Integrated Pest Management (IPM) BMPs for Groundwater Protection from Pesticides

AE-1114, July 1996

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Integrated pest management (IPM) combines various management strategies to deal with pest problems. Advocates of IPM recognize that reliance on any single form of pest management does not provide optimal results. Adoption of multiple pest management methods and judicious use of pesticides often results in overall reduction in the total amount of pesticide applied.

In some cases, increased pesticide ap-plications may be attributed to increased awareness of pest problems identified through IPM monitoring and scouting techniques. In these situations, IPM methods improve groundwater protection through improved timing, efficiency, and appropriateness of the pesticide applications.

Detailed discussion of best management practice (BMP) implementation for integrated pest management is found in the references at the end of this fact-sheet. Each reference title includes the source of information and the related BMP numbers.

BMPs

1. Plant pest-resistant cultivars if available.
Many plant diseases and some insect pests can be avoided by growing tolerant or resistant cultivars. For example, wheat cultivars with improved resistance to some leaf diseases are available in North Dakota. These cultivars have less need for fungicide applications.

2. Maintain competitive plant growth through the regular use of good agronomic practices.
Some of the more important practices include: planting into a soil environment conducive to germination and seedling growth, good planting technique, using high quality seed, seeding at optimum rates, timing planting and harvesting for optimum conditions, and maintaining soil fertility based on regular soil testing.

3. Use crop rotation to break pest life-cycles.
Take-all, tan spot, Septoria, common root rot, Hessian fly, certain wireworms, wheat stem sawfly, and wheat stem maggots are all problems common to wheat that are best controlled through crop rotation.

4. Control volunteer plants that can serve as hosts for certain diseases and insects.
For example, volunteer small grain should be destroyed two to three weeks before planting the new wheat crop. Volunteer small grain that hosts disease or insects has the greatest potential to affect the new crop within a distance of 1 mile.

5. Use tillage to control pests where appropriate.
The effects of tillage on soil erosion and surface water quality should be considered when making the decision to use this management practice for pest control.

6. Use biological control of pests when available and when effectiveness has been demonstrated.
For example, the herbicide picloram has been used for leafy spurge control for many years. A biological alternative method of leafy spurge control in some areas is grazing goats or sheep. However, the most promising biological control of leafy spurge may be several species of flea beetles.

7. Use preemptive techniques for pest management.
Pest control should not be limited to only responsive methods. Preemptive management measures are implemented in advance of the actual observation of pests. This type of management may be the most effective means of dealing with certain pest problems. Responsive management options can be quite limited if pests are allowed to reach outbreak levels. Implementing management strategies that maintain pests below threshold levels can avoid the use of expensive or less effective methods of pest control. Where available, pest-crop models should be used to accurately predict pest problems and help guide management decisions. Pest-crop models are of greatest value when accurate and continuous weather observations are available. The North Dakota Agricultural Weather Network (NDAWN) at NDSU provides continuous weather information from over 30 locations across North Dakota.

8. Optimize timing of pesticide applications according to pest life cycles and economic thresholds of damage.
This can only be accomplished by regular scouting of fields to assess pest levels and crop damage.

9. Rotate pesticides to prevent development of pest resistance.
Chemical compounds with different modes of action should be selected or rotated for use on the target pest.

Further Information

This circular is one of seven **GROUNDWATER/PESTICIDE FACT SHEETS**. Please refer to the following fact sheets for additional information.

- AE-1110 What is the BMP Selection Process for Groundwater Protection from Pesticides?
- AE-1111 How is the Assessment Process for Ground-water Contamination from Pesticides Used for BMP Selection?
- AE-1112 Farmstead BMP Recommendations for Groundwater Protection from Pesticides
- AE-1113 Improved Pesticide Application BMPs for Groundwater Protection from Pesticides
- AE-1114 Integrated Pest Management (IPM) BMPs for Groundwater Protection from Pesticides
- AE-1115 Soil and Water Conservation BMPs for Groundwater Protection from Pesticides
- AE-1116 Irrigation BMPs for Groundwater Protection from Pesticides

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References

IPM Integrated Pest Management in North Dakota Agriculture NDSU Extension Fact Sheet PP19 **BMP1-9**
Integrated Pest Management in the North Central States North Central Region Extension Pub. NCR-586 **BMP1-9**
Leaf Blight Diseases of Potato NDSU Extension Circular PP-1084 **BMP1-9**
Integrated Management of Leafy Spurge NDSU Extension Circular W-866 **BMP1-9**
North Dakota Field Crop Insect Management Guide NDSU Extension Report ER-22 **BMP1-9**
Plant Diseases Development and Mangement NDSU Extension Bulletin EB-31 **BMP1-3 BMP5**
Crop Rotations for Managing Plant Disease NDSU Extension Circular PP-705 **BMP3**
Management of Early and Late Blight of Potatoes NDSU Fact Sheet **BMP7-8**
North Dakota Agricultural Weather Network NDAWN Department of Soil Science, NDSU **BMP7-8**

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