miles distant) of an adjacent cotton field. Relatively large populations of active predators (0.5-1.5 per plant) occurred from mid June until mid July when applications of insecticides became necessary to control the pink bollworm, *Pectinophora gossypiella* (Saunders). Large populations of *Collops* beetles, ladybird beetles, *Hippodamia* spp., big-eyed bugs and other predators were in the field until that time. Lacewing eggs and adults also occurred in large numbers reflecting a strong potential for populations of lacewing larvae which are active predators of bollworm, *Heliothis zea* (Boddie), eggs.

Because available food in the cotton was limited, populations of the mobile predators were migratory but probably had some suppressive effect on pest populations as they sought food during their migration.

Although the full food range and the impact of the predators is not fully understood it is known that the predators attack many insects injurious to cotton. Therefore, the grower should be aware of the beneficial insect populations in his cotton fields.

The preliminary data suggest that interplantings of cotton and grain sorghum in large blocks within fields might greatly facilitate the interchange of predators from grain sorghum to cotton. The data in table 1 also indicate that the grain sorghum might provide a ready reservoir of predators for migration into the cotton during the time insecticides are applied replenishing to some extent the populations decimated by them. Therefore large numbers of predators can probably be produced in aphid-infested grain sorghum that might readily transfer to cotton as the sorghum matures. Since only extremely high infestations of the greenbug cause an economic reduction in the yield of grain sorghum, it is apparent that the grower growing sorghum and cotton concurrently in adjacent fields would benefit greatly through the interplanting of the two crops.

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