WHEAT RESEARCH UPDATE FROM UK SPECIALISTS

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***Articles in this Issue*:**

***Notes of Interest*:**
If you attended the Southern Tier Wheat Field Day on May 15, 1997, CEU credits are available - 2.50 hrs. Contact Dottie.

Stored Grain Pests and Monitoring Options

Lee Townsend-Extension Entomologist

Harvested wheat that is held in on-farm storage for several months is prone to serious damage by stored grain insects, especially weevils and flour beetles or "bran bugs". Stored product insects can damage kernels or feed on fines. Also, water produced by their metabolic processes can lead to "hot spots" in the grain mass. In addition, the mere presence of insects in wheat can result in dockage or rejection.

The Federal Grain Inspection Standard for insects in wheat is based upon the numbers and

> 2 or more live weevils
> **<u>OR</u>** 1 live weevil + 1 or more **OLI***
> **<u>OR</u>** No live weevils - 2 or more **OLI**
>
> ***OLI** = other live insects

kinds found in a 1,000 gram (2.2 pound) sample (box above). Weevils, such as the rice weevil or granary weevil, are recognizable by the snout on the front of their heads. OLI (other live insects) can be a combination of beetles or caterpillars, such as Indian meal moths or Angoumois grain moths. Life cycles of the beetles are in the range of 30 to 40 days during the warm summer months. Females lay about 300 eggs during their life, so insect numbers can increase rapidly.

Infestations of insects in stored wheat begin in or around the bin or nearby storage areas for animal feeds. An aggressive sanitation program coupled with a preventive bin spray will greatly the potential for problems but all sources around the farm cannot be eliminated. Wandering adults can enter the grain mass and start an infestation at any time.

There are two main ways to monitor for stored grain insects that will allow you to detect problems early and take effective action.

- **Active sampling** involves entering the bin at regular intervals and using tools such as a partitioned grain trier or deep cup (bin probe). These are inserted into the grain and opened to obtain samples from different depths in the mass. The grain can be tested for moisture and examined for insects or damage. A temperature probe can be used to take readings when the grain samples are collected.
- **Passive sampling** uses pheromone traps or unbaited traps to capture insects that are moving in the grain mass. Storgard® products provide a variety of options in trap design and pheromone lures. The WB II reusable grain probe kit functions like a minnow trap in that the plastic tube has holes that allow insect entry but escape is very difficult. The durable, reusable tubes are left in place and can be retrieved regularly to look for insects that have been captured as they move through the mass.

<u>Treatment options</u> for binned grain are limited. Fumigation with aluminum phosphide (Phostoxin, etc.) is effective in controlling insects throughout the bin in an established infestation,

but requires training and unique tools to disperse the pellets or tablets in the grain mass. Also, the bins must be sealed completely to hold the gas at the proper level for the appropriate amount of time. There is no residual effect so re-infestation may occur.

Grain protectants can be used for control if fumigation is not an option. This requires moving the grain so that the insecticide can be distributed evenly through the grain mass. Infested grain can be treated as it is moved to another bin or temporarily into wagons or trucks. This approach is necessary if the insects are distributed throughout the grain mass. Malathion (Cythion) or Reldan can be applied to wheat as a spray while the grain is passing by on an auger. Flow rate of the grain must be known so that the application can be calibrated. Some malathion (Cythion) labels contain instructions for application as a grain protectant, others only address treatment of empty bins and equipment. Read the label before buying and using any pesticide.

Although malathion has a powerful smell, it is not a fumigant. Malathion works as a contact insecticide or as a stomach poison. Attempts to blow malathion fumes through the grain will not provide control.

Wheat Spindle Streak Mosaic Variety Ratings for 1997

Don Hershman-Extension Plant Pathologist

Wheat spindle streak mosaic (WSSM) is an annual problem in many Kentucky wheat fields. However, only rarely does this soil-borne virus disease become as widespread, severe, and long-lasting in susceptible varieties as it did this spring. Normally some fields will show the characteristic yellow dashes of WSSM, but symptoms will disappear as temperatures warm in late April. In contrast, symptoms this spring often remained visible throughout the season, and contributed to premature crop maturity and apparent reduced yields. Increased problems with WSSM this spring are thought to be due to the abnormally cool weather we experienced in April and the first half of May.

Wheat producers do not like to see diseases in their fields and this is understandable. However, big disease years give us the opportunity to assess varietal differences which can help farmers avoid disease problems in future years. The last year we were able to make “good” WSSM ratings was in 1993.

The following table indicates our most current WSSM ratings as indicated according to level of resistance or susceptibility. If you had a problem with WSSM this spring, it would be prudent to select a variety for planting this fall which is rated at least moderately resistant. You never know when we’ll have another serious WSSM year, so it is best to only plant varieties with some resistance in fields which have a history of the disease.

Variety	WSSM Reaction	Variety	WSSM Reaction
Beck 103	MS	Becker	MS
Caldwell	S	Cardinal	MS
Clark	R	Clemens	MS
EK 102	S	EK 114	S
EK 309	S	Elkhart	S
Ernie	MS	Featherstone 520	S
FFR 523	S	FFR 525	VS
FFR 555	MS	FFR 558	S
Foster	MS	Glory	R
Hopewell	MR	Jackson	S
KAS Justice	MS	KAS Patriot	MS
Madison	R	NK Coker 9543	MS
NK Coker 9663	S	NK Coker 9704	S
NK Coker 9803	MS	P2510	R
P2540	R	P2548	VS
P2568	R	P2552	R
P2684	MS	P2737	MR
Patterson	MR	Pocahantas	S
Terra SR 204	MS	Terra SR 205	MS
Terra SR 211	MS	Verne	MR
Voris 6044	MS	Wakefield	S

Ratings are based on observation of replicated plots and/or multiple field observations.
R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible, VS=very susceptible.

Amisorb on Wheat

Lloyd Murdock-Extension Soils Specialist

Amisorb is a new product being sold commercially that is reported to increase nutrient plant uptake and availability and stimulate root growth. The material was tested by the University of Illinois in the laboratory and showed great promise. However, its success in the field has not been as consistent. This test was designed to measure its effectiveness on winter wheat. The Amisorb was applied in the fall at 1 qt/ac and at the same rate in late winter (Feb. 14) with nitrogen fertilizer. Nitrogen was applied at the rate of 30 lb/ac in February and 60 lb/ac in March. Pioneer 2540 wheat was planted at 35 seeds/ft^2 on Oct. 16.

The results are seen in the table below. There was no yield differences between the two treatments and there were no visual differences between the treatments throughout the growing season. Chlorophyll readings were taken at jointing and there were no differences, indicating that nitrogen was equally available in both treatments. This was in spite of the heavy rains that fell during early March. At this point, Amisorb does not show promise as an effective additive to a fertilizer program for wheat.

Effect of Amisorb on the Yield of Winter Wheat

Treatment	Yield (bu/ac @ 13.5% H_2O)
Amisorb (2 qt./ac)	101
None	104

Nitrogen Rates and Time of Application on Wheat

Lloyd Murdock-Extension Soils Specialist

Nitrogen (N) on wheat is an important component of the wheat management package. The rates that should be used and when they should be applied is always on a producer's mind. The rates will change some with the conditions and the management, but there are some guidelines that will always be pretty close.

The following data was gained from a trial on a well-drained soil in southern Christian County. Two varieties of wheat (Foster and Coker 9803) were used and the yields were averaged. Nitrogen (30 lbs/ac) was added to all plots in the fall. The different N treatments were added on Feb. 14 (Greenup) and March 12 (Feekes 5). Wheat was planted on Oct. 16 at the rate of 35 seeds/ac. and protected from insects and diseases with insecticides and fungicides. Corn residue was tilled prior to planting. The planted area allowed for only 2 replications of this experiment.

The results clearly indicate that large amounts of N were lost from the Feb. N application, but the Feb. application was still very important for the overall yield. The yields can be seen in the following table. When 90 lb/ac of N were added in one application in Feb., the yields were only 9 bu/ac. above the treatment with no spring N. This shows the importance of the March application on a wet year. The heavy rains in early March resulted in more than half of the Feb. N being lost before the crop had adequate growth to take up larger amounts of N.

All of the best yielding treatments had N applied in Feb. Indicating the importance of this application. It appeared that 30 and 45 lb/ac of N applied in Feb. were equally effective under these conditions. Treatments 3 and 4 had a total of 90 lb/ac of N applied in Feb. And March with different splits, but the yields were almost identical. The heavy rains in March probably reduced the amount of natural N available to the wheat and caused a reduction in tillers produced during the "green up" stage of growth if some N was not added in February.

The two treatments with the highest yields received a total of 105 and 120 lbs/ac of N in Feb. and March. A total of 90 lb/ac received during this time was not sufficient for maximum yields this year, indicative of the high amounts of N lost this spring with the heavy rains.

Effect of N Rates, Time of Application on the Yield & Head Density of Winter Wheat

Tmt	N Rate (lb/ac) Feb.	N Rate (lb/ac) Mar.	Heads Head/Ft^2	Yield (13.5% H_2O) bu/ac
1.	40	80	75	89 a*
2.	45	60	75	88 a
3.	30	60	67	81 ab
4.	45	45	66	79 ab
5.	0	60	66	77 b
6.	0	90	63	75 b
7.	90	0	51	56 c
8.	0	0	42	42 c

*Yields with the same letter are not statistically significantly different at the 0.1 level.

Fall vs. Spring Herbicide Treatments

James Martin-Extension Weed Specialist

Many of the broadleaf weeds in wheat can be controlled when herbicides are applied in a timely manner. Broadleaf weeds that emerge in the fall and overwinter often tend to be difficult to control, consequently, there is an increasing trend to wheat growers to apply herbicide treatments in the fall to weed control.

One of the trials conducted in Christian County compared Harmony Extra (thifensulfuron + tribenuron) applied at 0.5 oz/A in the fall and spring on the effects of weed control and wheat yield. Peak (prosulfuron) was applied at a rate of 0.5 oz/A only in the fall. The current Peak label prohibits rotating to soybeans until 10 months after treatment, therefore Peak is not used in wheat fields that are rotated to double-crop soybeans.

The major weed species in the area was henbit. The non-treated check plots had about 30% ground cover of henbit on April 8, 1997. The fall treatment of Harmony Extra averaged 91% control of henbit compared with an average of 67% when applied in the spring. The poor control observed with Peak supports results of previous studies with this herbicide. Studies in 1996 indicated that Peak applied in the fall controls many problem weeds in wheat including wild garlic, but does not provide acceptable control of henbit.
Although the differences in weed control did not appear to significantly limit wheat yield, there was a slight trend for greater yield when a herbicide was used compared to the non-treated check. The major differences in wheat yield were attributed to variety with Coker 9803 having approximately 20 bushels less per acre compared with Foster and Pioneer 2540.

Conclusion: Fall treatments of Harmony Extra may provide better control of such cool-season broadleaf weeds as henbit compared with spring treatments. The differences in control between fall and spring treatments may not always impact wheat yields. However, experience has shown that in certain cases, such as no-till plantings, broadleaf weeds can gain a competitive advantage if not treated with a pre-plant "burndown" treatment or with a fall treatment following wheat emergence.

Table 1. Effect of Herbicide and Variety on Henbit Control in Wheat

	Harmony Extra Fall	Harmony Extra Spring	Peak Fall	Non-Treated Check	**AVG**
--% Control-------------------------------------					
Foster	90	65	20	0	**44**
Coker 9803	93	65	25	0	**46**
Pioneer 2540	90	70	20	0	**45**
AVG LSD(0.05)=8	**91**	**67**	**22**	**0**	

Table 2. Effect of Herbicide and Variety on Wheat Yield

	Harmony Extra Fall	Harmony Extra Spring	Peak Fall	Non-Treated Check	**AVG**
--- Bu/Ac --					
Foster	98.2	100.3	101.75	103.0	**100.8**
Coker 9803	81.3	77.7	90.3	74.2	**80.9**
Pioneer 2540	105.0	104.3	98.4	96.9	**101.2**

AVG	**94.8**	**94.1**	**96.8**	**91.4**	

18 Steps for Maximum Winter Wheat Yields

1. Test soil to determine fertility of field.
2. Apply P, K, and lime according to soil test.
3. Select several high-yielding, disease-resistant, winter-hardy varieties.
4. Calibrate the drill.
5. For conventional tillage, prepare a good seedbed.
6. For no-tillage, use a contact herbicide.
7. Nitrogen: 30 lb/A in fall as residual or applied.
8. Plant from Oct. 10 to Oct. 30.
9. Plant in 4- to 8-inch row spacings. Tramlines may be established at this time for subsequent applications.
10. Seed 35 (up to 40 for no-till) seeds per square foot of high-quality seed.
11. Apply insecticide as needed for insect control (fall and spring).
12. Check stand density near mid February when winter survival can be rated.
    - A) If stand is adequate (25 or more plants per square foot), apply 30 to 40 pounds of nitrogen mid to late February.
    - B) If stand is thin (less than 25 plants per square foot), apply 40 to 50 pounds of nitrogen mid to late February.
13. Apply an additional 50 to 60 pounds of nitrogen at Feekes 5 (mid March).
14. Use proper weed control measures (fall and spring).
15. Apply fungicides as needed for disease control during the growing season.
16. Harvest on time at optimum grain moisture (13% to 15%).
17. Provide and prepare adequate, safe storage space.
18. Market wisely for optimum profits.

1997 Kentucky Small Grain Variety Trials

C.R. Tutt, C.S. Swanson, M.D. Elmore and D.A. Van Sanford

In 1997, Kentucky farmers harvested 26 million bushels of soft red winter wheat produced on 500,000 acres. The average yield of 52 bu/a was 1 bushel less than the 1996 yield. Barley yields were 70 bu/a, 4 bushels less than the 1996 yields.

Small grain performance tests were conducted in six of the seven agroclimatic regions of Kentucky. **[Summaries are shown on the following pages, as well as the Hopkinsville location which was viewed at the Southern Tier Field Day (May 1997) in Christian Co.]** Agricultural areas within each region are considered to have similar soil types and climatic conditions. Each region having a substantial acreage of a small grain commodity will have a trial conducted in that region for that commodity.

The objective of the Kentucky small grain variety trials is to evaluate varieties of barley and wheat that are commercially available or may soon be available to Kentucky farmers. New varieties are continually being developed by agricultural experiment stations and commercial firms. Annual evaluation of small grain varieties and selections provides seedsmen, farmers, and other agricultural workers with current information to help them select the varieties best adapted to their locality and individual requirements.

Since weather, soil and other environmental factors will alter varietal performance from one location to another, tests are grown in six locations in the state.

Kentucky 1997 WHEAT VARIETY TRIAL 6 LOCATIONS

Variety	Yield (bu/a)	Test Wt. (lb/bu)	Lodging (%)	Height (in)	Survival (%)	Heading (Apr. 1=1)
2552	73.3	58.0	0	37	99	38
2540	71.4	56.1	0	38	99	41
NK COKER 9663	67.2	57.0	3	42	98	37
GLORY	64.7	55.8	4	37	100	38
86C-127-3	64.6	58.3	2	38	99	38
25R26	63.9	54.0	1	35	100	40
25R57	63.6	56.0	0	37	99	37
2568	63.3	55.2	0	36	100	36
2510	63.0	55.7	0	37	100	42
MADISON	62.7	54.8	5	37	100	35
PATTERSON	61.4	57.3	0	39	95	36
VERNE	61.4	56.4	3	41	100	39
WAKEFIELD	61.3	55.4	1	39	97	40
AGRIPRO ELKHART	60.8	58.1	1	39	98	37
KY88C-439-9	60.7	54.8	1	37	91	36
CLARK	60.2	55.4	0	38	100	35
2684	60.2	57.9	2	35	100	34
KAS JUSTICE	59.8	54.7	0	38	99	40
AGRIPRO FOSTER	59.5	56.2	0	38	100	39
86C-061-8	59.2	56.0	1	37	99	36
HOPEWELL	58.7	55.5	0	38	96	43
BECKER	58.6	53.3	0	35	100	41
JACKSON	58.3	55.5	1	37	95	38
BECK 103	58.3	55.0	1	37	98	38
2737	58.0	52.1	0	37	99	40
KY88C-315-2	58.0	54.8	0	38	97	40
EK 309	57.9	54.9	0	37	93	38
TERRA SR 205	57.9	55.6	0	37	97	38
KAS PATRIOT	57.8	55.2	2	37	97	38
AGRIPRO CLEMENS	57.4	55.6	8	42	100	41
FFR 558W	57.2	57.0	0	39	99	39
KY88C-438-29	57.2	54.8	8	36	99	35
POCAHONTAS	56.9	56.1	3	34	98	36
EK 102	55.8	55.0	0	36	99	38
EK 114	55.4	54.8	1	37	99	38
TERRA SR 211	55.4	54.5	0	36	90	38
TERRA SR204	55.0	57.5	3	39	98	39
CARDINAL	54.9	54.7	0	41	82	43
NK COKER 9803	54.5	58.5	1	33	99	36
NK COKER 9704	54.4	58.0	0	33	99	35
VORIS 6044	54.3	55.2	6	38	97	35
CALDWELL	53.9	54.2	0	38	97	39
FFR 555W	53.7	53.0	0	36	96	38
ERNIE	52.8	55.3	6	33	97	35
FFR 525W	52.5	56.0	7	36	98	36
FEATHERSTONE 520	49.9	55.1	8	35	100	38
NK COKER 9543	49.8	55.0	6	33	100	36
FFR 523W	45.7	52.2	0	30	95	35
Average Yield (bu/a)	58.5					

KENTUCKY 1997 WHEAT VARIETY TRIAL HOPKINSVILLE

Variety	Yield (bu/a)	Test Wt. (lb/bu)	Lodging (%)	Height (in)	Survival (%)	Heading (Apr. 1=1)
25R26	88.2	55.3	0	40	100	36
GLORY	86.3	58.1	0	41	100	33
2552	84.4	59.7	0	40	100	33
NK COKER 9663	83.6	57.0	0	43	100	32
TERRA SR 211	83.1	57.2	0	39	100	33
2540	82.3	56.8	0	41	100	37
25R57	81.0	55.5	0	40	100	32
2510	81.0	55.5	0	41	100	38
AGRIPRO ELKHART	80.0	60.0	0	44	100	32
JACKSON	79.6	56.9	0	40	100	34
KAS PATRIOT	79.5	57.3	0	40	100	33
TERRA SR 205	79.1	56.5	0	41	100	34
MADISON	78.4	55.6	0	40	100	30
EK 309	78.4	55.8	0	41	100	34
KY88C-439-9	77.3	55.6	0	39	100	31
2568	77.2	55.6	0	41	100	32
BECK 103	77.1	56.8	0	39	100	34
AGRIPRO CLEMENS	76.6	57.9	0	46	100	38
VORIS 6044	76.2	58.0	0	44	100	30
AGRIPRO FOSTER	76.0	57.4	0	42	100	35
KAS JUSTICE	75.4	56.4	0	43	100	36
86C-127-3	75.3	58.0	0	42	100	35
BECKER	75.2	51.8	0	39	100	37
86C-061-8	74.9	57.9	0	41	100	31
KY88C-438-29	74.5	54.0	0	38	100	31
WAKEFIELD	74.1	56.3	0	42	100	36
VERNE	74.1	58.0	0	45	100	33
2684	73.8	57.4	0	37	100	29
ERNIE	73.2	55.9	0	34	100	31
FFR 558W	73.0	58.7	0	42	100	36
KY88C-315-2	72.5	58.3	0	41	100	36
PATTERSON	72.0	58.2	0	44	100	31
FFR 555W	71.6	55.2	0	39	100	33
NK COKER 9803	71.3	58.2	0	36	100	31
TERRA SR204	70.8	58.2	0	43	100	35
EK 102	70.2	57.9	0	38	100	33
CALDWELL	69.5	55.8	0	43	100	34
EK 114	69.5	56.1	0	39	100	34
2737	68.8	52.4	0	41	100	36
POCAHONTAS	67.5	56.3	0	35	100	31
NK COKER 9704	67.2	57.5	0	36	100	31
FEATHERSTONE 520	66.4	56.7	0	37	100	35
NK COKER 9543	66.3	53.8	0	35	100	31
FFR 525W	64.7	57.2	0	38	100	31
CLARK	64.5	56.7	0	40	100	30
CARDINAL	64.2	59.5	0	44	100	39
FFR 523W	63.9	52.6	0	32	100	30
HOPEWELL	58.8	56.6	0	40	100	39
Average Yield (bu/a)	74.3					

If you would like to continue receiving the Wheat Science Newsletter, please let us know; otherwise your name will be removed from our mailing list.

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