True Armyworm (*Pseudalatia unipuncta*) Management in Arkansas Wheat

Arkansas Wheat Promotion Board
Annual Report

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Introduction

The 2000-2001 Arkansas wheat season is one many growers around the state will not soon forget, at least from an armyworm standpoint. The true armyworm (*Pseudalatia unipuncta*) infestation that occurred in late April resulted in the treatment of over 90% of acreage in some counties. Many areas reported armyworm populations more than 10 times greater than the currently recommended treatment threshold of six larvae/ft^2. Many veterans in the agriculture industry were quoted as saying they had never seen such high populations.

While this year's armyworm outbreak was unsettling for most Arkansas wheat producers, it did provide researchers an opportunity to take in-depth observations concerning armyworm damage and management in wheat. With funds provided by the Arkansas Wheat Promotion Board, we were able to investigate the following objectives:

(1) Monitor true armyworm moth flights using pheromone traps in order to warn producers of population outbreaks.

(2) Determine correlation between the winter weed annual bluegrass (*Poa annua*) and armyworm population in wheat.

Methods-Objective 1

The true armyworm moth was monitored on a weekly basis in Lonoke, Prairie, and Arkansas Counties from early February to late May. Populations are currently being observed in Lonoke and Arkansas Counties every two weeks to determine post-season pressure. Agents in White and Monroe Counties monitored populations from late February to mid-May. True armyworm pheromone strips were used to attract moths and were replaced every two weeks. The total number of moths per trap was counted weekly

and converted to a total daily average based upon the number of traps in each county. Moth numbers were reported weekly in Dr. Rick Cartwright's wheat pest management newsletter, which was distributed through mail and accessible through Extension's Pest Management Web Page: http://ipm.uaex.edu

Methods-Objective 2

In some areas, large true armyworm populations have been observed in wheat fields that contain significant populations of the winter weed annual bluegrass (*Poa annua*). The presence of this weed may provide a favorable site for egg deposition as well as protection and food for young armyworm larvae. On April 26 and May 1, data was collected from two fields in the Stuttgart area to determine the correlation between *Poa annua* and armyworm population. The number of true armyworm larvae was counted using $1ft^2$ grids at several randomly selected points throughout the field. At each sample site, the *Poa annua* population was determined by visually rating the percentage groundcover per square foot. Correlation of percentage groundcover versus armyworm larvae/ft^2 was analyzed using SAS Version 8.0.

Results-Objective 1

Moth trap catches were an effective method in predicting armyworm outbreaks in 2001, particularly when numbers were compared to those of previous years. Initially, moth catches in 2001 were actually lower than those observed in 2000 (Figures 1 and 2, page 5), with the first peak in 2001 occurring 10-14 days later than in 2000. However, by the first week in April 2001, moth numbers had far surpassed the maximum number found in 2000 by 15 moths/trap/day. As in 2000, two major armyworm flights occurred over a two-week period in Lonoke, Prairie, and Arkansas Counties in April 2001. White

and Monroe Counties reported only one major flight around April 12; however, as in the other counties, numbers in 2001 were greater than those reported in 2000.

Wheat fields in Arkansas County were treated for true armyworm beginning the last week in April, which was two weeks after the first moth peak for that county (31 moths/trap/day). True armyworm eggs hatch in approximately seven days and early larval development is largely weather dependent. Cool nights were occurring during this time and likely slowed initial larval development. However, by the second peak which occurred April 20, temperatures were higher; therefore, larval development and activity increased rapidly. The different sizes of armyworm larvae found in fields were a direct result of the two increases, or peaks, in moth population.

Current post-season moth numbers indicate low armyworm population compared to those seen during wheat season. Despite an increase in numbers in June, post-season counts are as low as those seen in February when temperatures did not favor larval development. Data from the past three years indicate the most favorable window for true armyworm moth flights to be from late March to mid April.

Monitoring moth numbers using pheromone traps is an effective method to predict armyworm population in wheat. Weekly trap counts can warn producers of early moth outbreaks in surrounding counties as well as estimate the larval pressure that will be seen in the coming weeks. Taking into consideration the moth numbers observed mid-season, the true armyworm epidemic of 2001 should not have been a total surprise.

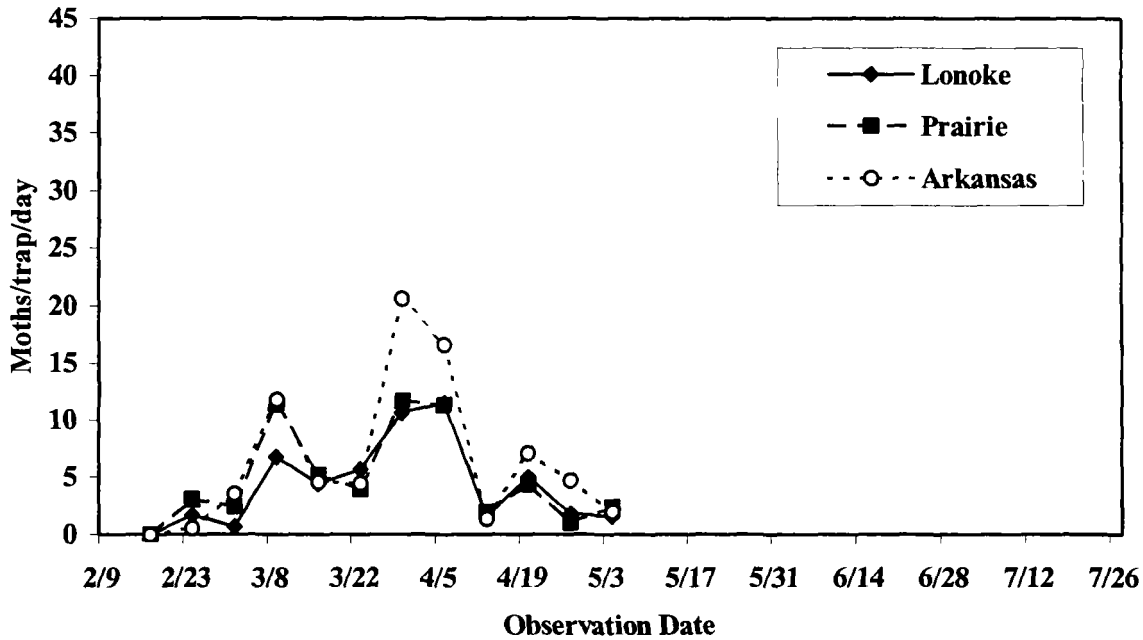

Figure 1. Daily average true armyworm moths caught in pheromone traps in three Arkansas counties, 2000.

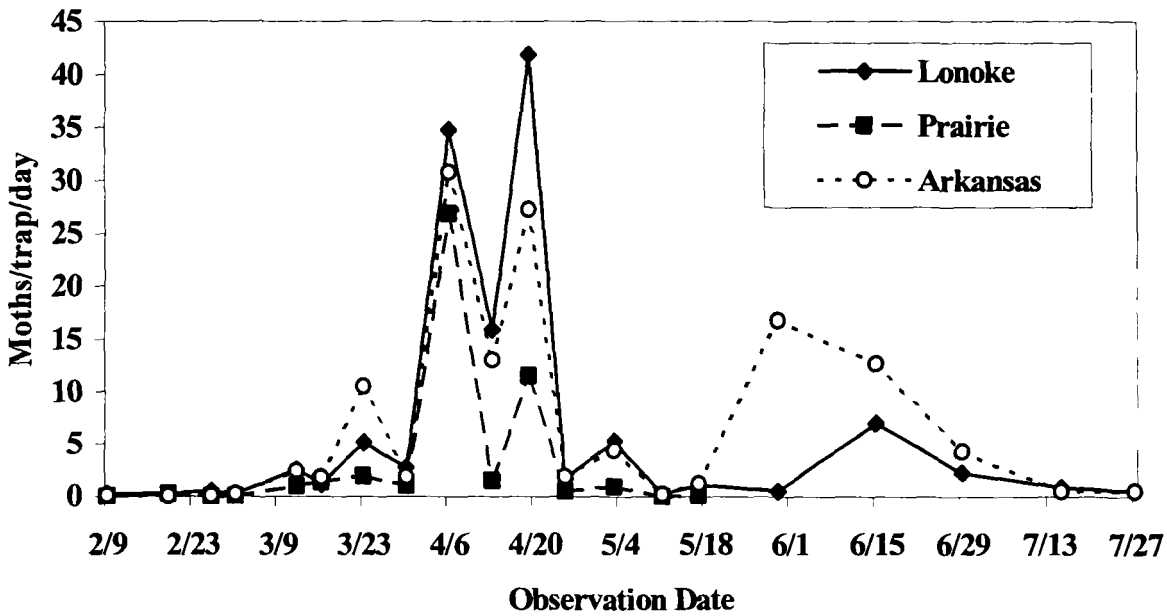

Figure 2. Daily average true armyworm moths caught in pheromone traps in three Arkansas counties, 2001.

Results-Objective 2

Wheat fields containing areas of high and low populations of *Poa annua* had strong positive correlations between percentage *Poa annua* groundcover and armyworm population. Fields possessing a uniform distribution of *Poa annua*, whether high or low, also had a uniform armyworm larvae population that corresponded to the amount of groundcover present.

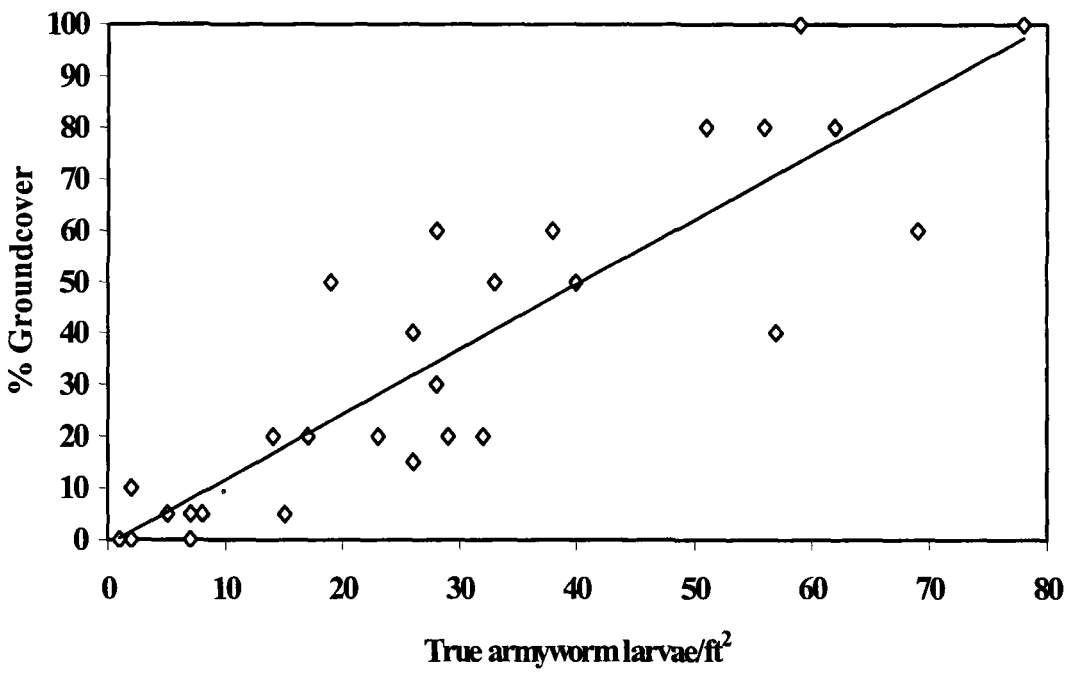

Figure 3. Correlation between annual bluegrass (*Poa annua*) and true armyworm larvae in wheat, 104 acres. (r = 0.89).

Figure 3 displays data taken from a 104-acre field in Arkansas County. This particular field contained a fluctuating distribution of *Poa annua*. The r-value of 0.89 indicates a strong positive correlation between percentage groundcover and armyworm larvae. An r-value of 1.0 indicates a 1:1 relationship between two variables.

A 65 acre field in the Stuttgart area was also observed for *Poa annua* and armyworm correlations. The results were similar to those from the 104 acre field (Figure 4). Samples from both fields were taken on May 1. Previous samples taken on April 26 resulted in r-values of 0.65 and 0.71 for the 104-acre and 65-acre fields, respectively (data not shown).

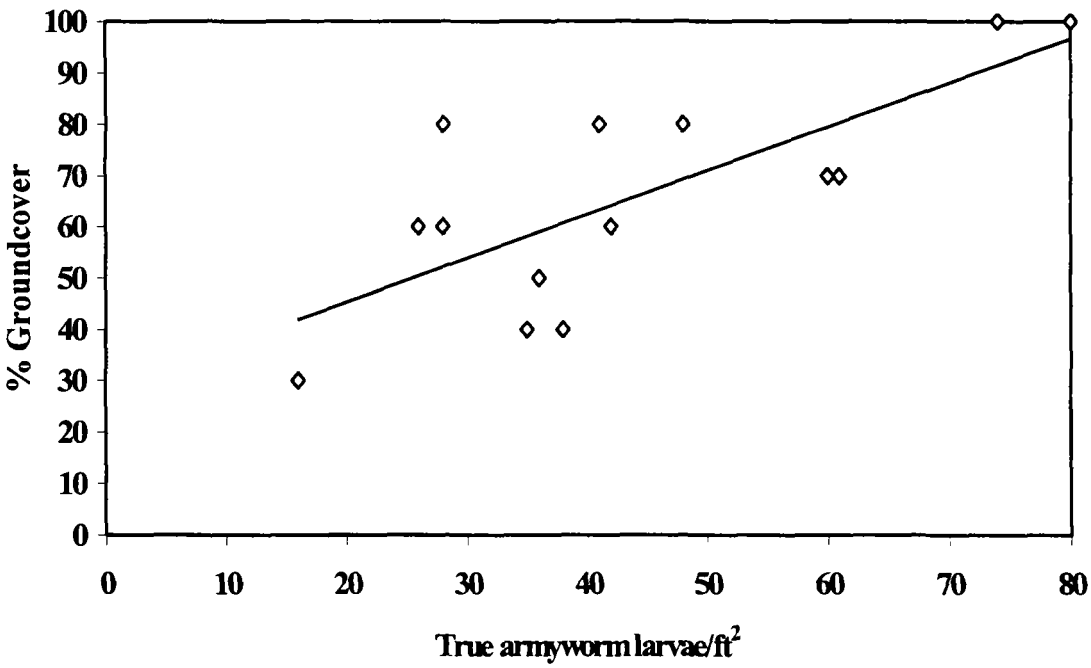

Figure 4. Correlation between annual bluegrass (*Poa annua*) and true armyworm larvae in wheat, 65 acres. (r = 0.75).

Figures 3 and 4 indicate that a wide distribution of *Poa annua* is required to result in a strong correlation between *Poa annua* groundcover and true armyworm larvae. Samples were taken from two fields in Prairie County which had zero percent groundcover. Armyworm larvae counts in these fields were five or less per square foot, far fewer than those observed in Arkansas County. Larvae numbers in these fields may have been greater had there been any *Poa annua* present.

The results from this objective indicate that *Poa annua* does serve as a favorable host to the true armyworm, most likely as a preferred location for egg deposition. *Poa annua* also serves as a tender, convenient food source for young larvae; however, once the *Poa annua* dries and matures, wheat plants become the primary food source for older, more aggressive true armyworm larvae. *Poa annua* is a small, overlooked winter annual that is not considered a big threat to wheat performance and yield. On the other hand, the fact that *Poa annua* is a possible host to the true armyworm increases the risk of allowing its presence in wheat fields. Economic damage may be impossible from a plant competiton standpoint; however, economic losses from insect damage may result.

Insecticide Screening

In addition to those projects funded by the Arkansas Wheat Promotion Board, an industry-supported insecticide screening experiment was conducted to compare the ability of several insecticides to control the true armyworm in wheat. The experiment was located east of Lonoke on the Robert Moery Farm. Insecticides were applied on two nine treatment tests on May 1 with a 2-man boom equipped with a CO_2 backpack sprayer. Plot sizes were 14.2' by 50' with treatments in both tests arranged in a randomized complete block design with four replications.

Observations were made on both tests 2 and 5 DAT (days after treatment). Live true armyworm larvae were counted in 1-ft^2 grids at three randomly selected locations within each plot. Percentage true armyworm control was calculated based upon the number of live armyworms found in the untreated check. At harvest maturity, a plot combine was used to harvest 50-100 ft^2 from each plot to determine seed yield. This range in harvested area was used to avoid sections within the plots that were used for

armyworm sampling. Test weight and moisture were observed and the yields were adjusted accordingly.

The results from Test 1 are displayed in Table 1. A major goal of this test was to compare different rates of Tracer 4SC to other insecticides currently labeled for true armyworm control in wheat. At two days after treatment (DAT), all insecticide treatments resulted in significantly fewer armyworm larvae than the control. No significance was observed among treatments with respect to armyworm population or percentage control; however, by 5 DAT, significance was observed among some treatments. No difference in armyworm control was seen between Warrior T, Tracer (1.3 and 1.5 oz. rates only), and Denim (both rates). Only Tracer (1.5 oz.) and Denim (0.01 lb) provided greater control than all other treatments not mentioned above.

Table 1.Comparison of insecticides to control true armyworms (TAW) in wheat. 2001.

Trt No.	Treatment Name	Rate	Live TAW/ft^2 2 DAT	TAW Control (%) 2 DAT	Live TAW/ft^2 5 DAT	TAW Control (%) 5 DAT	Seed Yield (bu/ac)
1	Untreated Check		32.4 a[1]	*N/A*	19.6 ab	*N/A*	66.1 a
2	Baythroid 2EC	0.03 lb ai/ac	2.2 c	93.6 a	10.9 cd	45.3 cd	72.7 a
3	Warrior T 1CS	0.03 lb ai/ac	1 1 c	95.6 a	4.1 d	79.7 ab	74.0 a
4	Tracer 4SC	1.0 fl oz/ac	2 1 c	91 8 a	9.7 cd	51.8 bcd	68.4 a
5	Tracer 4SC	1.3 fl oz/ac	1.8 c	95.7 a	7.2 cd	62.7 a-d	71.4 a
6	Tracer 4SC	1.5 fl oz/ac	1 7 c	95.0 a	2.6 d	85.9 a	71 4 a
7	Tracer 4SC + Dyne-Amic	1.0 fl oz/ac + 0.5% v/v	3.8 c	89.0 a	14.6 bc	33.1 d	73.2 a
8	Denim 0.16EC	0.0075 lb ai/ac	2.9 c	87 3 a	5.8 d	70.2 abc	67 1 a
9	Denim 0.16EC	0.01 lb ai/ac	0.9 c	97.1 a	2.8 d	85.7 a	74.1 a

[1]Means followed by the same letter are not significantly different at the 5% level.

The difference among rates of Tracer 4SC is noteworthy due to some problems with its effectiveness during the 2001 growing season. Growers in some areas did not

receive satisfactory control with the 1.0 oz/ac rate. In this experiment, this rate resulted in 52% control. This level of control will still allow populations well above threshold to exist, and a second application may be necessary. Increasing the rate of Tracer by 0.5 lb resulted in much greater control. While many complaints against Tracer may have been the result of communication or application, this experiment suggests that higher rates are more effective.

Surprisingly, no significant differences in seed yield were observed among any treatments, including the untreated check. Whether this lack of significance holds in practical situations is questionable. For example, average yield of Denim (0.01 lb) was eight bushels higher than the untreated check.

Test 2 was conducted to compare insecticides not labeled for commercial control of armyworm in wheat to a standard insecticide, Tracer 4SC. At 2 DAT, significant differences were observed between treatments (Table 2). Steward (0.065 and 0.09 lb rates) resulted in significantly higher control than the Confirm and Intrepid treatments; however, no differences were observed with Steward and the other treatments. By 5 DAT, all treatments had fewer live larvae present than the untreated check. All three rates of Steward had significantly greater control than the standard treatment of Tracer. No difference was observed between Steward and the other treatments.

It is important to mention the increased control seen with Confirm and Intrepid at 5 DAT. These products cause mortality slower than others, as they are molting compounds. The live larvae seen at 2 DAT more than likely ceased feeding shortly after the insecticide application. Three days later, they were obviously dead, and the control of these products was comparable to the others.

Table 2. Comparison of insecticides to control armyworms (TAW) in wheat. 2001.

Trt No.	Treatment Name	Rate	Live TAW/ft^2 2 DAT	TAW Control (%) 2 DAT	Live TAW/ft^2 5 DAT	TAW Control (%) 5 DAT	Seed Yield (bu/ac)
1	UTC		21.8 a[1]	*N/A*	20.2 a	*N/A*	63.9 a
2	Tracer 4SC	1.3 fl oz/ac	7 7 bcd	67.0 ab	7.2 bc	60.3 b	63.6 a
3	Steward 1.25SC	0.04 lb ai/ac	7.3 bcd	65.5 abc	1.8 bc	90.9 a	75.1 a
4	Steward 1.25SC	0.065 lb ai/ac	1.3 d	94.1 a	1.6 c	92.0 a	69.2 a
5	Steward 1.25SC	0.09 lb ai/ac	4.5 cd	81 7 a	1.8 bc	91.5 a	73.7 a
6	Confirm 2F	0.06 lb ai/ac	13.8 abc	37.7 bcd	4.1 bc	80.8 ab	73.0 a
7	Confirm 2F + Latron CS-7	0.06 lb ai/ac + 0.125% v/v	16.6 ab	22 9 cd	4.0 bc	80.5 ab	74.4 a
8	Intrepid 2F	0.03 lb ai/ac	15.5 ab	26.9 bcd	7.3 b	64.6 ab	69.2 a
9	Intrepid 2F + Latron CS-7	0.03 lb ai/ac + 0.125% v/v	8.7 bcd	56.0 abc	5.9 bc	71.3 ab	71.1 a

[1]Means followed by the same letter are not significantly different at the 5% level.

As in Test 1, no significant yield differences were observed between treatments in Test 2. Again, numerical differences were present. Test 2 indicates strong performance of Steward, Confirm, and Intrepid when compared to Tracer, a product currently labeled and recommended for true armyworm control in Arkansas wheat.