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WINTER WHEAT IPM FIELD GUIDE FOR DELAWARE AND MARYLAND

Pre-Planting Decisions:

1. Choose well adapted disease resistant varieties. **(91)**
2. Plant after the fly free date in your area to prevent Hessian fly problems. **(91)**
3. Fertilize and lime according to soil test recommendations. **(1584)**
4. Practice crop rotation.

Scout 10 randomly selected sites throughout the field for weeds in early spring.

Weeds	Sampling	Threshold	Notes
Wild Garlic (718, 771, 1154)	Examine10 sites 10 ft. x 50 ft.. Count # of garlic plants or clumps.	1 clump per 500 sq. ft.	A grain contamination problem.
Annual Ryegrass (1154)	Count the number of plants in 1 sq. ft. in 10 sites throughout the field.	1-2 plants per sq. ft.	
Winter Annuals (1154)	Estimate % of ground covered by of winter annuals. Rate infestation as follows: Few <10% ground cover Light <20% ground cover Moderate <40% ground cover Heavy <60% ground cover Severe >60% ground cover		

Pre-heading Stage

Disease	Sampling	Frequency	Threshold	Notes
Powdery Mildew (1310, 1005)	Examine 10 plants in 10 sites looking for powdery white mold growth on leaf surfaces. Determine the % of plants infected (incidence) and the % of leaf area infested (severity).	weekly starting at jointing stage	5-10% of upper leaf area infested.	Favorable conditions for powdery mildew development: temperatures 60-75°F, and periods of high relative humidity. For more detailed thresholds, see Pest Management Recommendations for Field Crops. **(91)**
Septoria Leaf & Glume Blotch (1005, 1310)	Examine 10 plants in 10 sites. Refer to table below to determine indicator leaf. Record the # of indicator leaves with 1 or more leaf & glume blotch lesions. **Table of Indicator Leaf Equivalents** Feeke's Growth Stage — Indicator Leaf 6-8 — Flag-5, Flag-4 8-10 — Flag-3 10-10.51 — Flag-2 10.52-11 — Flag-1	weekly starting at jointing stage	25 of 100 indicator leaves with 1 or more lesions.	See Bull. 237 Pest Management Recommendations for Field Crops for more detailed thresholds. **(91)**

Pre-heading Stage, continued

PEST	Damaging Stage	Monitored Stage	SAMPLING Method	SAMPLING Frequency	THRESHOLD	NOTES
Aphids (181)	all	all	Examine 1 ft. of row in 10 sites throughout the field. Count # of aphids per ft. of row; note # of aphid predators & parasitized aphid mummies.		150 aphids per linear ft. of row	Aphid feeding causes discoloration on the leaves. Extensive feeding can result in circular yellow to brown spots with dead plants in the center. Natural enemies usually control aphids. The greenbug aphid is more destructive than other aphids due to the injection of a toxic substance during feeding.
Cereal Leaf Beetle (181)	adult larval	larval	Examine 10 plants in 10 sites. Record # of larvae per stem.	weekly from April through June. (until hard dough stage)	0.5% beetles per stem and 10-20% defoliation.	Adults & larvae feed on the upper surface of leaves. Adult beetles chew completely through the leaf leaving long skinny holes. The larvae only eat the surface tissue leaving the translucent lower cuticle intact. Larvae cause the most feeding damage and are sometimes heavily parasitized. Once wheat reaches the hard dough stage, beetle feeding has little effect on yield.

Heading Stage

Disease	Sampling	Frequency	Threshold	Notes
Powdery Mildew (1005, 1310)	Examine 10 plants in 10 sites to determine the % of plants infected (incidence) and the % of leaf area infested (severity).	weekly starting at jointing stage	5-10% of upper leaf area infested. See Bull. 237 Pest Management Recommendations for Field Crops for more detailed thresholds. (91)	Favorable conditions for powdery mildew development: temperatures 60-75°F, and periods of high relative humidity.
Leaf Rust (1310)	Examine 10 plants in 10 sites to determine the % of plants infected (incidence) and the % of leaf area infested (severity).	weekly starting at jointing stage	1-3% of upper leaf area infested	Favorable conditions for disease development: temperatures 60-85°F, free moisture from showers, dew can be found on the leaves from early evening to late morning.
Septoria Leaf & Glume Blotch (1310)	Examine 10 plants in 10 sites. Refer to table below to determine indicator leaf. Record the # of indicator leaves with 1 or more leaf & glume blotch lesions. **Table of Indicator Leaf Equivalents** Feeke's Growth Stage / Indicator Leaf: 6-8 Flag-5, Flag-4; 8-10 Flag-3; 10-10.51 Flag-2; 10.52-11 Flag-1	weekly starting at jointing stage	25 of 100 indicator leaves with 1 or more lesions.	Septoria development favored by wind driven rain, high relative humidity & temperatures between 68-82°F. See Bull. 237, Pest Management Recommendations for Field Crops. (91)

Heading Stage, continued

PEST	Damaging Stage	Monitored Stage	SAMPLING Method	SAMPLING Frequency	THRESHOLD	NOTES
Aphids (181)	all	all	Examine 10 heads in 10 sites for presence of aphids. Record # of aphids/head. Note # of aphid predators & parasitized aphid mummies.	Weekly	25 per head	Feeding on the heads by large numbers of aphids can cause the growing kernels to shrivel.
Cereal Leaf Beetle (181)	adult larval	larval	Examine 10 plants in 10 sites. Record # of larvae per stem.	Weekly	0.5% beetles per stem and 10-20% defoliation	Adults & larvae feed on the upper surface of leaves. Adult beetles chew completely through the leaf leaving long skinny holes. The larvae only eat the surface tissue leaving the translucent lower cuticle intact. Larvae cause the most feeding damage & sometimes are heavily parasitized. Once wheat reaches hard dough stage, beetle feeding has little effect on yield.
Grass Sawfly (182, 950)	larval	larval	Examine 5 linear row ft. in 10 sites throughout the field. Shake the plants & look at the ground between the rows. Count # of larvae. Record # of larvae per ft. & the average size of larvae. Note # of clipped heads.	Weekly	0.4 sawfly larvae per linear row ft. If armyworms are present, reduce threshold of both by 1/2.	Sawflies prefer to feed on stems which results in grain head being clipped off. Sawflies are easily distinguished from armyworms by the solid green body, amber head (with brown band on older larvae) and 8 pairs of prolegs. **Detection of sawflies when they are still small and easy to control is critical.**
True Armyworm (182, 950)	larval	larval	Examine 5 linear row ft. in 10 sites throughout the field. Shake the plants & look at the ground between the rows & count # of larvae.	Weekly	2 per linear row ft. If sawflies are present, reduce threshold of both by 1/2.	Small armyworm larvae feed on the leaves of wheat plants, causing little damage. As the wheat matures and starts to dry up, armyworms feed on upper stems and heads and can clip heads. Unlike sawflies, armyworms are striped with only 5 pairs of prolegs. Frass (fecal droppings) may be seen on the soil surface indicating the presence of larval feeding. **Detection when the larvae are small and easy to control is critical.**

***Bolded numbers in parenthesis indicate sources of additional information found in the Mid-Atlantic IPM database by this special reference number.**

Scouting procedures, thresholds, and crop management recommendations have been compiled from a number of sources and may not be valid for all areas within the Mid-Atlantic Region. These field guides are meant to be used as guidelines. As such, they should be validated on a small acreage before relying on them. No guarantee of their validity, success, or failure to perform in the field is implied or expressed. Consult your local Cooperative Extension Agent for additional information or assistance.