



# Current Report

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## Sequential Sampling for Predators in Cotton

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Research in Oklahoma has shown that two predators, collops and lady beetles, can reduce or eliminate damage from bollworms and/or budworms. Other predators e.g. lace wings, big eyed bugs, assassin bugs, damsel bugs, spined soldier bugs and spiders, are important, but we do not have data to support the degree of protection they provide.

Collops beetle adults have reddish bodies with metallic blue areas on the wing covers. They eat eggs and larvae of the bollworm and budworm. Lady beetle adults have orange, red, black or grayish bodies with white or black markings. The larvae and adults eat bollworms and budworm eggs and larvae. Adults of both predators migrate to cotton fields from other crops, ditch-banks, fencerows, pastures and wooded areas around the fields. Collops and lady beetles move into the fields in early summer and multiply as long as they have insects to eat and are not killed by applications of chemicals.

### Sequential Method

Sequential sampling provides a method of determining predator numbers. It is based on examining all plants in one row foot of cotton and counting the number of lady beetles (adults and larvae) and/or adult collops in the unit. The number of predators found can be recorded opposite the sample/column

in the table (see table on back). Then continue to sample one-foot units randomly over the field, recording the number of collops and lady beetles in each unit. Accumulate total predator numbers in the "Running total column" until the "Total Needed" columns indicate that a decision is made. When the total number of collops and lady beetles is greater than or equal to the numbers in the "Total Needed" columns, enough samples have been taken and sampling should stop. As long as the "Running Total" remains below the "Total Needed", continue to sample. Note that no decision (ND) can be made on adequate predator protection until at least 24 units are sampled.

This sampling procedure allows for concluding that damage from bollworms and budworm attack can be reduced by at least 95% because of adequate predator protection. The table allows for termination of sampling if by 24 sample units you find 4 or less total predators since the field would be inadequately protected. Similarly you could stop after 24 samples if 469 or more predators were found and the field would normally be well protected from worm damage. One should realize that predator numbers can fluctuate rapidly. Thus it is extremely important to check fields frequently to determine the protection from worm damage the predator population is providing.

SEQUENTIAL SAMPLING TABLE FOR PREDATORS IN COTTON

Sample Number <sup>1/</sup>	Running Total of Collops & Lady Beetles (larva and adults)	Total Needed <sup>2/</sup>	Sample Number <sup>1/</sup>	Running Total of Collops & Lady Beetles (larva and adults)	Total Needed <sup>2/</sup>
1.	_____	ND <sup>3/</sup>	36.	_____	113
2.	_____	ND	37.	_____	108
3.	_____	ND	38.	_____	104
4.	_____	ND	39.	_____	101
5.	_____	ND	40.	_____	98
6.	_____	ND	41.	_____	95
7.	_____	ND	42.	_____	93
8.	_____	ND	43.	_____	90
9.	_____	ND	44.	_____	88
10.	_____	ND	45.	_____	86
11.	_____	ND	46.	_____	85
12.	_____	ND	47.	_____	83
13.	_____	ND	48.	_____	82
14.	_____	ND	49.	_____	80
15.	_____	ND	50.	_____	79
16.	_____	ND	51.	_____	78
17.	_____	ND	52.	_____	77
18.	_____	ND	53.	_____	76
19.	_____	ND	54.	_____	75
20.	_____	ND	55.	_____	74
21.	_____	ND	56.	_____	73
22.	_____	ND	57.	_____	72
23.	_____	ND	58.	_____	72
24.	_____	469 <sup>4/</sup> (or stop if 4 or less)	59.	_____	71
25.	_____	339	60.	_____	70
26.	_____	271	61.	_____	70
27.	_____	228	62.	_____	69
28.	_____	199	63.	_____	68
29.	_____	178	64.	_____	68
30.	_____	162	65.	_____	67
31.	_____	149	66.	_____	67
32.	_____	139	67.	_____	66
33.	_____	131	68.	_____	66
34.	_____	124	69.	_____	65
35.	_____	118	70.	_____	65

<sup>1/</sup> Each sample number represents counts from whole plant inspections in one row foot increments.

<sup>2/</sup> Total of predators need to provide 95% "plus" protection from bollworms/budworms.

<sup>3/</sup> ND = No Decision (Continue Sampling)

<sup>4/</sup> If by 24 row foot samples your total count does not exceed four total predators, there is not adequate protection and you can stop sampling.

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