

**WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005**

Adopted for use for certification by Protected Harvest

Date of Inspection:

Farm:

Variety / Acres:

Please answer the following for the field which you are certifying.

Refer to the *BioIPM Potato Workbook* for additional information and clarification.

Variety Designation\*:

**Short season (SS)** = less than 90 days from emergence to final vinekill

**Long season (LS)** = 90 days or more from emergence to final vinekill

\* exceptions may apply due to extenuating circumstances

Specify emergence date: \_\_\_\_\_

Specify final vinekill date: \_\_\_\_\_

If necessary, explain short or long season designation:

**Scouting Section**

**1A** What method of scouting did you most commonly use?

*(check only one)*

- Informal observations during routine farming operations (e.g., while spraying or while going out to check irrigation equipment). = 0 point
- Informal observations of what was happening on the edge of the field. = 1 point
- Crop scouts focused mostly on looking for potential hot spots and spot-checking where problems have occurred in the past. = 3 points
- Crop scouts followed specific patterns along pivot irrigation tracks, along field borders and in the interior of the field. = 5 points

point total for question 1A  
possible range 0-5  
**If 0, then stop here.**

**1B** Whose scouting data did you primarily use to make management decisions for this field?

*(check only one)*

- Independent Crop Consultant = 5 points
- IPM Trained Farm Employee = 4 points
- Farm Owner/Manager = 4 points
- Farm Employee = 2 points
- Farm Dealer/Co-op = 1 point

point total for question 1B  
possible range 1-5

**1C Bonus:** If additional scouting data was taken, who provided these data?

*(check only one)*

- Independent Crop Consultant = 5 points
- IPM Trained Farm Employee = 4 points
- Farm Owner/Manager = 4 points
- Farm Employee = 2 points
- Farm Dealer/Co-op = 1 point
- No One = 0 points

point total for **bonus** question 1C  
possible range 0-5

## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

**1D** How many scouting trips were made during each of the following stages of plant growth in this field? (enter number of trips on all that apply)

- Planting to emergence = 1 point per trip
- Emergence to tuber initiation = 2 points per trip
- Tuber initiation to full canopy = 3 points per trip
- Full canopy to when vines go down = 3 points per trip
- Vines down to vine kill = 2 points per trip
- At harvest = 1 point per trip

point total for question 1D  
possible range:  
1-30 for long season crop  
1-20 for short season crop

**1E** Why did you scout?

*(check as many that apply)*

- To determine when levels of a pest in a field reached or exceeded thresholds. = 2 points
- To reduce the amount of pesticides you used in order to minimize environmental impact. = 2 points
- To check on the effectiveness of a pest control measure you took. = 1 point
- In response to a local or recent pest report you heard or read about. = 1 point
- To monitor areas of the fields where you knew pests were already a problem. = 1 point

point total for question 1E  
possible range 1-7

**1F** Which of the following best represents how you or your farm manager kept track of the scouting information collected on this field?

*(check only one)*

- No written or electronic records were kept of scouting reports on this field. = 0 points
- Written records were kept in a file. = 1 point
- Written records were kept in a file so we could track changes in pest pressure over time for this field. = 2 point
- Either my scout or I analyzed scouting records by moving them onto a field map so we could more effectively identify "hot spots" and observe general patterns of change across time within the field. = 4 points

point total for question 1F  
possible range 0-4  
**If 0, then stop here.**

# WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

**1G Bonus:** Did you use computer generated geo-referenced images of pest populations to identify "hot spots" within fields to keep on file for long term comparisons of pest populations?  
*(check only one)*

- Yes = 5 points
- No = 0 points

point total for question 1G  
possible range 0 or 5

**Scouting Section Total =**

LS possible points: **51 + (10) = 61, if less than 25 points, stop here.**  
 SS possible points: **41 +(10) = 51, if less than 20 points, stop here.**

## Information Sources Section

**2A** Do you have access to weather data for the field of which you are certifying (e.g. pest alerts, insight report)?  
*(check all that apply)*

- Degree days \_\_\_\_\_ Source = 1 point
- Rainfall \_\_\_\_\_ Source = 1 point
- Severity Values \_\_\_\_\_ Source = 1 points
- P-days \_\_\_\_\_ Source = 1points
- Did not have access to weather data = 0 points

point total for question 2A  
possible range 0-4

**2B** Did you use weather data (e.g. degree days, rainfall, etc.) in your management decision for:  
*(check all that apply)*

- Weeds = 1 point
- Insects = 1 point
- Diseases = 2 points
- Did not use weather data = 0 points

point total for question 2B  
possible range 0-4

**2C** Did you use recommendations from SureHarvest, WISDOM or PCM software for mgmt decisions on:  
*(check all that apply)*

- Weeds = 1 point
- Insects = 1 point
- Diseases = 2 points
- Did not use SureHarvest, WISDOM or PCM = 0 points

point total for question 2C  
possible range 0-4

**WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005**

**2D** Did you attend the potato winter educational meetings?  
*(check only one)*

- Yes, and I incorporated specific practices during the growing season = 3 points

Provide Specific Example \_\_\_\_\_

- Yes = 2 points
- No = 0 points

point total for question 2D  
possible range 0-3

**2E** In the past year, did you or your farm manager attend any university sponsored field days or educational meetings with regards to potato crop management (other than the winter educational meeting)?  
*(check only one)*

- Yes = 1 point for each meeting (maximum of 5 )
- No = 0 points

point total for question 2E  
possible range 0-5

**2F Bonus:** Have you conducted on-farm research in collaboration with the University?  
*(check only one)*

- Yes = 5 points
- No = 0 points

point total for **bonus**  
question 2F  
possible range 0-5

**Information Sources Section Total =**

Possible points: **20 + (5) = 25, if less than 10 points, stop here.**

## Pest Management Decisions

**3A** Did you ever NOT spray to control a pest, even if scouting records indicated that levels of the pest were at or above threshold because:

*(check all that apply)*

- The control period of the pest was nearly over and the cost of making a control measure may have exceeded the amount of return gained by controlling the pest. = 2 points
- You thought that natural control (e.g. beneficial species or weather) would be able to control the pests naturally. = 2 points
- You did not think the pest was damaging the crop. = 2 points
- Not applicable because thresholds were always followed. = 0 points

point total for question 3A  
possible range 0-6

**3B** As a self evaluation, I would characterize my principal or main pest control strategy as:

*(check only one)*

- Cropping system uses primarily multiple, non-chemical practices (e.g., crop rotation, resistant varieties, cultivation, biological control, etc.). If pesticides are used, they are used in response to pest problems diagnosed through scouting. = 5 points
- Cropping system based on a combination of non-chemical practices (e.g., crop rotation, resistant varieties, cultivation, biological control, etc.) and chemical control that is based on scouting. = 3 points
- Cropping system rarely uses non-chemical practices to control pests. Pesticide applications are the primary means to control pests and are based on infrequent scouting. = 1 point
- Pests are controlled largely by pesticide applications based on calendar or stage of plant growth. = 0 points

point total for question 3B  
possible range 0-5  
**If 0, then stop here.**

**3C** Is the person who makes pesticide applications on your farm a certified applicator (can be a private or commercial applicator)?

*(check only one)*

- Yes = 1 point
- No = 0 points

point total for question 3C  
possible range 0 or 1  
**If 0, then stop here.**

# WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

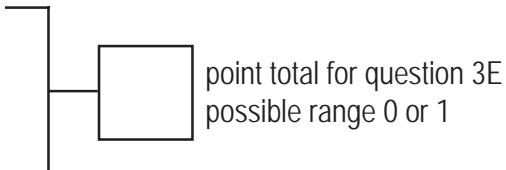
**3D** Is your spray equipment (or the custom applicators' equipment) calibrated before this crop season?  
*(check only one)*

- Yes = 1 point
- No = 0 points



**3E** Do you have and follow a written drift management plan for pesticide applications?  
*(check only one)*

- Yes = 1 point
- No = 0 points



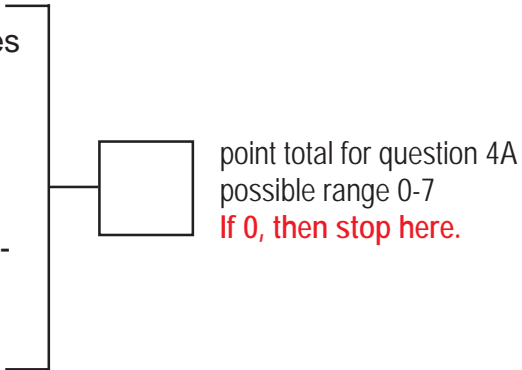
**Pest Management Section Total =**

Possible points: **14**, if less than 6 points, stop here.

## Field Management Decisions

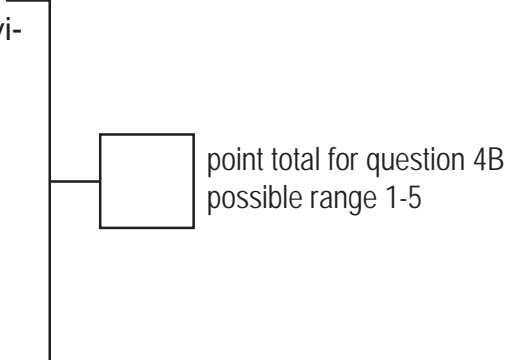
**4A** This field was last planted to potatoes:  
*(check only one)*

- On a four or more year rotation (one year of potatoes and three years of other crops). = 7 points
- On a three year rotation (one year of potatoes and two years of other crops). = 4 points
- On a two year rotation (an alternate planting of potatoes and a non-potato crop). = 1 point
- This field had potatoes last year. = 0 points



**4B** This field was rotated away from other potato fields in order to minimize pest pressures by:  
*(check only one)*

- Large distance (greater than 1/2 mile) between previous and current year's potato fields. = 5 points
- Medium distance (greater than 1/4 mile) between previous and current year's potato fields. = 3 points
- Short distance (less than 1/4 mile or adjacent to previous year's potatoes) . = 1 point



# WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

**4C** Did you plant certified seed?  
(check only one)

- Yes = 3 points
- No = 0 points

point total for question 4C  
 possible range 0 or 3  
**If 0, then stop here.**

**4D Bonus:** Did you consult your certified seed grower to determine growing conditions and/or disease concerns?  
(check only one)

- Yes = 3 points
- No = 0 points

point total for **bonus**  
 question 4D  
 possible range 0 or 3

**4E** How many times were aerial photos (e.g. remote sensing) used during the growing season?  
(check only one)

- Weekly = 3 points
- Twice per month = 2 points
- One to two times per growing season = 1 point
- Never = 0 points

point total for question 4E  
 possible range 0-3

**4F Bonus:** Did you use any other types of remote sensing (e.g. satellite images) on this field?  
(check only one)

- Yes = 5 points
- Specify \_\_\_\_\_
- No = 0 points

point total for **bonus**  
 question 4F  
 possible range 0 or 5

**4G** Did you implement any practice to enhance wildlife or general biodiversity in and/or around your farm and/or privately owned lands (e.g. buffer zones, windbreaks, planting of corners for food and habitat, lupines)?  
(check all that apply)

- Use of buffer zones. = 2 points
- Use of windbreaks. = 2 points
- Planting of corners for food and habitat. = 2 points
- Planting lupens for wildlife enhancement (e.g. Karner Blue Butterfly). = 2 points
- Use of CRP land = 2 points
- Other (please describe). = 2 points
- Did not implement wildlife enhancement practices. = 0 points

point total for question 4G  
 possible range 0-12

# WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

**4H** Did you harvest when soil/tuber temperatures were above 45 degrees Fahrenheit (F) but below 65 degrees F ?  
*(check only one)*

- Yes = 3 points
- No = 0 points



**4I** Did you NOT store injured, diseased, or immature potatoes?  
*(check only one)*

- Yes = 2 points
- No = 0 points



**Field Management Section Total =**

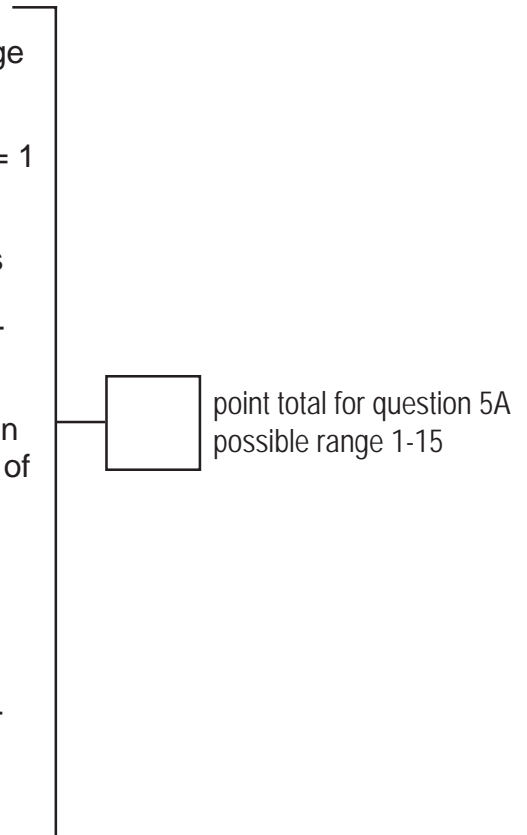
Possible points: **35 + (8) = 43, if less than 14 points, stop here.**

---

## Weed Management Section

**5A** Which of the following practices did you do **prior** to the growing season:  
*(check all that apply)*

- Plant a cover crop last fall, at least in part, to manage weeds. = 2 points
- Clean plow the field in the spring to control weeds. = 1 point
- Till after harvest last fall to control weeds. = 2 points
- Spot spray herbicides to control weeds before planting. = 2 points
- Use mowing or tillage equipment to control weeds on the field edges or adjacent areas to reduce the chance of weeds migrating on this field. = 2 points
- Select herbicide chemistries in rotational crops to avoid potential resistance in potatoes. = 3 points
- Did you control a known problem weed in previous years crops (e.g. did you control nightshade in the rotational crops?). = 3 points



**WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005**

**5B** Which of the following practices were used **during** this growing season:  
(check all that apply)

- Scout potatoes for weeds shortly after emergence in a systematic pattern and continued each week until control options were no longer available. = 2 points
- Keep field records for long-term comparisons based on weed density and species. = 2 points
- Clean machinery when moving from field to field, to lessen the chance of spreading weeds. = 1 point
- Use a pre-emergence drag-off. = 1 point
- Propane torch between rows of potatoes to reduce weed pressure. = 1 point
- Manage planting density and timing of planting of the potato seed so weeds were suppressed by the early closing of the crop canopy. = 3 points
- Use application rates below maximum labeled rates followed by scouting as a weed management practice. = 2 points
- Spot spray or cultivate for weeds if scouting reports indicated that there was a weedy spot within the field. = 3 points
- Use mechanical methods (e.g. hilling, cultivations, rotary hoeing, mechanical weeder) for weed management. = 3 points

point total for question 5B  
possible range 1-18

**5C Bonus:** Did you interplant smother crops with potatoes for weed control?  
(check only one)

- Yes = 5 points What Smother Crop(s) \_\_\_\_\_
- No = 0 points

point total for **bonus** question 5C  
possible range 0 or 5

**Weed Management Section Total =**

Possible points: 33 + (5) = 38 , if less than 15 points, stop here.

## Insect Management Section

**6A** Which of the following practices did you use to manage insects **prior to planting** this year's crop?

*(check all that apply)*

- Culturally manage a potato insect pest (e.g. wire-worm, European corn borer) in the crop planted prior to potatoes in this field. = 1 point
- Select resistant or tolerant varieties. = 1 point
- Avoid planting potatoes on fields adjacent to previous year's potatoes. = 3 points
- Avoid using similar chemical control tactics (e.g. systemics) on fields adjacent to the previous year's potatoes for a resistance management practice. = 2 points

point total for question 6A  
possible range 1-7

**6B Bonus:** Did you release beneficial insects in the area of this field during the **previous 2** years?

*(check only one)*

- Yes = 5 points Beneficial \_\_\_\_\_ for Pest \_\_\_\_\_
- No = 0 points

point total for **bonus**  
question 6B  
possible range 0 or 5

**6C** Which of the following practices did you use to manage insects **during the growing season:**

*(check all that apply)*

- Adjust the planting date of the potatoes on this field in order to avoid insect problems. = 2 points
- Select an insecticide based on preserving natural enemies. = 3 points
- Manage the health of the crop to enhance its ability to withstand a degree of pest pressure. = 1 point
- Plant trap crops (e.g. field edges) or use physical barriers (e.g., plastic-lined trenches) along field borders to slow the migration of Colorado potato beetles into this field. = 3 points
- Use a fall trap crop (e.g. a strip of potatoes that are not vinekilled) to concentrate beetles for more efficient control of overwintering beetles. = 3 points
- Avoid spraying for insects just before vinekill or harvest. = 1 point

see following page for  
more answers and total  
box

## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

Scout potatoes for insect pests at least weekly throughout the growing season in a systematic pattern. = 2 points

Keep field records on the density of each insect pest for long-term comparisons. = 2 points

Rotate chemistry families of insecticides specifically to avoid the emergence of resistance. = 3 points

● see previous page for more answers

point total for question 6C  
possible range 1-20

**6D Bonus:** Did you manage or enhance the habitat in or around the field to enhance populations of beneficial insects?

*(check only one)*

Yes = 5 points

No = 0 points

point total for **bonus**  
question 6D  
possible range 0 or 5

**6E Bonus:** Did you release beneficial insects in this field during this growing season?

*(check only one)*

Yes = 5 points

Beneficial \_\_\_\_\_ for Pest \_\_\_\_\_

No = 0 points

point total for **bonus**  
question 6E  
possible range 0 or 5

**6F** Which of the following practices were used as Colorado potato beetle controls?

*(check all that apply)*

Maps of Colorado potato beetle overwintering sites were developed so that in subsequent years potatoes can be planted as far as possible from these sites. = 3 points

Colorado potato beetles were scouted using plant counts to determine the number of adults and larvae during growing season. = 1 point

Colorado potato beetle control was targeted at first generation larvae which are predicted using heat unit accumulations (e.g. SureHarvest) and treated when 2nd instar larvae were present at damaging levels (confirmed by scouting). = 3 points

Spot treatments for Colorado potato beetles were used when infestations were localized on field edges. = 2 points

point total for question 6F  
possible range 1-9

**WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005**

**6G** Which of the following practices were used as potato leafhopper controls?  
*(check all that apply)*

- Potato leafhopper adults were scouted using sweep nets. = 1 point
- Potato leafhopper nymphs were scouted using leaf counts. = 1 point
- The potential for leafhopper migrations from adjacent fields (e.g. alfalfa) was considered in management decisions. = 2 points
- Economic thresholds were used in making pest management decisions for potato leafhopper. = 2 points
- Potato leafhoppers were not controlled = 0 points

point total for question 6G  
possible range 0-6

**6H** Which of the following practices were used for aphid control?  
*(check all that apply)*

- Aphid populations were scouted using leaf samples. = 2 points
- Beneficial populations (predators, parasitoids) were incorporated into treatment decisions for aphids. = 3 points
- Economic thresholds were used in making pest management decisions for aphids. = 2 points
- Aphids were not controlled = 0 points

point total for question 6H  
possible range 0-7

**Insect Management Section Total =**

Possible points: 49 + (15) = 64, **if less than 20 points, stop here.**

## Disease Management Section

**7A** Which of the following practices did you use **prior to planting this year's potato crop** to lower the potential for potato disease in the field?

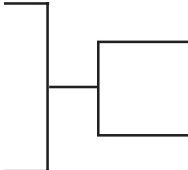
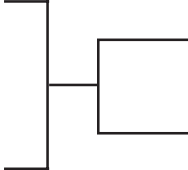
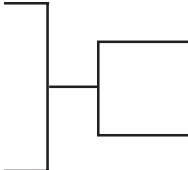
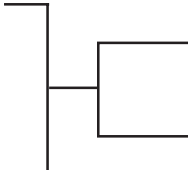
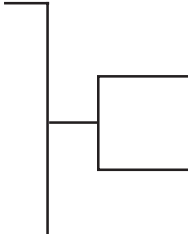
*(check all that apply)*

- Remove and/or bury cull piles (e.g remnants of last year's crop, waste from cutting, waste from storage) prior to emergence to prevent the spread of disease. = 2 points
  - Remove vines from potato fields soon after harvest last fall. = 2 points
  - Avoid planting potatoes on fields adjacent to previous year's potatoes. = 1 points
  - Change the crop rotation on this field to lower the probability of certain soil-borne diseases occurring (e.g plant a crop that decreases nemetode populations). = 3 points
  - Adjust planting dates for potatoes on this field in order to avoid disease problems. = 2 points
  - Manage cut seed by carefully handling and wound healing (e.g. forced air and high relative humidity). = 3 points
  - Warm seed to recommended temperatures before cutting and planting. = 2 points
  - Wait until soil temperatures are at least 50 degrees F and increasing before planting the seed. = 2 points
  - Irrigate dry soil prior to planting. = 2 points
  - Select resistant or tolerant varieties for the suppression of plant disease (e.g. plant a scab resistant variety in a field where there has been a history of scab). = 2 points
  - Apply compost or other organic soil amendments (other than green manure) for the suppression of one or more potato diseases. = 2 points
- List amendments \_\_\_\_\_
- Control weed hosts of plant diseases (e.g., hairy nightshade as a host for late blight). = 2 points

If this box is not checked, stop here.

point total for question 7A  
possible range 1-25

## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

- 7B** Did you sample soil for Verticillium propagules and use the verticillium threshold (>10 propagules per cubic centimeter soil when nematodes are not present, >7 propagules when nematodes present) in your management decision?  
(check only one)
- Yes = 2 points
- No = 0 points
- 
 point total for question 7B  
possible range 0 or 2
- 7C** Did you sample soil for plant parasitic nematodes and use the nematode threshold (> 1 nematodes per cubic centimeter soil) in your management decision?  
(check only one)
- Yes = 2 points
- No = 0 points
- 
 point total for question 7C  
possible range 0 or 2
- 7D** **Bonus:** Did you run one or more soil assays, in addition to the standard assays for Verticillium or nematodes, to determine populations of other soil microbes and/or assess soil health?  
(check only one)
- Yes = 5 points
- No = 0 points
- 
 point total for **bonus**  
question 7D  
possible range 0 or 5
- 7E** **Bonus:** Did you grid sample this field for Verticillium and nematodes in order to apply pesticides site specifically?  
(check only one)
- Yes = 5 points
- No = 0 points
- 
 point total for **bonus**  
question 7E  
possible range 0 or 5
- 7F** **Bonus:** Did you plant a cover crop specifically for the suppression of Verticillium or plant parasitic nematodes?  
(check only one)
- Yes = 5 points
- List Cover Crop \_\_\_\_\_
- No = 0 points
- 
 point total for **bonus**  
question 7F  
possible range 0 or 5

## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

**7G** Which of the following practices did you use to control diseases **during the growing season:**  
(check all that apply)

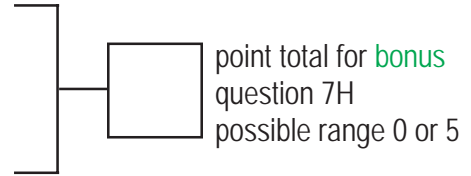
- Continue to eliminate (e.g. bury) cull piles including rock piles with potatoes, scrapings of storage, and cutting remnants on your farm prior to potato emergence. = 2 points
- Adjust equipment to avoid bruising potatoes during planting and harvesting. = 2 points
- Use a cup or air planter at planting to reduce disease spread. = 2 points
- Manage fertility for healthy plants in order to resist disease. = 1 points
- Manage irrigation to minimize conditions favorable to disease. = 3 points
- Monitor plant health and disease spread in the field with aerial monitoring or aerial photography. = 3 points
- Cooperate with neighbors to eliminate cull piles in your local area. = 3 points
- Work with neighboring growers and home gardeners to eliminate late blight sources (e.g. potatoes, tomatoes). = 3 points
- Manage volunteer potatoes in non-potato fields during the growing season. = 2 points
- Scout potatoes for disease weekly in a systematic pattern throughout the growing season. = 2 points
- Utilize disease forecasting models (SureHarvest) to initiate fungicide sprays at 18 severity values for late blight. = 2 points
- Utilize disease forecasting models (SureHarvest) to initiate fungicide sprays at 300 P-days for early blight. = 2 points
- Manage disease until leaves and stems were completely dead. = 2 points
- Keep field records of disease frequency and severity for long-term comparisons. = 2 points
- Rotate chemistry families of fungicides specifically to avoid the emergence of resistance. = 3 points

point total for question 7G  
possible range 1-34

# WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

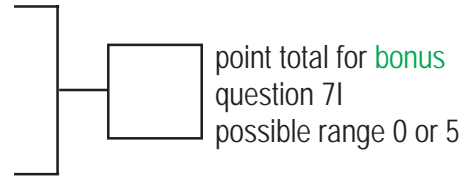
**7H Bonus:** Did you apply an effective biological control agent to reduce the chance of disease?  
*(check only one)*

- Yes = 5 points  
Biocontrol Agent \_\_\_\_\_ For \_\_\_\_\_
- No = 0 points



**7I Bonus:** Did you remove and compost vines from potato fields?  
*(check only one)*

- Yes = 5 points
- No = 0 points



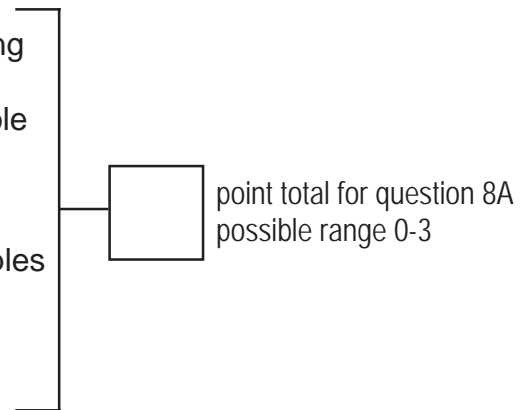
**Disease Management Section Total =**

Possible points: **63 + (25) = 88** , if **less than 30 points, stop here.**

## Soil and Water Quality Section

**8A** Which of the following three options best describes your nitrogen management strategy?  
*(check only one)*

- Nitrogen is applied in multiple applications according to University recommendations. Any nitrogen applied above University recommendations is justified by petiole nitrate samples and/or varietal needs. = 3 points
- Nitrogen is applied in multiple applications with supplemental nitrogen justified by petiole nitrate samples and varietal needs. = 2 points
- Other nitrogen application method. = 0 points



**8B** Did you take soil samples on this field in preparation for this growing season?  
*(check only one)*

- Yes = 2 points
- No = 0 points



## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

**8C** Which of the following four options best describes your irrigation management strategy?  
(check only one)

- Irrigation based on in field scheduling tools (rain gauges, computer programs, SureHarvest, WISDOM, etc.) to reduce risk of leaching pesticides and fertilizer below the root zone while still meeting the water demands of the crop. = 3 points
- Irrigation schedules are adjusted according to transpiration and rainfall rates for the area, but field information is not collected. = 2 points
- Irrigation is based on soil and crop moisture need as determined by farmer without measurement. = 1 point
- Irrigation is based on calendar or pre-determined schedule. = 0 points

point total for question 8C  
possible range 0-3

**8D Bonus:** Are you using practices to prevent or correct hardpan or compaction problems and to improve growth, root development, and efficiency of the crop such as rotations with deep rooted alfalfa?  
(check only one)

- Yes = 3 points  
List Practices \_\_\_\_\_
- No = 0 points

point total for **bonus**  
question 8D  
possible range 0 or 3

**8E** Did you maintain and/or implement any practices to prevent wind erosion (e.g. windbreaks, conservation tillage, cover crops)?  
(check all that apply)

- Use of conservation tillage practices. = 2 points
- Use of existing windbreaks. = 2 points
- Planting a new windbreak. = 2 points
- Planting of cover crops. = 2 points
- Other (please describe). = 2 points
- Did not maintain or implement any practices to prevent wind erosion. = 0 points

point total for question 8E  
possible range 0-10

WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

8F Bonus: Did you use a leaching model (Bland nitrate budget model) to better utilize nutrient use efficiency? (check only one)

- Yes = 3 points
No = 0 points

Point total box for question 8F with possible range 0 or 3.

8G Which of the following practices did you use to build your soil organic matter: (check all that apply)

- Build organic matter by incorporating a cover crop. = 2 points
During the previous fall (post harvest), you incorporated an organic amendment... = 3 points
List Types
This spring, prior to planting you incorporated an organic admendment... = 3 points
List Types
Did you utilize any practices in the non potato years to increase soil organic matter... = 2 points
List Practices
No practices were used to build organic matter. = 0 points

Point total box for question 8G with possible range 0 or 10. Note: If 0, then stop here.

8H Bonus: Are you monitoring changes in your soil organic matter? (check only one)

- Yes = 2 points
No = 0 points

Point total box for question 8H with possible range 0 or 3.

Soil and Water Quality Mgmt Section Total = [Large empty box]

Possible points: 28 + (11) = 39, if less than 11 points, stop here.

# WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

## Storage Section

If potatoes are shipped to market immediately, do not complete this section (place an X in the total). If potatoes are stored at another location, check with the person responsible for storage and ask that person to if they are going to implement the following storage questions. The following practices should be implemented during storage to ensure high quality, disease free tubers. Since certification will occur prior to storage, this section assumes your normal storage practices.

**9A** Which of the following practices do you or whoever is storing your potatoes implement to aid in good storage management:

*(check all that apply)*

- Adjust temperatures, relative humidity and ventilation to ensure suberization during curing period (50- 55 degrees F, 90-95% RH) = 3 points
- Adjust temperatures and relative humidity for most effective storage during holding period = 3 points
- Increase temperatures to 55- 65 degrees F prior to removal to avoid bruising = 3 points

 point total for question 9A  
possible range 3-9

**9B Bonus:** Did you or whoever is storing your potatoes experiment with safer alternatives for post harvest fungicide applications?

*(check only one)*

- I did not apply any compound for post harvest disease control = 3 pts
- Yes, I tried new compounds such as oxidate, puragene or ozone = 2 pts
- No, I applied traditional compounds = 0 points

 point total for **bonus**  
question 9b  
possible range 0 or 3

**9C Bonus:** Have you or whoever is storing your potatoes experimented with safer alternatives (compared to CIPC) for sprout inhibition?

*(check all that apply)*

- I did not apply any sprout inhibitors in storage. = 3 points
- I used MH-30 prior to storage. = 2 points
- Yes, I tried new compounds (such as ozone) in storage. = 2 points
- No, I applied traditional compounds (CIPC) = 0 points

 point total for **bonus**  
question 9c  
possible range 0-7

**Storage Section Total =**

Possible points: 9 + (10) = 19, if less than 4 points, stop here.

## Chain of Custody Section

Growers that only handle crops grown on their own farm are exempt from the requirement for a separate Handling Certification. However, during the grower audit basic chain-of-custody measures will be evaluated. Each grower of Protected Harvest certified crops must document the chain-of-custody of the crop from field to retail or produce title change, including during storage, packing, pallet loading, and transportation, ensuring the integrity of Protected Harvest's certification.

**10A** How are procedures for handling Protected Harvest certified crops communicated to staff?  
*(check one)*

- No procedures are in place = 0 points
- Procedures are only verbally communicated to staff with no formal written procedure. = 1 points
- Only a summary of procedures is included in other company documentation. (e.g. Production procedure etc.) = 3 points
- Specific written standard operating procedures (SOP) are in place and are distributed to employees and/or posted. = 5 points

point total for question 10A  
possible range 0-5  
**If 0, then stop here.**

**10B** What documented employee training methods are used?  
*(check all that apply)*

- Employees are trained, but training is not documented = 0 points
- Employees are in a documented mentoring program with experienced staff. = 1 point
- Employees attend special training sessions. = 3 points

point total for question 10B  
possible range 0-4

**10C** Which of the following written tracking mechanisms are used?  
*(check all that apply)*

- Harvest records include a unique field and harvest identification. (e.g. field tags, harvest log, etc.) = 3 points
- Storage records show the unique product lot identifications and quantities in inventory. If your operation does not store product within the certification program, award yourself points. (e.g. warehouse log, bin log, etc.) = 3 points
- Distribution records identify the unique product identifications and quantities distributed. (e.g. bill of lading, pull sheet, warehouse log, etc.) = 3 points
- Shipping paperwork clearly shows the certified status of product represented under this program. (e.g. Healthy

point total for question 10C  
possible range 0-12

## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

Grown or Protected Harvest identification on invoice, bill of lading, copy of Protected Harvest Certificate with each load, etc.) = 3 points

**10D** What methods are used to ensure the segregation of certified product from non-certified product?  
(check one)

Certified product intended to be sold as certified is mixed in the same bins as non-certified product, and no separation measures are used = 0 points

Certified and non-certified product is mixed within the same bins, and physical barriers are used (e.g. chicken wire, paper, etc.) = 3 points

Certified and non-certified product is mixed within the same bins, and visual identification techniques are employed (e.g. chalk mark on wall) = 2 points

Designated storage units are used that solely house certified or non-certified product at any given time = 4 points

No separation measures are needed because our facilities only store certified product = 5 points

point total for question 10D  
possible range 0-4  
**If 0, then stop here.**

**10E** Which of the following describes your product tracking capability?  
(check all that apply)

Procedures are in place that allow for distributed products to track back to the field of origin. = 4 points

A system is in place that can show where harvest from an individual field was eventually distributed. = 4 points

Distributed certified product cannot be reconciled to harvest yield and marketable yield data from certified fields. = 0 points

point total for question 10E  
possible range 0-8  
**If 0, then stop here.**

**Chain of Custody Section Total =**

Possible points: 32, **if less than 16 points, stop here.**

# TOTALS

copy and then add the following totals from previous pages:

<p><b>Chain of Custody Section Total</b> 32 , <b>minimum of 16</b></p>	<input type="text"/>
<p><b>Storage Management Section Total</b> 9 + (10) = 19, <b>minimum of 4</b> or "X" if potatoes are not stored</p>	<input type="text"/>
<p><b>Soil and Water Quality Section Total</b> 28 + (11) = 39, <b>minimum of 11</b></p>	<input type="text"/>
<p><b>Disease Management Section Total</b> 63 + (25) = 88 , <b>minimum of 30</b></p>	<input type="text"/>
<p><b>Insect Management Section Total</b> 49 + (15) = 64, <b>minimum of 20</b></p>	<input type="text"/>
<p><b>Weed Management Section Total</b> 33 + (5) = 38 , <b>minimum of 15</b></p>	<input type="text"/>
<p><b>Field Mmgt Decisions Section Total</b> 35 + (8) = 41, <b>minimum of 14</b></p>	<input type="text"/>
<p><b>Pest Mmgt Decisions Section Total</b> 14 , <b>minimum of 6</b></p>	<input type="text"/>
<p><b>Information Sources Section Total</b> 20 + (5) = 25, <b>minimum of 10</b></p>	<input type="text"/>
<p><b>Scouting Section Total =</b> LS: 51 + (10) = 61, <b>minimum of 25</b> SS: 41 + (10) = 51, <b>minimum of 20</b></p>	<input type="text"/>

## Final Score

---

### Possible points & minimum passing scores:

#### Long Season Crop:

<p>With Storage 334 + (89) = 423 <b>minimum of 227</b></p>
<p>Without Storage 325 + (79) = 404 <b>minimum of 221</b></p>

#### Short Season Crop:

<p>With Storage 324 + (89) = 413 <b>minimum of 220</b></p>
<p>Without Storage 315 + (79) = 394 <b>minimum of 214</b></p>

## Pesticide Toxicity

### Do Not Use List:

#### Insecticides:

Aldicarb (Temik®)	Oxamyl (Vydate®)
Azinphos-methyl (Guthion®)	Endosulfan (Thiodan®)
Disulfoton (Disyston)	Phorate (Thimet®)
Methamidophos (Monitor®)	Diazinon (Diazinon®)
Carbofuran (Furadan®)	Permethrin (Pounce®/Ambush®)
Carbaryl (Sevin®)	

#### Herbicides:

Paraquat (Gramoxone®)

### May Use with Restriction:

#### Insecticides:

All Insecticides* :	See protocols on page 22 for resistance management strategies.
Dimethoate (Cygon®) :	For short season potatoes apply at least 21 days before harvest (maximum of 1 pint per season) For long season potatoes apply at least 45 days before harvest (maximum of 2 pints per season)
Esfenvalerate (Asana®) :	No more than 19.2 oz. used per year .
Ethoprop (Mocap®) :	Apply only as needed when wireworms or other soil insects are expected to be present.

#### Herbicides:

Metribuzin (Sencor®) : Apply no more than 0.75 lbs ai per season

## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

### Fungicides:

- All fungicides:\*\* See protocols below for resistance management strategies.
- Metiram, Mancozeb & Maneb: No more than 4.5 lbs a.i. per season Metiram, 6 lbs a.i. per season Mancozeb, and 6 lbs a.i. per season of Maneb.
- Triphenyltin hydroxide (SuperTin®): Apply a maximum of 15 oz. per season
- Chlorothalonil (Bravo®) : No more than 16 lbs a.i. per season
- Group 11 (strobilurin fungicides) : Any application must be followed by at least one application from another family

### Fumigant\*\*\*:

- Metam Sodium (Vapam®) : Use only if Verticillium levels exceed thresholds  
(>10 microsclerotia per cubic centimeter of soil when nematodes are NOT present, >7 microsclerotia per cubic centimeter when nematodes are present) and/or nematode thresholds (> 1 nematodes per cubic centimeter soil)  
**Verify through soil test sample reports or field history**

### Resistance Management Protocols:

A resistance management program as recommended by the University of Wisconsin potato IPM team. Limited use of higher-risk pesticides is justified when needed to avoid the emergence of resistance to other, lower-risk pesticides. EPA grouping designations are provided on the chemical toxicity list (pages 24-5).

\* All insecticides must be used in a resistance management program. Utilize the following protocols when determining your insecticide choices. Chloronicotines (Group 4A) should not be applied both systemically and foliarly in the same growing season. No consecutive applications of Group 4A should be made. The synthetic pyrethroids (Group 3) can be applied twice consecutively for the target pest only at the lowest label rates. Otherwise, no consecutive applications of Group 3 are allowed. Group 1 compounds (carbamates and organophosphates) should not be applied consecutively. Compounds in Group 5 (Spinosyns), Group 6 (Avermectin), Group 9 (feeding disruptors) and Group 11 (Bt Microbials) should be applied no more than twice consecutively.

\*\* All fungicides must be used in a resistance management program designed to limit the selection pressure stemming from applications of fungicides known to be vulnerable to resistance. Preserving the efficacy of strobilurin fungicides is the current focus of Wisconsin resistance management recommendations. Strobilurin applications (Group 11) may not be made consecutively on the same field. When required by disease pressure, multiple applications of a fungicide not prone to resistance (e.g. chlorothalonil, an EBDC, tin, or copper based compound) may be made between strobilurin applications (Group 11), in order to limit the number of season-long strobilurin applications to no more than six. Group 1, 4 and 11 should be rotated with other fungicide compounds. Group 7, 12, 15, X, and Y compounds should be implemented and used in rotation with strobilurin compounds (Group 11). Compounds which have a high-risk of resistance development (Group 1, Thiophanate Methyl and Group 4, Metalaxyl and Mefenoxam), should be rotated with other groups.

## WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

\*\*\* Fumigation is not counted in toxicity totals per acre because toxicity totals per acre only account for pesticides applied during the growing season. Fumigation is necessary in Wisconsin potato production to avoid drastic yield reduction. It is used when Verticillium and nematode levels exceed the economic thresholds of >10 microsclerotia per cubic centimeter of soil. Fumigation is not used prior to each potato crop, and may not be necessary in ground which has not been planted to potatoes previously. Fumigation is usually used every 2 rotations of potatoes.

**To determine the toxicity units for the season, total the pounds of active ingredient for each compound and multiply by the toxicity factor for that compound.**

**Total toxicity units = all compounds sprayed during the growing season**

**Maximum toxicity units:**            **SS = 800 toxicity units per acre for the season.**  
**LS = 1200 toxicity units per acre for the season.**

### Toxicity Unit Exceptions for Late Blight Fungicides Only

- If 18 severity values are reached by June 1st, 400 additional toxicity units may be added.

**OR**

**The following conditions apply only when late blight is found in the vicinity (within 25 miles of field)**

- If late blight is found in the vicinity in June, then add 400 toxicity units
- If late blight is found in the vicinity after June 30th but before July 15th, then add 300 toxicity units
- If late blight is found in the vicinity after July 15th but before August 1st, then add 200 toxicity units
- If late blight is found in the vicinity in August, then add 100 toxicity units

NOTE: Severity values are units of measure which express the effect of temperature and relative humidity on the development of potato late blight.

Since weather conditions and/or the presence of inoculum determines the initiation and scheduling of fungicide use the exceptions above are used to avoid penalizing growers in geographic locations where more fungicide is required to protect the industry.

See the consumers guide to Protected Harvest for more information.

## Toxicity Factor<sup>1</sup> Chart

Red = Do Not Use

Blue = May Use With Restriction (see pg.2)

Name	Active ingredient (ai)	Trade Name	Toxicity Factor <sup>1</sup> 1 lb. ai	Average Toxicity Units per Application <sup>2</sup>	EPA Resistance Mgmt Group Designation
<b>Herbicides</b>					
	Diquat	Reglone®	73	18	22
	Endothall	Desiccate®	56	56	NA
	ETCP	Eptam	69	210	8
	Glyphosate	Roundup®	40	19	9
	Linuron	Lorox®	62	31	7
	Metolachlor	Dual/Dual II®	22	42	15
	Metribuzin	Sencor®, Lexone®	115	58	5
	Paraquat	Gramoxone Extra®	81	37	22
	Pendimethalin	Prowl®, Pentagon®	102	85	3
	Rimsulfuron	Matrix®	116	2	2
	Sethoxydim	Poast®	48	9	1
	Sulfuric Acid		21	21	NA
	Trifluralin	Treflan®	208	208	3
<b>Insecticides</b>					
	Aldicarb	Temik®			1A
	Azinphos-methy	Guthion®	326	245	1B
	Btt	Novodor®	10	10	11A
	Cyfluthrin	Baythroid®	489	15	3
	Cyfluthrin + Imidacloprid	Leverage®	489+159	23	3+4A
	Carbaryl	Sevin®			1A
	Carbofuran	Furadan®	401	200	1A
	Diazinon	Diazanon®	360	107	1B
	Dimethoate	Dimethoate/Cygon®	360	180	1B
	Disulfoton	Disyston®	249	275	1B
	Endosulfan	Thiodan®, Phaser®	266	200	2A
	Esfenvalerate	Asana®	509	26	3
	Ethoprop	Mocap®	309	924	1B
	Imidacloprid	Admire®/Provado®	159	32	4A
	Indoxicarb	Avaunt®	118	13	22
	Malathion	Cythion®	145	182	1B
	Methamidophos	Monitor®	330	250	1B
	Methoxyml	Lannate®			1A
	Oxamyl	Vydate®	343	171	1A
	Permethrin	Ambush/Pounce®	324	43	3
	Phorate	Thimet/Phorate®	621	1560	1B
	Phosmet	Imidan®	105	105	1B
	Piperonyl butoxide	Incite®	55	28	NA
	Pymetrozine	Fulfill®	118	21	9B
	Thiomethoxam	Platinum®/Actara®	159	20	4A
	Spinosad	Spinosad®	129	8	5

# WWF/WPVG/UW Collaboration - Ecological Potato Standards for 2005

Name	Active ingredient (ai)	Trade Name	Toxicity Factor <sup>1*</sup> 1 lb. ai	Average Toxicity Units per Application <sup>2</sup>	EPA Resistance Mgmt Group Designation
<b>Fungicides</b>					
	Azoxystrobin	Quadris®	47	5	11
	Basic copper sulfate		22	25	Y
	Chlorothalonil	Bravo®/Echo®	82	82	Y
	Copper hydroxide	Kocide®	36	54	Y
	Copper sulfate	Bordeaux/Tribasic	21	42	Y
	Cymoxanil	Curzate®	46	6	X
	Dimethomorph	Acrobat®	40	20	15
	Mancozeb	Dithane®/Penncozeb®	185	209	Y
	Maneb	Maneb®/Manex®	151	227	Y
	Metalaxyl	Ridomil®	120	135	Y
	Metiram	Polyram®	250	300	Y
	Propamocarb hydrochloride	Previcur®	48	42	X
	Pyratlostrobin	Headline®	47	5	11
	Triphenyltin hydroxide (TPTH)	SuperTin®/AgriTin®	385	70	X
	Zoxamide+Mancozeb	Gavel®	232	190	11+Y
<b>Others</b>					
	Maleic Hydrazide	MH30 or Royal®	37	110	NA
	Harpin Protein	Messenger®	11	3	NA

<sup>1</sup> Toxicity Factors are a multiattribute system derived from four components including: (1) acute mammalian toxicity; (2) chronic mammalian toxicity; (3) ecotoxicity (4) impacts biointensive IPM (effects on beneficial organisms, bees, and resistance management) . Note: values are re-evaluated and updated annually.

<sup>2</sup> Based on average applications rate. For total calculations, one must multiply toxicity factor by pounds of active ingredient of compound applied.

