

**Nutrient Best
Management Practice
(N-BMP) Loss Adjustment
Handbook**

**2003 and Succeeding Crop
Years**

Handbook Number: 20050

Nutrient BMP Endorsement LOSS ADJUSTMENT HANDBOOK

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1. Introduction

The Nutrient BMP Endorsement for MPCl Policy and Nutrient BMP Endorsement for CRC Policy are supplemental endorsements and attach to the Multiple Peril Crop Insurance (MPCI) or Crop Revenue Coverage (CRC) Insurance Policies, respectively. These endorsements are pilot products under section 508(h) of the Federal Crop Insurance Act and approved for four pilot states (Iowa, Minnesota, Pennsylvania and Wisconsin) for the 2003 growing season.

This handbook identifies standards for adjusting Nutrient BMP Endorsement corn losses in a uniform and timely manner in accordance with the endorsement provisions and the *Nutrient BMP Endorsement Underwriting Guide*. Adjustment will follow timely submission of a Notice of Damage or Loss (Exhibit 9) by the insured. This handbook describes a variety of ways a producer may attempt to intentionally create indemnities, visual indications of such attempts, protocols for positively identifying those occurrences and procedures for conducting voluntary and mandatory audits.

Appraisal is completed by comparing weight of grain harvested from a portion of a 40' to 60' wide check strip and an equal portion of an adjacent BMP strip of the same size in each management unit. These strips are identified and marked in the field and on (a copy of) an aerial photo by a certified crop consultant and reported to the insurer along with the acreage report. The check strip is fertilized by the farmer at a rate he or she feels is adequate for a full yield. The remainder of the field, including two BMP strips adjacent to and on either side of the check strip, are fertilized at a state-specific rate that meets the BMP standard indicated in the endorsement. (See endorsement Schedules 1 and 2 for approved nutrient management BMPs.)

One check strip is required for each endorsement management unit, which may include all or part of the insurance unit for the underlying MPCI or CRC policy. See the *Nutrient BMP Endorsement Underwriting Guide* for more details on the placement of check strips as well and background on the need for and development of the endorsement.

2. Definitions

Application for Endorsement – The form used to apply for insurance coverage under this endorsement. The application for endorsement must contain all the information required by us to insure the crop. Applications that do not contain all social security numbers and employer identification numbers, as applicable (except as stated herein), the crop consultant's professional certification and certification number, crop, type, variety, plan of insurance, and any other material information required to insure the crop, are not acceptable.

Appraisal Worksheet - Form used to record results of the appraisal and calculate the production loss on insured acreage for which a Notice of Damage or Loss has been filed.

Approved Nitrogen BMP – A management practice in which nitrogen is applied in strict conformity with the nutrient BMP plan and the agreement between the insured and insurer based on a documented nitrogen management recommendation by a crop consultant. Only an approved nitrogen BMP that meets the standards set forth in Schedule 2 of the endorsement and is recognized by CSREES, NRCS or a similar entity, approved by us, as compatible with the agronomic and weather conditions in the applicable state and county is insurable.

Approved Nitrogen and Phosphorus BMP – A management practice in which nitrogen and phosphorus are applied in strict conformity with the nutrient BMP plan and the agreement between the insured and insurer based on a documented nitrogen and phosphorus management recommendation by a crop consultant. Only an approved nitrogen and phosphorus BMP that meets the standards set forth in Schedules 1 and 2 of the endorsement

and is recognized by CSREES, NRCS or a similar entity, approved by us, as compatible with the agronomic and weather conditions in the applicable state and county is insurable.

Approved Nutrient BMP – A management practice in which nutrients are applied in strict conformity with the nutrient BMP plan and the agreement between the insured and insurer based on a documented nutrient management recommendation by a crop consultant. The approved nutrient BMP will be one recommended by CSREES, NRCS or a similar entity, approved by us, as compatible with the agronomic and weather conditions in the applicable state and county.

Approved Phosphorus BMP – A management practice in which phosphorus is applied in strict conformity with the nutrient BMP plan and the agreement between the insured and insurer based on a documented phosphorus management recommendation by a crop consultant. Only an approved phosphorus BMP that meets the standards set forth in Schedule 1 of the endorsement and is recognized by CSREES, NRCS or a similar entity, approved by us, as compatible with the agronomic and weather conditions in the applicable state and county is insurable.

ARCPACS - The federation of certifying boards in agriculture, biology, earth and environmental sciences. This certification program identifies individuals who have met and maintained standards in education, knowledge and experience in the following areas: agronomy, crops, soils, horticulture, plant pathology and weed science.

Best Management Practice (BMP) – The management of inputs to provide for economic and agronomic efficiency in production agriculture.

BMP Strips – The strips directly adjacent to and on either side of the check strip that are equal in width and length to the check strip.

Check Strip – An area of production fertilized at a rate greater than the BMP rate that is to be representative of the yields of the management unit where it is located. The crop consultant will determine the check strip location.

Check Strip Production - The appraised yield of the crop on the check strip.

CSREES – Cooperative State Research, Education and Extension Service, an agency within USDA.

Corn – A corn crop grown for harvest as grain.

Crop – Crop grown on insurable acres contained in the endorsement provisions.

Crop Consultant - An individual, approved by the insurer, who has no financial or personal interests in the insured's farming operation. This person may not be related to the insured or living in the same household with the insured. The person must have received professional certification and continuing education from ARCPACS, National Alliance of Independent Crop Consultants or American Society of Agronomy in a discipline applicable to the area of crop science, or is an individual approved by a governmental entity as qualified to establish a nutrient management plan.

Crop Revenue Coverage (CRC) - The program of federally subsidized and reinsured crop insurance that guarantees yields and revenues against specified causes of loss.

Deductible – The amount of loss not covered by the endorsement, which is 5 (five) percent.

Endorsement – This Nutrient BMP Endorsement, which is a written modification of the MPCl or CRC insurance policy issued by the insurer that becomes a part of the policy.

Global Positioning System (GPS) - a network of satellites generating signals which can be used by ground-based receivers to pinpoint current location coordinates (i.e., latitude and longitude).

Indemnity – Compensation for insured losses incurred by the insured.

Management Unit - The acreage to which an approved nutrient BMP is applied. Each management unit will contain only one check strip. A management unit will be:

- (1) For endorsements attached to MPCl policies, no larger than a basic unit as defined in section 1 of the MPCl Basic Provisions if the insured has chosen the basic unit structure for the insured acres; or,
For endorsements attached to CRC policies, no larger than a basic unit as defined in section 2(a) of the CRC Basic Provisions if the insured has chosen the basic unit structure for the insured acres.
- (2) For endorsements attached to MPCl policies, no larger than an optional unit as defined in sections 34(b) and (c) of the MPCl Basic Provisions if the insured has divided the insured acres into optional units; or,
For endorsements attached to CRC policies, no larger than an optional unit as defined in section 2(b) of the CRC Basic Provisions if the insured has divided the insured acres into optional units.
- (3) A portion of an optional or basic unit that is entirely within the boundaries of the optional or basic unit.
- (4) The insured must meet the following:
 - a. The insured must plant the crop in a manner that results in a clear and discernible break in the planting pattern at the boundaries of each management unit; and,
 - b. All management units the insured selects for the crop year are identified on the acreage report for that crop year.
 - c. The insured must have records that are acceptable to us of planted acreage for each management unit.

Manure Testing – A documented university or extension-service-recommended method of testing manure for nutrient content in the state where the insured acreage is located, and performed by a competent testing laboratory such as those certified by the Iowa Department of Agriculture and Land Stewardship or the Minnesota Department of Agriculture, or operated by the Penn State University or the University of Wisconsin. Manure testing may be used to determine the level of available nutrients applied to the insured acreage when determining the nutrient BMP plan.

Multiple Peril Crop Insurance (MPCI) – The program of federally subsidized and reinsured crop insurance that guarantees yields and revenues against a number of causes of loss.

NRCS – Natural Resources Conservation Service, an agency within USDA.

Nitrogen – An element necessary for crop growth, generally referred to as N, that can be available to the crop from inorganic and organic sources.

Notice of Loss – The form titled “Notice of Damage or Loss for Nutrient BMP Endorsement “ used by the insured to report probable damage or loss under the endorsement to the insurer.

Nutrient – An element essential for plant growth that can be applied to the soil in both organic and inorganic forms.

Nutrient BMP Plan – A document, prepared in cooperation with a crop consultant that describes the amount and manner in which nutrients will be applied to the insured acres. Only approved phosphorus and/or nitrogen BMPs are insurable (see Schedules 1 and 2 of the Nutrient BMP Endorsement to the MPCI and CRC policies).

Nutrient BMP Production – The appraised yield of the crop in the BMP strips.

Phosphorus – An element necessary for crop growth, generally referred to as P₂O₅, that can be available to the crop from synthetic and organic sources.

Phosphorus Soil Test – A soil test to determine the availability of phosphorus in the soil. The proper phosphorus soil test will be one recommended by CSREES, NRCS or a similar entity, approved by us, as compatible with the agronomic and weather conditions in the state and county (see Endorsement Schedule 1) and performed by a competent soil testing laboratory certified by the Iowa Department of Agriculture and Land Stewardship or the Minnesota Department of Agriculture, or operated by the Penn State University or the University of Wisconsin.

Physiological Maturity – The point when all the kernels on the ear have attained their maximum dry matter accumulation. The development of a black or brown abscission layer at the kernel tip and kernel moisture below 40 percent are indicators of physiological maturity.

Price Election – The reasonable expectation of the per unit value of the crop at harvest indicated on the Application for Endorsement and Summary of Coverage. This shall be 100% of the FCIC-set price for the MPCI APH yield policy.

Portable Scale - A measuring device designed specifically to be placed under the wheel of a cart or wagon to measure the weight of the contents of the wagon. At least two portable scales are used simultaneously under two wheels.

Sales Closing Date – A date contained in the special provisions by which an application must be filed. The last date by which you may change your crop insurance coverage for a crop year.

Soil Test – A procedure to determine the availability of nutrients in the soil. The proper soil test will be one recommended by CSREES, NRCS or a similar entity, approved by us, as compatible with the agronomic and weather conditions in the state and county, and performed by a competent soil testing laboratory such as those certified by the Iowa Department of Agriculture and Land Stewardship or the Minnesota Department of Agriculture, or operated by the Penn State University or the University of Wisconsin.

Stalk Nitrate Test – An end-of-season cornstalk test to assess the nitrate concentration in the lower end of cornstalks. An appropriate test will be one recommended by CSREES, NRCS or a similar entity, approved by us, as compatible with the agronomic and weather conditions in the state and county, and performed by a competent testing laboratory such as those certified by the Iowa Department of Agriculture and Land Stewardship or the Minnesota Department of Agriculture, or operated by the Penn State University or the University of Wisconsin.

Stationary Scale – A measuring device usually located at a grain elevator and designed specifically for measuring weight of harvested grain held in a wagon or grain cart.

Summary of Coverage – The list of crops, locations, premium and amount of insurance for which the insured has made an Application for Endorsement.

Weigh Wagon - A measuring device designed specifically for measuring weight of harvested grain held in the wagon. Grain carts that include a weighing device do not qualify as weigh wagons under this definition.

Yield Appraisal – A direct measurement of yield as determined by our representative in a manner described in the *Nutrient BMP Loss Adjustment Handbook*.

3. General Standards for Appraisal by Direct Weight Measurement

For each management unit that is to be adjusted, an appraisal will be completed on a portion of the check strip and one of two adjacent BMP strips in the unit. Any deviations in the appraisal methods described below require FCIC written authorization.

1. Verify crop maturity prior to initiating the appraisal. The appraisal is only to be performed after the corn kernels are physiologically mature. If the corn crop in the management unit is not physiologically mature, the insurer will determine with the insured the practicability of leaving any portion of management unit for subsequent appraisal and may request that the insured:
 - (a) Refrain from harvesting any unharvested portion of the management unit, the check strip or BMP strips until the crop is physiologically mature; or
 - (b) Refrain from harvesting the check strips or BMP strips until the crop is physiologically mature but release the remaining portion of the management unit to be harvested; or
 - (c) The insurer may release all portions of the management unit for an alternative use, in which case the insured forfeits all rights to any indemnity.
2. Locate the check strip in each endorsement unit. Identify a portion of each check strip and an equivalent portion of one of the two adjacent BMP strips for harvest. No more than two thirds of the check strip or two thirds of one adjacent BMP strip will be harvested during the initial adjustment. The remaining production will be left unharvested for an adjustment audit, if necessary, and may not be harvested until released by the insurer.
3. Use the Adjustment Check Sheet (see Exhibit 11) to inspect for potential fraud including differential management of the check strip, adjacent BMP strips and/or balance of the insured production.
4. Complete the Appraisal Worksheet (Exhibit 10) for each appraised management unit and submit to the insurer after each appraisal.
5. The adjuster must contact the insurer before leaving the location of the insured acreage to confirm that the appraisal is complete and to find out if the unit has been flagged by the insurer for an audit.

4. Appraisal Methods

A. Weigh Wagon Adjustment

This method is based on weighing the total production of shelled corn harvested from a specified area using a weigh wagon, then converting this production to bushels per acre.

1. Preparation for Weighing
 - (a) Confirm that the combine is empty.

- (b) Confirm that the weigh wagon is empty.
 - (c) Check weigh wagon to make sure it is functioning properly.
 - (d) Weigh wagon should be placed in a convenient, fairly level area of the field, facing into the wind if possible.
2. Weigh Criteria
- (a) The same combine must harvest all samples.
 - (b) Crops should be harvested in the same direction, especially if the plot traverses a slope, or if there is a strong wind blowing in the same direction as the rows.
 - (c) The same weigh device must weigh all samples.
 - (d) When using a weigh wagon, choose a level, convenient location and leave it in one place for data collection.
 - (e) Adjuster must always check to see that no one is standing on the wagon or touching the truck and verify that stalks are not touching the underside of the wagon during weighing.
 - (f) Dump grain directly from the combine into a stationary weigh wagon. Do not use a grain cart.
3. Weighing the Plot
- (a) The producer harvests the portion of the check strip designated by the adjuster and dumps the load into the weigh wagon. A sample of grain is taken after one half (1/2) of the grain is unloaded. The sample is checked for moisture.
 - (b) Moisture level of the sample and weight of the harvested grain are recorded immediately.
 - (c) Once the harvested portion of the check strip has been weighed, the weigh wagon is unloaded and the scale is balanced. An equivalent portion of the BMP strip designated by the adjuster is then harvested and weighed following the same procedures.
4. Determining Yield
- (a) The fresh weight of grain is corrected back to a reference moisture, typically 15%, the standard for #2 yellow corn (see Exhibit 8).
 - (b) Determine the number of bushels of grain by dividing the weight of the grain by 56 (there are 56 pounds in a bushel of corn).
 - (c) Calculate the area harvested (in acres) by multiplying the length of the strip harvested by the width of the strip harvested. Divide that result by the area of one acre (43,560 ft²) to determine the acreage of the harvested area.
 - (d) Estimate grain yield per acre by dividing the number of bushels divided by the area harvested (in acres).

B. Portable Scales Adjustment

This method is based on weighing the total production of shelled corn harvested from a specified area using portable scales, then converting this production to bushels per acre.

1. Preparation for Weighing
- (a) Confirm that the combine is empty.
 - (b) Confirm that the receiving wagon is empty.
 - (c) Check portable scales to confirm that they are functioning properly.
 - (d) The portable scales should be placed on firm ground in a convenient, level area.
2. Weigh Criteria
- (a) The same combine must harvest all samples.
 - (b) Crops should be harvested in the same direction, especially if the plot traverses a slope, or if there is a strong wind blowing in the same direction as the rows.
 - (c) The same weigh device must weigh all samples.

- (d) When using portable scales, they must be placed on firm, level ground in a convenient location and left in one place for data collection in accordance with manufacturer's instructions.
 - (e) The adjuster must confirm that all weighing devices are at the same height. If there are only two weighing devices weighing a four-wheeled wagon, the two wheels not being weighed should be at the same height as the wheels being weighed.
 - (f) The wagons that are to be used to weigh the corn should be weighed empty before corn is loaded to determine the empty weight of the wagons.
 - (g) Adjuster must always check to see that no one is standing on the wagon or touching the wagon.
 - (h) Dump grain directly from the combine into the wagon. Do not use a grain cart.
3. Weighing the Plot
- (a) The producer harvests the portion of the check strip designated by the adjuster into a grain wagon. A sample of grain is taken after one half (1/2) of the grain is unloaded. The sample is checked for moisture.
 - (b) The loaded wagon is then weighed using the portable scales. The empty weight of the wagon is then subtracted from the loaded weight of the wagon to determine the weight of the corn.
 - (c) Moisture level of the sample and weight of the harvested grain are recorded immediately.
 - (d) Once the harvested portion of the check strip has been weighed, the wagon is removed from the scales and the scales are balanced. An equivalent portion of the BMP strip designated by the adjuster is then harvested and weighed following the same procedures.
4. Determining Yield
- (a) The fresh weight of grain is corrected back to a reference moisture, typically 15 percent, the standard for #2 yellow corn (see Exhibit 8).
 - (b) Determine the number of bushels of grain by dividing the weight of the grain by 56 (there are 56 pounds in a bushel of corn).
 - (c) Calculate the area harvested (in acres) by multiplying the length of the strip harvested by the width of the strip harvested. Divide that result by the area of one acre (43,560 ft²) to determine the acreage of the harvested area.
 - (d) Estimate grain yield per acre by dividing the number of bushels divided by the area harvested (in acres).

C. Stationary Scales Adjustment

This method is based on weighing the total production of shelled corn harvested from a specified area using stationary scales available at a grain elevator or other local facility, then converting this production to bushels per acre.

1. Preparation for Weighing
- (a) Confirm that the combine is empty.
 - (b) Confirm that the receiving wagon is empty.
 - (c) Check stationary scales to confirm that they are functioning properly.
2. Weigh Criteria
- (a) The same combine must harvest all samples.
 - (b) Crops should be harvested in the same direction, especially if the plot traverses a slope, or if there is a strong wind blowing in the same direction as the rows.
 - (c) The same weigh device must weigh all samples.
 - (d) The wagons that are to be used to weigh the corn should be weighed empty before corn is loaded to determine the empty weight of the wagons.
 - (e) Adjuster must always check to see that no one is standing on the wagon or touching the wagon.

- (f) Dump grain directly from the combine into the wagon. Do not use a grain cart.
3. Weighing the Plot
- (a) The producer harvests the portion of the check strip designated by the adjuster into the grain wagon. A sample of grain is taken after one half (1/2) of the grain is unloaded. The sample is checked for moisture.
 - (b) The loaded wagon is then weighed using the stationary scales located at a grain elevator or other facility. The adjuster accompanies the loaded wagon from the field to the scales and return. The empty weight of the wagon is then subtracted from the loaded weight of the wagon to determine the weight of the corn.
 - (c) Moisture level of the sample and weight of the harvested grain are recorded immediately.
 - (d) Once the harvested portion of the check strip has been weighed, the wagon is removed from the scales and the scales are balanced. An equivalent portion of the BMP strip designated by the adjuster is then harvested and weighed following the same procedures.
4. Determining Yield
- (a) The fresh weight of grain is corrected back to a reference moisture, typically 15 percent, the standard for #2 yellow corn (see Exhibit 8).
 - (b) Determine the number of bushels of grain by dividing the weight of the grain by 56 (there are 56 pounds in a bushel of corn).
 - (c) Calculate the area harvested (in acres) by multiplying the length of the strip harvested by the width of the strip harvested. Divide that result by the area of one acre (43,560 ft²) to determine the acreage of the harvested area.
 - (d) Estimate grain yield per acre by dividing the number of bushels divided by the area harvested (in acres).

D. Other Adjustment Options

If conditions exist that prevent timely yield appraisals using the loss adjustment procedures described in this handbook, the insurer will conduct a yield appraisal of the Check Strip Production and the Nutrient BMP Production using standard Federal Crop Insurance Corporation (FCIC) loss adjustment procedures and forms for corn harvested for grain.

5. Identifying Intentional Mismanagement

A producer may attempt to intentionally create an indemnity by manipulating the management of the insured acres. Unlike other FCIC reinsured policies, check strips in this endorsement are identified at the beginning rather than at the end of the endorsement period. This means that a producer may be able to provide better care to the check strips and thus drive up both the guarantee and potential indemnity. The endorsement is designed on the explicit assumption that farmers will not over-manage the check strips, which may be done by manipulating pesticides, herbicides, cultivation and other factors.

Several strategies have been identified which may produce a difference between check strip yield and the yield from the balance of the insured acres or portion thereof.

First, a farmer might mismanage the insured acres on the theory that he will either get an indemnity or lower his management costs.

Second, the farmer might reduce management of the BMP strips directly adjacent to the check strip.

Third, the farmer may try to boost the check strip production.

Finally, the farmer may attempt to reduce yield in the BMP strips by manually removing corn plants or ears.

Any of these actions are a violation of the Nutrient BMP Endorsement provisions, with all attendant legal consequences and penalties.

A. Mismanage BMP Acres

One potential way to create an indemnity is to alter management practices to intentionally create a lower yield on the farmer's insured production than on the check strip. A farmer may try to produce a yield loss in several ways including: reducing fertilizer applications below BMP levels on the BMP acres, altering weed management practices, altering seeding rates and altering pest management practices.

We have included two types of controls in the endorsement to protect against or mitigate this management risk. These are detection systems and economic penalties.

- (1) Detection Systems – The Common Crop Insurance Policy, Crop Revenue Coverage Basic Policy and endorsement provisions require the insured to make available records for inspection on request. From the BMP plan, one can easily estimate the total amount of fertilizer that the farmer should have applied to the entire insured acreage. Examination of receipts for purchases of inputs such as seed, herbicides or fertilizer can determine if the farmer has reduced fertilizer, seed or herbicide purchases. Followup by interviewing suppliers from whom receipts show purchase may be required to confirm the receipts are genuine.

Fraud may also be detected through soil or tissue samples. Under the endorsement, a farmer must allow access to the insured acres to take samples. This provision enables representatives of the insurer to sample the crop or soil. In many cases, crop or soil samples can indicate if the amount of fertilizer or pesticide actually applied to the insured crop was different than that agreed to or stated by the farmer. For example, our research has shown that a farmer must cut nitrogen rates nearly in half to have a high probability of creating a yield loss greater than the deductible. However, a stalk nitrate test can determine if a farmer applied a half-rate of nitrogen compared to a BMP rate.

There are many other techniques that can determine if management practices were manipulated to create an indemnity including sampling weed densities, pest densities, plant population, root ratings, etc. When completing the appraisal, adjusters should use the Adjustment Check Sheet, which lists the indicators of differential management (see Exhibit 11).

- (2) Economic Penalties - Aside from the procedural controls to limit fraud, there are also economic penalties for a farmer attempting to cheat on this endorsement. The farmer who tries to cheat takes two risks. First, the farmer may fail to create a loss large enough to create an indemnity. He takes the risk that he may not be able to produce an indemnity larger than the sum of his deductible, the endorsement cost and the value of lost production (\$17 to \$23). The data show that relatively small reductions in application rates below the BMP level have a low likelihood of producing a yield differential large enough to produce an indemnity.

Analysis of several studies in Illinois, Indiana and Pennsylvania show that a farmer will have to reduce his application rates by 50 percent (i.e., cut nitrogen fertilizer approximately 100 pounds) just to create a 30 percent chance of securing an indemnity. Consequently, on average, the expected indemnity is nearly equal to or less than the premium. These studies are significant because they were conducted

on farmer cooperators' fields following varying farming practices such as different crop rotations, tillage practices and use of manure, which is exactly what we would expect from producers buying insurance. (Analysis of data from highly controlled, university plot experiments in Minnesota and Iowa in which a majority of the data were collected from continuous corn plots is quite different. These studies indicate that average indemnities could be three times the premium.) Thus, the typical insured producer under this endorsement will, on average, reap little or no benefit from cheating.

Second, a farmer will not want to reduce yield averages long term. Many government subsidy programs and crop insurance coverage levels are tied to average production levels (e.g., Approved Production History or APH). Most management practices designed to create an indemnity under this insurance program would have the effect of reducing overall yield. Therefore, farmers would be reluctant to use management practices that lower the APH over time.

B. Mismanage BMP Strips

The insured may also intentionally try to produce a difference in yield between the check strip and the adjacent BMP strips by either mismanaging the adjustment acres or over-managing the check strip.

The central problem with the strategy of mismanaging the BMP strips is that manipulation is likely to be visually apparent. The adjuster will be visiting just these acres. They will have similar soil type(s) and weather conditions as the remainder of the insured acres and the check strip. Corn plants that are substantially unfertilized are visually more yellow than properly fertilized plants. A farmer will create a readily identifiable yellow strip if he makes major reductions in fertilization rates. If the insured makes minor reductions, there will be a low chance of producing an indemnity, no savings in input costs across the entire insured area and a very real risk of losing the value of the endorsement premium on the entire insured acreage. The Adjustment Check Sheet (see Exhibit 11) includes items such as weed pressure, plant density and lodging (an indication of lack of corn rootworm control) for the adjuster to use to assess whether the adjacent strips have been managed in the fashion that is required by the insurance contract.

C. Boost Check Strip Production

A third option to create an indemnity is for the farmer to attempt to over-manage the check strip. Fertilizer response data show that excessive fertilization will not produce a positive yield response. Other differential management systems will produce identifiable indicators of differential management as described above.

D. Manual Removal or Manipulation of Corn Plants or Ears

The farmer might pull up or cut off corn plants, clip corn silks or manually remove corn ears from plants in the BMP strips to reduce yield in relation to the check strip. This practice should be readily detectable by visually inspecting the BMP strips for missing plants or underdeveloped or missing ears. The farmer will not know in advance which BMP strip and portion of the selected strip will be used for adjustment. Therefore, in order to have a high probability of creating an indemnity, the farmer would have to manipulate a substantial number of corn plants.

6. Protocols for Identifying Differential Management

A. Protocol for Identifying Differential Management of Corn Rootworm

1. Description

Corn rootworm beetles (western and northern) [*Diabrotica* sp.] are the most significant insect pest problem of corn in the Midwestern U.S. from the standpoint of insecticide use.

Adults lay eggs in the late summer and fall that hatch in early June. Corn rootworms (CRW) larvae feed on a narrow range of host species. In general, a corn-soybean rotation disrupts their life cycle and constitutes the most effective management tool available for farmers. Some populations of northern CRW have shown a life cycle adaptation called extended diapause. Extended diapause occurs when some of the eggs rest through the next summer and hatch the second spring after being laid. With extended diapause, control by a corn-soybean rotation can be defeated. Soil-applied insecticide treatment is generally a standard practice in corn acreage following corn targeted to control larvae. Corn rootworm adults occasionally cause economically significant problems when they feed on emerging corn silks. If silk feeding is too severe, pollination suffers with a resulting loss in yield. In addition, some producers scout for significant populations of adults in mid to late summer, and treat for adults to reduce the egg density, and the need for spring soil-insecticide treatment.

A farmer may seek to increase the probability of a claim through differential management of CRW in the check strip in relation to the adjacent BMP acres or the balance of the insured acreage. Potential methods include treating the check strip for corn rootworm when treatment is warranted and not treating the adjacent BMP strip or the rest of the insured acres, or planting varieties resistant to corn rootworm in the check strip and susceptible varieties in the other acres.

2. Visual Identification of Corn Rootworm Damage

- (a) The adjuster will locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres and look for any obvious visual differences of the corn crop between the separate areas.
- (b) A visual indication of corn rootworm damage is lodging of corn stalks (see Exhibit 1). Lodging can also result in reduced ear weight and a goose-necked appearance in the plants.
- (c) If visual assessment indicates possible mismanagement of insured acres, the adjuster will then contact the insurer and proceed to the Damage Assessment Protocol. **Farmer must discontinue any harvest in the insured field until notified otherwise by the insurer.**

3. Damage Assessment Protocol

- (a) Defer assessment until after September 1 or the initiation of the black layer in the kernels.
- (b) Locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres.
- (c) Within each of these areas, select and inspect in two random locations five consecutive plants, a total of plants (10) plants each, for the corn rootworm root rating. In the check strip or directly adjacent BMP strip, the plants selected should be midway between the strip borders (approximately 10 rows or 25 feet). (Gray and Steffey 1998)
- (d) Note on the appraisal worksheet the approximate location (e.g., GPS coordinates) of the sampled rows.
- (e) Wash all soil from roots leaving them fully exposed.
- (f) Examine the roots, scanning each root for feeding scars. As root regrowth occurs, larger roots shortened by larval feeding will have masses of small roots growing around the shortened end.
- (g) Referring to Exhibit 2 and the following scale, assign a number from 1 to 6 representing the severity of root damage to the plant just examined. Record the root rating for each individual plant.
- (h) 1-6 "Traditional" Scale (See Exhibit 2). (Hills and Peters 1971)
 - (i) 1 = no damage or only a few minor feeding scars
 - (ii) 2 = feeding scars evident but no roots eaten off to within 3.8 cm of plant
 - (iii) 3 = several roots eaten off to within 3.8 cm of plant

- (iv) 4 = 1 node of roots destroyed
- (v) 5 = 2 nodes of roots destroyed
- (vi) 6 = 3 or more nodes of roots destroyed
- (i) Repeat the rating process on each individual plant in each replicate of 5 plants. Average the 2 replications that were taken from each of the test areas (check strip, directly adjacent BMP strip or the remainder of the insured BMP acres).

4. Positive indication of Mismanagement

- (a) An average difference of one and one-half (1.5) root rating points between any of the three test areas (check strip, directly adjacent BMP strip or the remainder of the insured BMP acres) is a positive indication of mismanagement. (Gray and Steffey 1998)
- (b) A positive indication of mismanagement may result in denial of claim of loss and the farmer may be denied any indemnity due.

5. Additional Audit Procedures

If field audit indicates mismanagement, insurer will obtain and inspect the following:

- (a) Obtain and inspect pesticide application records. These records are legally required for all pesticide applications in every state. These records typically include date and time of all pesticide applications; applicator name and license number; material and rate applied; method of application; target pest(s); and location(s) treated. Applications should be consistent for all parts of insured fields (unless pest scouting records indicate spot treatments are justified), and will likely be similar for all nearby fields.
- (b) Obtain and inspect pest scouting records if available. These records are not legally required in most cases. If available, these records may indicate date any scouting for presence of pests took place, individual completing the scouting, results and indications of need for treatment. Pesticide application records should be consistent with indications of need for treatment, i.e., pesticide application is made at the appropriate time with an appropriate pesticide if scouting results indicate sufficient pests are present to justify treatment.
- (c) Obtain and inspect purchase/sale records for corn varieties planted and pesticides applied on insured fields. Amounts should be consistent with application rates indicated on pesticide application records. Varieties must be consistent across the insured unit, i.e., if varieties resistant to corn rootworms are planted, they must be planted on both check strip and adjacent BMP strips and the remainder of the unit.
- (d) Additional information regarding management practices may be available by interviewing any crop consultant, agchem retail agronomist, input salesperson or applicator who scouted for pests, advised on treatment or provided pesticides or application services on the insured field.

Note: The use of *Bt* hybrids genetically enhanced to suppress corn rootworm larvae is also a form of corn rootworm control. It is possible that a farmer may have planted a *Bt* hybrid in the check strip and a non-*Bt* hybrid in the adjacent area. There are quick tests available from several companies that can be performed to check for the presence of *Bt* in the tissue or grain of corn (see Exhibit 3).

B. Protocol for Identifying Differential Management of European Corn Borer

1. Description

European corn borer (ECB) [*Ostrinia nubilalis* (Hubner)] is the pest responsible for the second greatest amount of insecticide applications to corn. ECB overwinter as larvae that pupate once the soil warms sufficiently in the spring. Moths emerge from these pupae in June, adults mate and females place eggs on the underside of corn leaves and on other suitable plant species. ECB moths prefer to deposit eggs on the tallest corn. When larvae hatch, they feed on leaf tissue. These larvae mature and pupate, with a second emergence of moths usually occurring in late July and August. Second-generation ECB

moths prefer younger corn for egg deposition. The newly hatched second generation larvae feed lightly on leaves, but soon bore into leaf midribs, stalks and ear shanks. There are predictive models available to help farmers scout and plan treatments if they are needed.

A farmer may seek to increase the probability of a claim through differential management of the check strip in relation to the adjacent BMP acres or the balance of the insured acreage. Potential methods include treating the check strip for ECB and not treating the adjacent BMP strip for ECB when treatment is warranted, or planting varieties susceptible to ECB in the directly adjacent BMP strip and resistant varieties in the other acres.

2. Visual Identification of Corn Borer Damage

- (a) The adjuster will locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres and look for any obvious visual differences of the corn crop between the separate areas.
- (b) A visual indication of corn borer damage is lodging of corn stalks or breaking over of corn stalks above ground level (see Exhibit 4), ear droppage, shorter plants with fewer leaves and poor ear development (Anonymous 1996).
- (c) If visual assessment indicate possible mismanagement of insured acres the adjuster will then contact insurer and proceed to the Damage Assessment Protocol. **Farmer must discontinue any harvest in the insured field until notified otherwise by the insurer.**

3. Assessment of Potential Difference in Pest Management Practices

- (a) Defer assessment until after September 1 or the initiation of the black layer in the kernels.
- (b) Locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres.
- (c) Within each of these, select and inspect in two random locations eight consecutive plants, a total of sixteen plants, for European corn borer tunneling. In the check strip or directly adjacent BMP strip, the plants selected should be midway between the strip borders (approximately 10 rows or 25 feet).
- (d) Note on the appraisal worksheet the approximate location (e.g., GPS coordinates) of the sampled rows.
- (e) Split each plant's stalk from tassel to soil level.
- (f) Measure in centimeters the total amount of tunneling, including tunnel hooks (see Exhibit 5). A tunnel hook is the horizontal tunnel connecting the tunnel opening in the stalk with the vertical tunnel in the stalk.
- (g) Record the measurements.
- (h) Repeat the process on each individual plant in each replicate of 8 plants. Average the measurements for the two replications of samples taken in each of the test areas (check strip, directly adjacent BMP strip and the remainder of the BMP area)

4. Positive Indication of Mismanagement

- (a) Any difference in tunneling is a positive indication of mismanagement.
- (b) A positive indication of mismanagement may result in denial of claim of loss and the farmer may be denied any indemnity.

5. Additional Audit Procedures

If field audit indicates mismanagement, insurer will obtain and inspect the following:

- (a) Obtain and inspect pesticide application records. These records are legally required for all pesticide applications in every state. These records typically include date and time of all pesticide applications; applicator name and license number; material and rate applied; method of application; target pest(s); and location(s) treated. Applications should be consistent for all parts of insured fields (unless pest scouting

records indicate spot treatments are justified) and will likely be similar for all nearby fields.

- (b) Obtain and inspect pest scouting records if available. These records are not legally required in most cases. If available, these records may indicate date any scouting for presence of pests took place, individual performing the scouting, results and indications of need for treatment. Pesticide application records should be consistent with indications of need for treatment, i.e., pesticide application is made at the appropriate time with an appropriate pesticide if scouting results indicate sufficient pests are present to justify treatment.
- (c) Obtain and inspect purchase/sale records for corn varieties planted and pesticides applied on insured fields. Amounts should be consistent with application rates indicated on pesticide application records. The variety must be consistent across the endorsement unit, i.e., if genetically modified varieties resistant to ECB are planted, they should be planted on the check strip, adjacent BMP strips and the remainder of the unit.
- (d) Additional information regarding management practices may be available by interviewing any crop consultant, agchem retail agronomist, input salesperson or applicator who scouted for pests, advised on treatment or provided pesticides or application services on the insured field.

Note: The use of *Bt* hybrids genetically enhanced to suppress ECB larvae is also a form of ECB control. It is possible that a farmer may have planted a *Bt* hybrid in the check strip and a non-*Bt* hybrid in the adjacent area. There are quick tests available from several companies that can be performed to check for the presence of *Bt* in the tissue or grain of corn (see Exhibit 3).

C. Protocols for Identifying Differential Nitrogen Management Practices

A farmer may seek to increase the probability of a claim through differential nutrient management of the check strip in relation to the adjacent BMP acres or the entire BMP acreage. Potential methods include failure to apply the appropriate amount of fertilizer on the check strip or under-application of fertilizer on the adjacent BMP acres or the balance of the insured acreage.

Note: This type of manipulation is not likely for phosphorus BMP coverage (Options A and C). For phosphorus BMP coverage, the insured acreage must test high or very high for phosphorus soil levels. Adding additional phosphorus to soils testing in these ranges is not likely to produce a positive yield response in the insurance year.

1. Visual Identification of Differential Nitrogen Management

- (a) The adjuster will locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres and look for any obvious visual differences in the crop between the separate areas.
- (b) Visual indication of differential nitrogen management include stunted plants and yellowing (chlorosis) of leaves. Chlorosis begins at leaf tip and progresses along the midrib, creating a "V", or firing (the premature death of yellow leaves). (See Exhibit 6.)
- (c) If visual assessment at the time of adjustment indicate possible mismanagement of insured acres, the adjuster will then contact the insurer and proceed to the Differential Management Assessment Protocol. **Farmer must discontinue any harvest in the insured field until notified otherwise by the insurer.**

2. Differential Management Assessment Protocol

- (a) Locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres.
- (b) Within each of these areas, actual plant tissue samples will be collected to determine the nitrogen content of the corn plant.

- (c) The sampling technique that will be employed is as follows:
 - (i) Tissue samples of the lower stalk of corn are collected in each test area (check strip, adjacent BMP strip, and remainder of insured acres) within 3 weeks of physiological maturity (black layer) (Blackmer and Mallarino 1996).
 - (ii) Samples are collected from 10 plants by cutting the stalk at 15 cm and 35 cm above the ground and removing dried leaves from the resulting 20 cm of stalk.
 - (iii) Samples are to be collected at 5 random locations within each test area (check strip, adjacent BMP strip, and remainder of insured acres).
 - (iv) Each sample set should be properly labeled and kept separate from other samples.
 - (v) Note on the appraisal worksheet the approximate location (e.g., GPS coordinates) of the sample locations.
- (d) All samples will then be forwarded to a testing laboratory for a stalk nitrate test.
- (e) After the nitrogen concentration has been determined for all samples, average the values for the 5 replications that were taken in each of the test areas (check strip, directly adjacent BMP strip or the remainder of the insured BMP acres).

3. Positive Indication of Mismanagement

- (a) An average difference of 2500 parts per million (ppm) in stalk nitrate concentration between any of the three test areas is a positive indication of differential management of nitrogen.
- (b) A positive indication of mismanagement may result in possible denial of claim of loss and the farmer may be denied any indemnity due.

4. Additional Audit Procedures

If field audit indicates mismanagement, insurer will obtain and inspect the following:

- (a) Obtain and inspect fertilizer and other nutrient application records if available. These records are legally required for all nutrient applications in some states. These records typically include date and time of all pesticide applications; applicator name and license number; material and rate applied; method of application; target pest(s); and location(s) treated. Applications should be consistent for all parts of insured fields, and will likely be similar for all nearby fields.
- (b) Obtain and inspect soil sampling and nutrient application records if available. These records are required for nitrogen and phosphorus as a condition of coverage, and may be legally required for additional nutrients in some states. These records may indicate date and location of soil sampling, individual pulling samples, results of lab analysis and indications of need for fertilizer application. Fertilizer application records should be consistent with indications of need, i.e., fertilizer application is made at the appropriate time with an appropriate material if lab analysis indicates need. The check strip is an exception and will be fertilized in excess of report recommendations.
- (c) Obtain and inspect purchase/sale records for fertilizers applied on insured fields. Amounts purchased should be consistent with application rates indicated on nutrient application records.
- (d) Additional information regarding nutrient management practices may be available by interviewing any crop consultant, agchem retail agronomist, input salesperson or applicator who sampled soil or plant tissue for nutrients, advised on fertilizer applications or provided fertilizer or application services on the insured or nearby fields.

D. Protocol for Identifying Differential Weed Management Practices

1. Visual Identification of Differential Weed Management

- (a) The adjuster will locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres and look for any obvious visual differences in weed control between the separate areas.
- (b) A visual indication of differential weed management is an apparent difference in weed density in the separate areas.

- (c) If visual assessment at the time of adjustment indicate possible mismanagement of insured acres, the adjuster will then contact insurer and proceed to the Differential Management Assessment Protocol.
2. Differential Management Assessment Protocol
- (a) Locate the check strip, the adjacent BMP strips and the remainder of the insured BMP acres.
- (b) Within each of these areas, an actual measurement of weed density will be taken. For any particular field or sub-field, the weed density is calculated based on the number of weeds present per unit area. One sampling technique that may be used is method that utilizes twenty weed counts with 0.5 by 0.5 m² quadrats. Perennial species such as Canada thistle and quackgrass are counted as the number of shoots/m², while annual species are counted as plants/m². Another sampling technique is to measure a length of row and multiply that amount by the row width to get the area. Count the number of weeds in that row area. Divide the number of weeds by the row area to calculate the weed density. Perform additional random weed density measurements at two additional locations in each test area.
- (c) Note on the appraisal worksheet the approximate location (e.g., GPS coordinates) of the sampled rows.
- (d) Record the measurements.
- (e) Determine the average weed density for each of the test areas.
3. Positive Indication of Mismanagement
- (a) Any difference in average weed densities is a potential indication of mismanagement.
- (b) If there is a difference in average weed densities, an additional soil test should be performed to test for the presence or absence of herbicides and their known residues (see Exhibit 7). These tests will indicate if any herbicides were applied to the area in question and what type of herbicides were applied.
- (c) Soil tests confirming a difference in herbicides applied to the test area is a positive indication of mismanagement.
- (d) A positive indication of mismanagement may result in denial of claim of loss and the farmer may be denied any indemnity.
4. Additional Audit Procedures
- If field audit indicates mismanagement, insurer will obtain and inspect the following:
- (a) Obtain and inspect herbicide application records. These records are legally required for all herbicide applications in every state. These records typically include date and time of all herbicide applications; applicator name and license number; material and rate applied; method of application; target pest(s); and location(s) treated. Applications should be consistent for all parts of insured fields (unless pest scouting records indicate spot treatments are justified), and will likely be similar for all nearby fields.
- (b) Obtain and inspect weed scouting records if available. These records are not legally required in most cases. If available, these records may indicate the date any scouting for presence of weeds took place, individual performing the scouting, results and indications of need for treatment. Herbicide application records should be consistent with indications of need for treatment, i.e., herbicide application is made at the appropriate time with an appropriate herbicide if scouting results indicate sufficient pests are present to justify treatment.
- (c) Obtain and inspect purchase/sale records for corn varieties planted and herbicides applied on insured fields. Amounts should be consistent with application rates indicated on herbicide application records. Varieties should be consistent across the insured field, i.e., if genetically modified varieties resistant to specific herbicides are planted, they should be planted on both check strip and adjacent BMP area.
- (d) Additional information regarding management practices may be available by interviewing any crop consultant, agchem retail agronomist, input salesperson or

applicator who scouted for weeds, advised on treatment or provided herbicides or application services on the insured field.

Note: The use of herbicide resistant, genetically enhanced hybrids is also a form of weed control. It is possible that a farmer may have planted a herbicide resistant hybrid in the check strip and a non-herbicide resistant hybrid in the adjacent area. Tests are available to check for the presence or absence of the genetic material in question in the tissue or grain of corn (Exhibit 3).

7. Protocols for Auditing the Nutrient BMP Endorsement

The goal of this section is to provide minimum guidelines for insurers to assure effective quality control under a voluntary or mandatory program under the Nutrient BMP Endorsement.

The endorsement uses a check strip to determine insured production and any resulting indemnities. Because of the small amount of production in the check strips, it is unreasonable to expect the farmer to store it separately from other production. Thus, the producer is not required to save or store separately production from the check strips or adjacent BMP strips. This limits the opportunity for an audit at a later date, providing opportunity for collusion between the insured and loss adjuster to intentionally create a payable loss by inaccurately reporting production to the insurer.

The audit procedures described below will assess whether appraisal procedures have been accurate and may expose intentional program abuse and identify discrepancies, inconsistencies or errors.

A. Random Claims Field Review Standards

1. The insurer must conduct field audits for at least 1 in every 200 or 0.5 percent, of its indemnified Nutrient BMP insurance contracts annually for which a claim has been filed. The contract(s) to be audited will be selected at random. If the insurer has less than 200 claims in the insurance year, at least one must be audited.
2. The loss adjuster shall have no knowledge beforehand that a contract is flagged for audit.
3. Prior to notification that the contract has been selected for audit, the adjuster will conduct the appraisal according to the endorsement provisions and this handbook, leaving at least one-third of the check strip and adjacent BMP strip intact.
4. After completing the adjustment, while still at the insured crop's location, the adjuster will call the insurer to report that the adjustment has been completed.
5. The insurer will inform the adjuster if the contract has been flagged for audit.
6. If the insurer informs the adjuster that the contract will be audited, the adjuster must notify the producer that the remaining production in the check strip and the adjacent BMP area shall not be harvested or destroyed until the earlier of the insurer adjustment audit or 15 days after the initial adjustment.
7. The insured must confirm in writing to the insurer that he or she has been requested not to harvest any remaining production until the subsequent audit or 15 days post the initial appraisal.
8. Within those 15 days, the insurance provider will assign a loss adjuster not associated with the initial appraisal to conduct the audit. This adjuster will verify all information used

to establish the initial appraisal, including repeating the appraisal on the remaining portions of the check strip and BMP strips if necessary.

9. After the review is completed, the insurer will inform the producer that the remaining production has been released for harvest.

B. Auditing the Nutrient BMP Plan

A claim may result from errors in the nutrient management plan prepared by the crop consultant rather than from failure of the nutrient BMP. To verify accuracy of the nutrient management plan, the insurer may request to review the nutrient BMP plan for conformance to the standards listed in endorsement Schedules 1 and 2. An individual holding one of the certifications listed under the definition of crop consultant should be competent to undertake this audit.

8. References and Resources

Blackmer, A.M., and A.P. Mallarino. 1996. Cornstalk Testing to Evaluate Nitrogen Management. Iowa State University Extension Publication PM1584. <http://www.extension.iastate.edu/Publications/PM1584.pdf>

Certified Soil Testing Laboratories. Iowa Department of Agriculture and Land Stewardship. Iowa Soil Testing Laboratory Certification Program. <http://www.agriculture.state.ia.us/certlabs.htm>

Certified Soil Testing Laboratories. Minnesota Department of Agriculture. <http://www.mda.state.mn.us/appd/soilabs.htm>

Managing Manure Nutrients for Crop Production. 1999. Iowa State University Extension Publication PM 1811. <http://www.extension.iastate.edu/Publications/PM1811.pdf>

Anonymous. 1996. *How Corn Is Damaged by the European Corn Borer.* Iowa State University. <http://www.ent.iastate.edu/pest/cornborer/howdamage/damage1.html>

Anonymous. *Corn Rootworm.* Ohio State University Extension Field Crops Pest Management Circular 16.

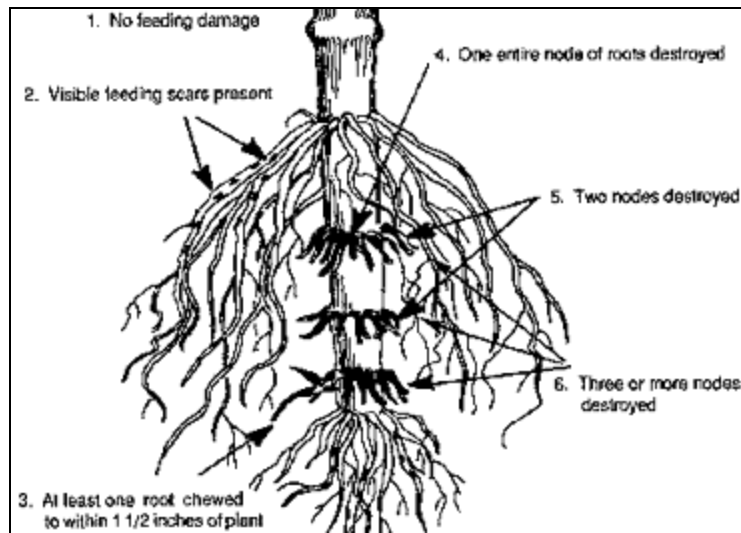
Gray, M. and K. Steffey. 1998. Corn Rootworm (Coleoptera: Chrysomelidae) Larval Injury and Root Compensation of 12 Maize Hybrids: An Assessment of the Economic Injury Index. *Journal of Economic Entomology* 91(3): 723-740

Hills, T.M. and D.C. Peters. 1971. A Method of Evaluating Postplanting Insecticide Treatments for Control of Western Corn Rootworm Larvae. *Journal of Economic Entomology* 64: 764-765

Exhibit 1. Lodging of Corn Stalks



Exhibit 2. Root Rating System for Corn Rootworm Damage



(Continued on following page.)

Exhibit 2. (Continued)

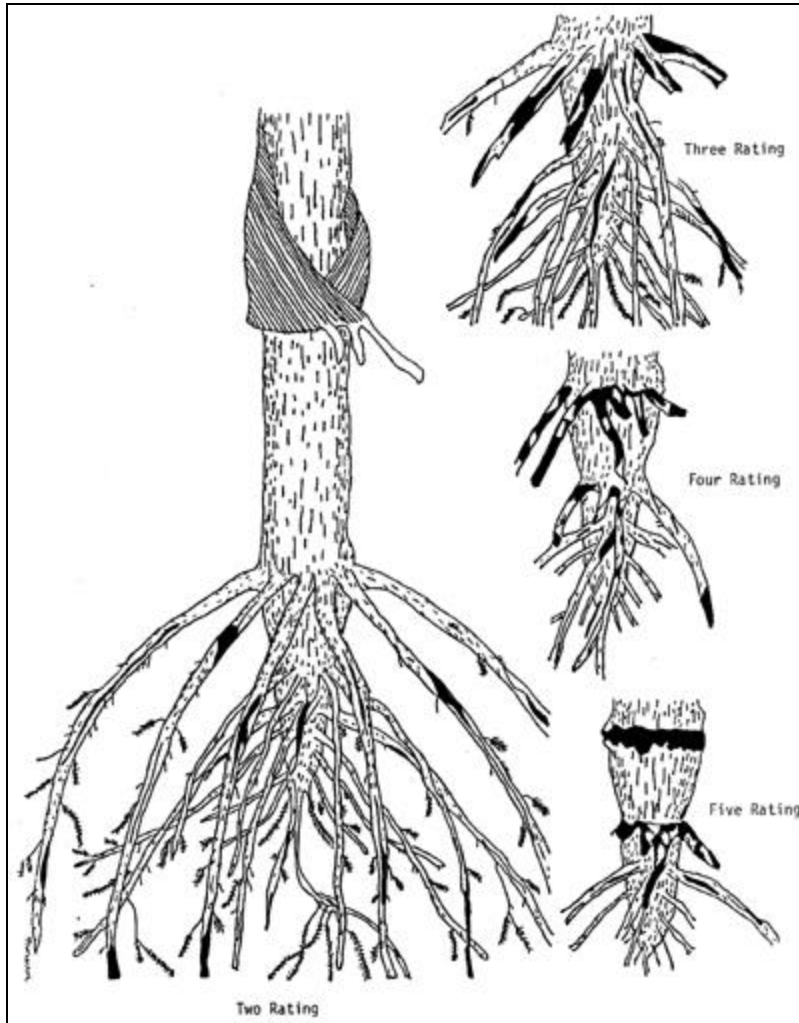


Exhibit 3. Suppliers of Tests for Herbicide-Resistant and *Bt* Corn Hybrids

Partial list:

EnviroLogix, Inc.
500 Riverside Industrial Parkway
Portland, Maine 04103
Phone: (207) 797.-300 Fax: (207) 797-7533
email: info@envirologix.com
www.envirologix.com

Neogen Corporation
Food Safety Division
620 Leshler Place
Lansing MI 48912 USA
Phone: (517) 372-9200, Fax: (517) 372-0108
e-mail: neogen-info@neogen.com
www.neogen.com

Strategic Diagnostics, Inc.
111 Pencader Drive
Newark, Delaware 19702
Phone: (800) 544-8881, Fax: (302) 456-6782
www.sdix.com

Exhibit 4. Breaking of Corn Stalks Above Ground Level



Exhibit 5. Corn Borer Larvae in Corn Stalks



Exhibit 6. Visually Rating Nitrogen Sufficiency

Nitrogen Recommendations —

a series IC-478-R12

by Alfred M. Blackmer, extension agronomist,
Department of Agronomy

Soil Fertility

Visually rating nitrogen sufficiency

Extensive studies in Iowa showed that Reasonable evaluations of N sufficiency were provided by a visual rating system based on firing comparisons. This system was at least as reliable as analysis of ear leaves at silking, and it required less time and money..

Corn producers often evaluate nitrogen sufficiency in their fields by observing the leaf color or amounts of firing. Although these evaluations often are not reliable, visual rating of N sufficiency can provide important information when used appropriately. Visual rating relies on many of the same principles as tissue testing, and can be considered a form of tissue testing. Several symptoms of nitrogen deficiency easily can be observed by comparing corn plants with adequate N to plants that do not have adequate N. N-deficient plants appear to be less green. Plants with extreme deficiencies may appear yellow-green or yellow. This symptom can be seen at any stage of growth. It occurs because N deficiencies limit chlorophyll production in the plant.

Another symptom of N deficiency in corn is a specific pattern of yellow and green on individual leaves. The yellow forms a V-shape, with the widest part toward the end of the leaf and narrowest part on the midrib pointing toward the stalk. The percentage of the leaf that is yellow tends to increase with severity of the N deficiency. This pattern occurs first on lowest leaves and moves higher as severity increases. The yellow pattern occurs because N is moved from old tissues to new tissues within the plant.

A third symptom of N deficiency is firing, the

premature death of leaves after they have turned yellow. The dead leaves are brown and shriveled to a fraction of their former size. Because it is normal for lower leaves to die as corn plants mature, only the amounts of firing that exceed normal can be considered a symptom of N deficiency.

Each of these symptoms can be used to evaluate N sufficiency **only** if you compare them with plants that have adequate N and are grown under otherwise similar conditions. Comparisons are needed for two important reasons. First, loss of greenness and firing occurs progressively as all corn plants mature, so plants must be the same physiological age. Second, plant greenness and amounts of firing tend to vary with weather, soil factors, hybrid, diseases, and other factors.

The need for comparisons when visually rating N sufficiency is not a serious problem in production agriculture. Comparisons easily can be made if a producer plans ahead and applies fertilizer so as to have narrow strips with above-normal and below-normal rates of N application in some fields. These strips should cross several different soil types to enable comparisons within areas of uniform soil conditions.

Strips with above-normal and below-normal rates of fertilization are needed because corn usually shows no visual signs of N excesses. If you find differences between normal and above-normal rates, the normal rate did not supply enough N. If you find no differences between normal and below-normal rates, the normal rate supplied more N than needed.

Extensive studies in Iowa showed that reasonable evaluations of N sufficiency were provided by a visual rating system based on firing comparisons. This system was at least as reliable as analysis of ear leaves at silking, and it required less time and money. It is described in the first 1993 volume of the *Journal of Production Agriculture*.

The visual rating system based on firing was developed and evaluated in research trials that also measured yields and end-of-season cornstalk nitrate concentrations. In accordance with normal practice, the studies were conducted on areas selected to have a high degree of uniformity.

Subsequent use of the visual rating system in non-uniform fields was more difficult than expected because N sufficiency varied from site to site within a field. Thus, many visual ratings were needed for each field. Other measurements, including differences in yield and stalk nitrate concentrations, confirmed the variability in N sufficiency. Aerial color photographs showed N sufficiency varied in spatial patterns related to landscape position and other factors.

Spatial variability of N sufficiency poses the same problem for conventional tissue testing as it does with a visual rating system. Analysis of a sample collected from an area with a mixture of N deficiencies and excesses provides little useful information. The fact that this usually is not recognized as a serious problem in conventional tissue testing shows an important advantage of visual rating systems; visual rating systems encourage and facilitate the dividing of fields into meaningful units before samples are collected. This is important

because an essential step in moving toward site-specific management of N is learning what should be considered a site to sample.

In summary, visually rating a field's N status should not be considered too "low tech" to be useful. Effective use requires some skill, but the test can provide important information at little cost.

Checking for strips of N-deficient corn that coincide with fertilization patterns can reveal problems caused by non-uniform applications of fertilizer.

When strips of below- and above-normal rates of N are deliberately placed in fields, visually rating the N sufficiency can reveal how fertilizer needs vary with landscape position and other factors. Spatial patterns in corn color or firing can be used to show how fields should be divided to collect soil or plant samples.

Reprinted from the July 28, 1997 *Integrated Crop Management* Newsletter.

File: Agronomy 8-2

Exhibit 7. Testing for Herbicide Residues in Soils

Reprinted from the 2002 *Illinois Agricultural Pest Management Handbook*

Chapter 15 • TESTING FOR HERBICIDE RESIDUES IN SOILS 289

The information in this chapter is provided for educational purposes only. Product trade names have been used for clarity, but reference to trade names does not imply endorsement by the University of Illinois; discrimination is not intended against any product. The reader is urged to exercise caution in making purchases or evaluating product information. Label registrations can change at any time. Thus the recommendations in this chapter may become invalid. The user must read carefully the entire, most recent label and follow all directions and restrictions. Purchase only enough pesticide for the current growing season.

15

Herbicides vary in their potential to persist in soil. Herbicides that can persist to the next season may injure subsequent crops and require close monitoring.

Two methods used to determine if injurious herbicide residues might exist are a soil chemical test conducted at a laboratory and a bioassay done either in the suspect field or in a warm, sunny indoor location (such as a greenhouse). These tests help predict potential herbicide-residue problems so the grower can make better decisions about crop rotation, herbicide selection, planting date, and other cultural practices.

Soil Collection and Preparation

With the lab analysis or indoor bioassay, proper sampling of soil is the first step. The procedures for submitting a soil for laboratory analysis and for conducting an indoor bioassay are similar. These guidelines should be followed:

1. In early to midspring or before planting time, collect representative soil samples from the suspect field. Take samples from several locations in the field. For the bioassay or laboratory analysis, take 15 to 20 soil cores and combine them to make a composite sample. This sample should represent no more than 15 to 20 acres. Enough areas must be sampled to avoid missing locations with high herbicide-residue content. Take separate samples from areas where excessive residues are suspected, such as sprayer turnaround points and end rows. Do not mix these samples with the others. Sample the soil to a 6-inch depth, and divide the samples into 0-to-3-inch and 3-to-6-inch sections for greater accuracy. Be sure to mark on the bags the depths

from which the samples came. About 8 pounds of soil (about 4 quarts) are needed for each bioassay and 2 pounds of soil (about 1 quart) for each laboratory analysis.

2. Sample an area that is not suspect for use as a “check” soil. This soil may be taken from a nearby fencerow or another untreated area. Keep this sample separate from the others. Many laboratories require a check soil.

3. Submit the samples to the laboratory as soon as possible after sampling. If bioassays are to be performed, they should be run on the soil samples as soon as possible after they have been obtained from the field. If samples cannot be assayed immediately, store the soil in a refrigerator or freezer that is not used for food. If samples are stored in a warm environment, herbicide residue may decrease with time.

Bioassay

The bioassay can help predict potential crop injury. The test is inexpensive and can be done with a few simple supplies. A bioassay does not measure the amount of herbicide residue present in the soil, but it may indicate whether or not enough residue is present to injure a sensitive crop.

Field Bioassay

A field bioassay is conducted by planting one or more strips of a species sensitive to the suspect herbicide in the field. This procedure can be done in the fall or spring, but it is more accurate when performed closer to the planting of the intended crop. Before planting the desired crop, allow the test plants to grow and develop symptoms of injury from any herbicide residues. Plant the strips in several locations, if possible, and include an area that is most suspect and an area that can serve as a check. Choose an appropriate species for the bioassay, such as one of the more sensitive ones listed in this chapter. Include several species of

differing sensitivity for greater accuracy.

Indoor Bioassay

The procedures for conducting an indoor bioassay vary, depending on what herbicide residue is of concern.

However, for the indoor bioassay, the procedures for soil collection and preparation are the same.

1. For an indoor bioassay, collect the samples and allow them to air dry if needed until they can be worked readily. Do not overdry. If the soil is cloddy, crush the clods into pieces (the size of a pea or smaller). If the soil contains a high amount of clay, the addition of coarse sand (50 percent by volume) improves its physical condition. If sand is added, mix it thoroughly with the soil.

2. Tin cans, milk cartons, and cottage cheese containers are appropriate containers in which a bio-assay can be conducted. Punch holes in the bottoms of the containers to allow water drainage. Fill two or more containers (a set) with soil from each sample. Additional containers increase the accuracy of the test. Place the soil samples obtained from the 0-to-3-inch depth in one set of containers; and, in another set, place the soil obtained from the 3-to-6-inch depth. Follow this procedure for the composite sample and the sample taken from areas where excessive residues are expected. In addition, fill a final set of containers with the check soil.

Testing for Specific Herbicide Groups

Triazine Residues

For suspected carryover from triazine herbicides, such as atrazine and Princep (simazine), an oat plant bioassay works best. Place about 15 oat seeds in each container of soil and cover the seeds with about 1 inch of soil. Wet the soil with water, but do not saturate it. Place the containers in a warm location (70 ° to 75 ° F) where they can receive ample light. Sunlight is essential for the development of the plant as well as for inducing symptoms of triazine injury. The container should be watered as needed.

Injury symptoms should become apparent within 10 to 14 days after emergence. Triazine injury is characterized by chlorosis (yellowing), then necrosis (browning) of leaf tissue. As injury symptoms start at the leaf tip and develop toward the base, a comparison with the plants in the check soil is essential.

If injury appears on the oats, enough herbicide residue may be present to injure a susceptible crop. Planting a more tolerant crop is suggested. In general, the order of susceptibility from most to least susceptible to triazine herbicides is as follows:

Ryegrass > Alfalfa > Oats > Wheat >
Soybean > Sorghum > Corn

DNA Residues

If residues from dinitroaniline (DNA) herbicides, such as Treflan (trifluralin) or Prowl, Pendimex (pendimethalin), are suspected, a different assay technique is used. A sorghum or corn-root bioassay is relatively quick and easy to perform.

Wrap a number of sorghum or corn seeds in a moist paper towel and store them at room temperature for 2 to 3 days. This procedure allows the seed to imbibe water and germinate. Once the seed has germinated, carefully place three to five seeds into containers with the suspect soil and the check soil. Cover the seeds with soil to a depth of about 1 inch and leave them for 10 to 14 days, depending on the air temperature. Water the plants as needed but do not saturate the soil.

At the end of the 10-to-14-day period, carefully re-move the plants and observe the root formation. DNA herbicides inhibit root development. Symptoms include stunted plants, stubbed roots, inhibited root-hair development, thickened hypocotyls on broadleaf species, and leaves that fail to unroll. If the plants in the suspect soil display any of these symptoms in comparison to the check plants, DNA residues may be present at concentrations high enough to injure susceptible crops. In general, the order of susceptibility from most to least susceptible to DNA herbicides is as follows:

Annual rye > Oats > Sorghum > Corn >
Wheat > Alfalfa > Soybean

Imazaquin, Imazethapyr, and Chlorimuron Residues

Imazaquin, the active ingredient in Scepter and a component of Squadron and Backdraft; imazethapyr, the active ingredient in Pursuit and a component of Pursuit Plus, Extreme, and Lightning; and chlorimuron, the active ingredient in Classic and a component of Canopy, Canopy XL, and Synchrony STS, have the same mode of action. These herbicides affect root and shoot growth and development. Symptoms of plant injury include inhibited root development, stunted plants, and interveinal chlorosis or leaf striping.

Therefore, a sorghum or corn-root bioassay performed according to the procedure outlined for suspected DNA residue is appropriate. Corn is more sensitive to imazaquin, and sorghum is more sensitive to imazethapyr and chlorimuron. In addition to making root observations, look for stunted shoot growth and interveinal chlorosis or yellowing. Bioassay plants should be grown for 14 to 21 days. The order of crop susceptibility from most to least susceptible to imazaquin, imazethapyr, and chlorimuron is as follows:

Imazaquin:

Canola > Alfalfa = Corn = Sunflower >
Sorghum > Oats > Wheat > Soybean

Imazethapyr:

Canola > Sorghum > Sunflower >
Oats > Wheat > Corn > Alfalfa > Soybean

Chlorimuron:

Canola > Alfalfa > Sunflower >
Sorghum > Corn > Oats > Wheat > Soybean

Introduction and commercialization of Clearfield (CF) corn hybrids resistant to the imidazolinone herbicides provide producers with a viable option for corn production in fields suspected of having soil-residue levels (carryover) of imidazolinone herbicides high enough to cause injury to conventional hybrids. If bioassay results show residue levels of imidazolinone herbicides are high enough to cause potential injury to conventional hybrids, you may wish to consider planting a Clearfield hybrid if corn is the rotational crop of choice.

Command (Clomazone) Residues

Clomazone, the active ingredient in Command and Command Xtra, inhibits the production of photosynthetic pigments in susceptible plants, causing them to emerge lacking green color (that is, they are white, or albino). Lower levels of Command residue may appear as a chlorosis or mild bleaching of the plants. Oats or wheat can be used to detect Command residues using the same procedure as was outlined for detecting triazine residues. Bioassay plants should be grown for 10 days to 2 weeks. Susceptible plants that are exposed to significant levels of Command residues will be white, while untreated or tolerant plants will be green. Keep in mind that oats and wheat are usually more susceptible than corn to injury from Command. The order of susceptibility from most to least susceptible to Command residues is as follows:

Oats = Wheat = Alfalfa > Sunflower =
Sorghum = Corn > Soybean

Other Residues

Bioassays may be made for other herbicides using similar techniques. If the site of action of a specific herbicide is known, then a procedure for detecting the herbicide can be developed. For example, if the herbicide is a root meristematic inhibitor (that is, if it stops cell division in the roots), then a root bioassay is the appropriate test. If the herbicide inhibits photosynthesis, then injury symptoms first appear in the leaves. Choose a species that is moderately susceptible to the suspected herbicide, and always include a check soil. Wheat and oats are very good indicator plants for many herbicides but may be more sensitive than the desired crop. Include several species in the bioassay to give a better range of susceptibility. The desired rotational crop is a good bioassay plant to include.

Laboratory Analysis

Laboratory analysis involves extracting herbicide from the soil with the use of specialized equipment to detect very small amounts. The amount is expressed in parts of herbicide per million parts of soil (ppm). This measurement can be transposed into pounds of herbicide active ingredient per acre (lb a.i./A) if we assume that an acre of soil weighs 1 million pounds in the top 3 inches and 2 million pounds in the top 6 inches. For a soil sample taken to a 3-inch depth, 1 ppm = 1 lb/A of residue. For a soil sample taken to a 6-inch depth, 1 ppm = 2 lb/A of residue. A lab report of 0.2 ppm atrazine, then, means that there is 0.2 pound of atrazine per acre if the samples were taken to a 3-inch depth, and 0.4 pound per acre if taken to a 6-inch depth.

The location and concentration of the chemical depend on the herbicide used, the soil type, whether the ground was tilled, and the amount of rainfall since application. In most medium-textured soils (silt loams, silty clay loams, sandy clay loams), the herbicide remains primarily in the top 3 inches unless there was excessive rainfall, the ground was plowed, or the herbicide was deeply incorporated. If the soil has a high sand content (coarse texture), then herbicide leaching may be greater. Movement of the herbicide from the surface soil zone by tillage or by rainfall decreases the likelihood of crop injury. The risk of injury is greater when the herbicide residue is concentrated in the top 3 inches rather than distributed throughout a 6-inch soil depth. Therefore, it is best to sample the 0-to-3-inch and 3-to-6-inch sections separately. Whether parts per million or pounds of active ingredient of herbicide per acre is used, it is difficult to

translate these units of measure into potential crop injury.

Many variables affect crop susceptibility or tolerance, including soil type, crop sensitivity, and environmental conditions after planting. Crop injury is more likely on more coarsely textured soils or under cool, wet weather conditions. Additionally, high soil pH increases the potential of triazine or chlorimuron injury. General guidelines are provided in Table 1, although you are cautioned that crop injury may still occur below these levels.

Laboratories may differ in available tests and in the prices for analysis. The cost can range from \$20 to \$200 per sample for herbicide analysis. Most laboratories can analyze a sample and have the results in 5 to 7 days. Contact your local Extension office for more information on laboratory selection.

Correcting for Herbicide Residues

If the lab test or bioassay indicates a potential herbicide-residue problem, several steps can be taken.

1. First select a tolerant crop or variety. This selection

depends on what herbicide is of concern. Check current herbicide labels for more information on crop tolerance.

2. Tillage can help dilute herbicide in a problem field.

3. Plant the field that concerns you last. Delaying planting allows more time for the herbicide to dissipate.

4. If the triazine herbicides or chlorimuron is suspect, be sure to check the soil pH and adjust your management practices accordingly.

5. If imazaquin or imazethapyr is suspect, check for low soil pH (<5.5). Liming would both benefit crop growth and minimize carryover of these herbicides. In summary, a bioassay or laboratory test is not 100 percent accurate in predicting herbicide-residue problems. Crop response to herbicide residue depends on various factors, including species and variety, soil type, and environmental conditions after planting. So, predicting crop injury is often difficult. However, using a soil chemical test or bioassay can help in deciding whether a potential problem exists and in choosing the appropriate crop or variety.

Table 1. General guidelines for interpreting laboratory analysis

Herbicide	Safe level*		
	Parts per billion	Parts per million	Crop
Triazine	150–250	0.150–0.250	Soybean
	40–100	0.04–0.100	Alfalfa
	60–150	0.06–0.150	Oats
	75–180	0.075–0.180	Wheat
Dinitroaniline	100–200	0.100–0.200	Corn
	200–300	0.200–0.300	Wheat
Clomazone	50–200	0.050–0.200	Corn
	15–100	0.015–0.100	Wheat, alfalfa
Imazaquin	2–10	0.002–0.010	Corn
	10–30	0.010–0.030	Wheat
Imazethapyr	10–30	0.010–0.030	Corn
	4–15	0.004–0.015	Sorghum
Chlorimuron	1–2	0.001–0.002	Corn
	2–5	0.002–0.005	Wheat

*Due to differences in herbicide availability from the soil, “safe” values for herbicide residues differ according to soil type. Low-range values are for coarsely textured soils with low levels of organic matter; higher-range values are for finely textured soils with higher levels of organic matter. 1 ppm = 1,000 ppb.

Authors

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Exhibit 8. Corn Moisture Adjustment Factor Table

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Whole Moisture Percent	Tenths of Percent - Moisture									
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
15	1.0000	0.9988	0.9976	0.9964	0.9952	0.9940	0.9928	0.9916	0.9904	0.9892
16	0.9880	0.9868	0.9856	0.9844	0.9832	0.9820	0.9808	0.9796	0.9784	0.9772
17	0.9760	0.9748	0.9736	0.9724	0.9712	0.9700	0.9688	0.9676	0.9664	0.9652
18	0.9640	0.9628	0.9616	0.9604	0.9592	0.9580	0.9568	0.9556	0.9544	0.9532
19	0.9520	0.9508	0.9496	0.9484	0.9472	0.9460	0.9448	0.9436	0.9424	0.9412
20	0.9400	0.9388	0.9376	0.9364	0.9352	0.9340	0.9328	0.9316	0.9304	0.9292
21	0.9280	0.9268	0.9256	0.9244	0.9232	0.9220	0.9208	0.9196	0.9184	0.9172
22	0.9160	0.9148	0.9136	0.9124	0.9112	0.9100	0.9088	0.9076	0.9064	0.9052
23	0.9040	0.9028	0.9016	0.9004	0.8992	0.8980	0.8968	0.8956	0.8944	0.8932
24	0.8920	0.8908	0.8896	0.8884	0.8872	0.8860	0.8848	0.8836	0.8824	0.8812
25	0.8800	0.8788	0.8776	0.8764	0.8752	0.8740	0.8728	0.8716	0.8704	0.8692
26	0.8680	0.8668	0.8656	0.8644	0.8632	0.8620	0.8608	0.8596	0.8584	0.8572
27	0.8560	0.8548	0.8536	0.8524	0.8512	0.8500	0.8488	0.8476	0.8464	0.8452
28	0.8440	0.8428	0.8416	0.8404	0.8392	0.8380	0.8368	0.8356	0.8344	0.8332
29	0.8320	0.8308	0.8296	0.8284	0.8272	0.8260	0.8248	0.8236	0.8224	0.8212
30	0.8200	0.8180	0.8160	0.8140	0.8120	0.8100	0.8080	0.8060	0.8040	0.8020
31	0.8000	0.7980	0.7960	0.7940	0.7920	0.7900	0.7880	0.7860	0.7840	0.7820
32	0.7800	0.7780	0.7760	0.7740	0.7720	0.7700	0.7680	0.7660	0.7640	0.7620
33	0.7600	0.7580	0.7560	0.7540	0.7520	0.7500	0.7480	0.7460	0.7440	0.7420
34	0.7400	0.7380	0.7360	0.7340	0.7320	0.7300	0.7280	0.7260	0.7240	0.7220
35	0.7200	0.7180	0.7160	0.7140	0.7120	0.7100	0.7080	0.7060	0.7040	0.7020
36	0.7000	0.6980	0.6960	0.6940	0.6920	0.6900	0.6880	0.6860	0.6840	0.6820
37	0.6800	0.6780	0.6760	0.6740	0.6720	0.6700	0.6680	0.6660	0.6640	0.6620
38	0.6600	0.6580	0.6560	0.6540	0.6520	0.6500	0.6480	0.6460	0.6440	0.6420
39	0.6400	0.6380	0.6360	0.6340	0.6320	0.6300	0.6280	0.6260	0.6240	0.6220
40	0.6200	0.6180	0.6160	0.6140	0.6120	0.6100	0.6080	0.6060	0.6040	0.6020

Exhibit 9. Notice of Damage or Loss Notice of Damage or Loss for Nutrient BMP Endorsement

1. Policy Number:			2. Claim Number: (Company Use)		
3. Insured's Name:		4. Agent Name:		5. Insurer Name:	
6. Street Address:		7. Street Address		8. Street Address:	
9. City:	State:	ZIP:	10. City:	State:	ZIP:
12. Phone:		13. Phone:		14. Phone:	
15. Best time to contact insured:		16. Agency Name:		17. Crop:	
18. Insured's Intention: Check One <input type="checkbox"/> To harvest <input type="checkbox"/> To chop/silage <input type="checkbox"/> Leave for cover <input type="checkbox"/> Replant <input type="checkbox"/> Destroy <input type="checkbox"/> Pasture <input type="checkbox"/> Hay <input type="checkbox"/> Crop will be direct marketed <input type="checkbox"/> Other (explain)					
19. Check One: <input type="checkbox"/> This is notice of damage only (appears that production will exceed the guarantee at this time) <input type="checkbox"/> This is a notice of a probable loss <input type="checkbox"/> Immediate inspection is requested. If checked, explain why.					
20. Is insured an agent, employee or contractor affiliated with multi-peril crop insurance? <input type="checkbox"/> Yes <input type="checkbox"/> No					
21. Insured's Signature:				22. Date:	
Note: Refer to the Basic Provisions, Coarse Grains Crop Provisions and the Endorsement Provisions for more details on notice of damage or loss requirements.					
23. If you have less than 100% share, is the other share insured under a multi-peril crop insurance program? If so, list the person's name, name of insurance company for which they carry multi-peril crop insurance and policy number if known. (See reverse for additional space.)					
Name		Insurance Company		Policy Number	

Insured Acres Information (see next page additional space)

24 Management Unit	25 Unit No.	26 Sec. No.	TWP	Range	27 State	28 Cty.	29 Estimated Production	30 Cause of Damage	31 Date of Damage	32 Insured Acres		33 Expected Harvest Date
										Whole	10ths	

"See reverse side of form for statement required by Privacy Act of 1974."

(Reverse)

(Cont.) Additional person with a share insured under an MPCPI program.		
Name	Insurance Company	Policy Number

Collection of Information and Data (Privacy Act)

The following statements are made in accordance with the Privacy Act of 1974, as amended (5 U.S.C. 552a and section 502(c) of the Federal Crop Insurance Act (7 U.S.C. 1502(c)). The authority for requesting information to be furnished on this form is the Federal Crop Insurance Act, (7 U.S.C. 1501 et seq.) and the Federal crop insurance regulations contained in 7 C.F.R. chapter IV. Collection of the social security account number (SSN) or the employer identification number (EIN) is authorized by section 506 of the Federal Crop Insurance Act (7 U.S.C. 1506), and is required as a condition of eligibility for participation in the Federal crop insurance program. The primary use of the SSN or EIN is to correctly identify you, and any other person with an interest in you or your entity of 10 percent or more, as a policyholder within the systems maintained by the Risk Management Agency (RMA). Furnishing the SSN or EIN is voluntary. However, failure to furnish that number will result in denial of program participation and benefits.

The balance of the information requested is necessary for the insurance company, RMA, and the Farm Service Agency to process this form to: provide insurance; provide reinsurance; determine eligibility; determine the correct parties to the agreement; determine premiums or other monetary amounts; pay benefits and insure compliance with all program requirements. The information furnished on this form will be used by Federal agencies, RMA and Farm Service Agency employees, insurance companies, and contractors who require such information in performance of their duties. The information may be furnished to: RMA contract agencies within the United States Department of Agriculture; the Department of Treasury, including the Internal Revenue Service; the Department of Justice, or other Federal or State law enforcement or regulatory agencies; credit reporting agencies and collection agencies; other Federal agencies as requested in computer matching programs; and in response to judicial orders in the course of litigation. The information may also be furnished to congressional representatives and senators making inquiries on your behalf. Furnishing the information required by this form is voluntary; however, failure to report the correct and complete information requested may result in rejection of this form; rejection of any claim for indemnity; ineligibility for insurance; and a unilateral determination of any monetary amounts due and the imposition of administrative, civil, or criminal sanctions.

Insured Acres Information (cont.)

Management Unit	Unit No.	Sec. No.	TWP	Range	State	City.	Estimated Production	Cause of Damage	Date of Damage	Insured Acres		Expected Harvest Date
										Whole	10ths	

Notice of Damage or Loss Form Instructions

1. **Policy Number:** Enter the insured's policy number.
2. **Claim Number:** Insurance provider will enter the number assigned to the claim.
3. **Insured's Name:** Enter the insured's name.
4. **Agent Name:** Enter the insurance agent's name.
5. **Insurer Name:** Enter the insurer's name.
6. **Street Address:** Enter the insured's street or mailing address.
7. **Street Address:** Enter the agent's street or mailing address.
8. **Street Address:** Enter the insurer's street or mailing address.
9. **City, State, ZIP:** Enter the insured's city, state and zip code.
10. **City, State, ZIP:** Enter the agent's city, state and zip code.
11. **City, State, ZIP:** Enter the insurer's city, state and zip code.
12. **Phone:** Enter the phone number of the insured.
13. **Phone:** Enter the phone number of the agent.
14. **Phone:** Enter the phone number of the insurer.
15. **Best time to contact insured:** Enter the time to best reach the insured.
16. **Agency Name:** Enter the insurance agency's name.
17. **Crop Insured:** Enter name of crop, e.g., corn.
18. **Insured's Intention:** Check the box that best describes what the insured plans to do with the crop. If other is checked, please explain what the insured plans to do with the crop.
19. **Check One:** Check the box that appropriately describes the damage or loss to the crop. If immediate inspection is requested please explain why.
20. Check "Yes" if insured is an agent, employee or a contractor affiliated with multi-peril crop insurance. If not, check "No."
21. **Insured's Signature:** Insured signs here.
22. **Date:** Date of insured's signature.
23. If another person has a share in the crop, list the person's name, name of insurance company for which they carry multi-peril crop insurance and policy number if known.
24. **Management Unit:** Enter the insured management unit.
25. **Unit Number:** Enter the unit number in which the management unit is located.
26. **Legal Description:** Section number (Sec. No.), township (TWP), range for the location of the unit.

27. **State:** Enter the state where the management unit is located.
28. **Cty:** Enter the county where the management unit is located.
29. **Estimated Production:** Enter the estimated production of the endorsement management unit.
30. **Cause of Damage:** Enter the cause of damage.
31. **Date of Damage:** Enter the date of damage.
32. **Insured Acres** Enter the acres insured to tenths of an acre.
33. **Expected Harvest Date:** Enter the date the insured expects to harvest the crop.

Exhibit 10. Appraisal Worksheet Nutrient BMP Endorsement Appraisal Worksheet

Company			1. Insured's Name			2. Policy Number			3. Unit Number			7. Type of Appraisal Weigh wagon – ww Portable scales – ps Stationary scales – ss			
3a. Claim Number			4. Crop CORN GRAIN			5. Crop Year			6. FSA Farm Number						
8	9	10	11	12	13	14	15	16	17	18	19a	20	21		
											19b				
Management Unit	Acres	Type of Appraisal	Strip Appraised	Harvested Strip					Grain Gross Weight	Bushel WT Factor	Moisture % ----- Factor	Adjusted Grain Production (bushels)	Per Acre Yield (bushels)		
				Width	Length	Total Area	Acre Factor	Total Acres							
			Check Strip				43,560			56	-----				
			BMP Strip				43,560			56	-----				
Management Unit	Acres	Type of Appraisal	Strip Appraised	Harvested Strip					Grain Gross Weight	Bushel WT Factor	Moisture % ----- Factor	Adjusted Grain Production (bushels)	Per Acre Yield (bushels)		
				Width	Length	Total Area	Acre Factor	Total Acres							
			Check Strip				43,560			56	-----				
			BMP Strip				43,560			56	-----				
22. Remarks:															
23. Review of Appraisal (Check One): <input type="checkbox"/> The remaining production in the check strip and the adjacent BMP area shall not be harvested or destroyed until the earlier of our adjustment review or 15 days after the initial adjustment. <input type="checkbox"/> The remaining production has been released for harvest.															
24. Insured's Signature:							Date:			25. Code Number and Adjuster's Signature				Date:	

Indemnity Calculation

26. Management Unit	27. Check Strip Yield	28. BMP Strip Per Acre Yield	29. Insured Acres	30. Price Election	31. Share	32. Total Indemnity

NUTRIENT BMP ENDORSEMENT APPRAISAL WORKSHEET INSTRUCTIONS

Complete HEADING items 1 through 7, PART I items 8 through 21, and Part II items 22 and 23.

Verify or make the following entries:

Standard Items	Information Required
1 Insured's Name	Name of the insured that identifies EXACTLY the person (legal entity) to whom the policy is issued.
2 Policy Number	Insured's policy number assigned by the insurer.
3 Unit Number	Five-digit (e.g., 00100) unit number from the acreage report.
3a Claim Number	Enter claim number assigned by the insurer.
4 Crop Name	"CORN GRAIN" has been entered.
5 Crop Year	Crop year, as defined in the policy, for which the claim has been filed.
6 FSA Farm Number	Farm Service Agency Farm Serial Number.
7 Type of Appraisal	Appraisal method to be entered in item 10. See Nutrient BMP Endorsement Loss Adjustment Handbook for other adjustment options.

PART I - WEIGH METHOD

Use this method for corn for grain **only after grain is physiologically mature**.

Verify or make the following entries:

Standard Items	Information Required
8 Management Unit	Producer management unit identification symbol used on the initial application for coverage under the endorsement.
9 Acres	Number of acres in the management unit (item 8), to tenths.
10 Type of Appraisal	Enter the appraisal method code (ww, ps, ss).
11 Strip	Check strip and BMP strip have been entered.
12 Width	Enter width of harvested check strip and BMP strip in feet.
13 Length	Enter length of harvested check strip and BMP strip in feet.
14 Total Area	Result of multiplying strip width (item 12) by strip length (item 13), in square feet rounded to tenths.
15 Acre Factor	Area (43,560 square feet) of one acre has been entered.
16 Total Acres	Result of dividing harvest strip total area (item 14) by the acre factor (item 15), rounded to tenths.
17 Grain Gross Weight	Weight of harvested grain from each harvested strip.
18 Bushel WT Factor	Pounds in one bushel of corn (56) have been entered.

19a	Moisture	Moisture percentage if in excess of 15 (through 40 percent), rounded to tenths.
19b	Moisture Factor	If grain moisture is more than 15 percent enter the four-decimal-place factor from the Corn Moisture Adjustment Table in the Loss Adjustment Handbook corresponding to the moisture percentage (item 19a).
20	Adjusted Grain Production	Result of dividing grain gross weight (item 17) by the bushel weight factor (item 18) and multiplying the result by the moisture factor (item 19b).
21	Per Acre Yield	Result of dividing the adjusted grain production (item 20) by the harvested strip total acres (item 16), rounded to tenths.
22	Remarks:	Enter pertinent information about the appraisal. Include any appropriate calculations. Attach a Special Report when more space is needed.

PART II - Signatures

BEFORE obtaining insured's signature, REVIEW ALL ENTRIES on the appraisal worksheet WITH THE INSURED, particularly explaining codes, etc., which may not be readily understood.

23	Review of Appraisal	If appraisal is selected by the insurer for review, the Insured must refrain from harvesting or destroying crop until the earlier of the adjustment review or 15 days after the initial adjustment.
24	Insured's Signature	Insured's (or insured's authorized representative's) signature and date signed.
25	Adjuster's Code Number, Signature, and Date	Signature of adjuster, adjuster's code number and date signed after the insured (or insured's authorized representative) has signed. If the appraisal is performed prior to signature date, document the date of appraisal in the Remarks/Narrative section of the Appraisal Worksheet (if available).

Part III – Indemnity Calculation

26	Management Unit	Producer management unit identification symbol used on the initial application for coverage under the endorsement.
27	Check Strip Yield	Enter the check strip per acre yield.
28	BMP Strip Per Acre Yield	Enter the BMP strip per acre yield.
29	Insured Acres	Number of insured acres in the management unit (item 9).
30	Price Election	Enter the MPCl price election for the crop year.
31	Share	Enter the insured's share of the crop in the management unit.
32	Total Indemnity	The total indemnity is equal to the difference between the check strip yield multiplied by 0.95 and the BMP strip yield multiplied by insured acres multiplied by the price election multiplied by the insured's share.

Exhibit 11. Adjustment Check Sheet

When the adjuster arrives at the insured acres, he or she should immediately check the field for the following visual indications of potential fraud or mismanagement:

A. Is there lodging of corn or broken corn stalks in the management unit? Yes No

1. If yes, is the lodging or broken stalks distributed equally across the management unit?
 Yes No

(a) If no, check the box(es) for the area(s) where the lodging or broken stalks are located*.
 Check strip
 BMP strips
 Remainder of the management unit

* Having only one or two boxes of the three boxes checked is an indication of potential mismanagement for insect pests and may warrant additional investigation. See *Protocols for Identifying Intentional Mismanagement* in the Loss Adjustment Handbook for additional information.

B. Are there stunted plants, yellow leaves (chlorosis) or firing (dead or dying leaves) in the management unit? Yes No

1. If yes, are the affected plants distributed equally across the management unit?
 Yes No

(a) If no, check the box(es) for the area(s) where the affected plants are located*.
 Check strip
 BMP strips
 Remainder of the management unit

* Having only one or two boxes of the three boxes checked is an indication of potential mismanagement for nitrogen and may warrant additional investigation. See *Protocols for Identifying Intentional Mismanagement* in the Loss Adjustment Handbook for additional information.

C. Is there heavy weed pressure in the management unit? Yes No

1. If yes, is the weed pressure distributed equally across the management unit?
 Yes No

(a) If no, check the box(es) for the area(s) where the heavy weed pressure is concentrated.
 Check strip
 BMP strips
 Remainder of the management unit

* Having only one or two boxes of the three boxes checked is an indication of potential mismanagement for weeds and may warrant additional investigation. See *Protocols for Identifying Intentional Mismanagement* in the Loss Adjustment Handbook for additional information.