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**Chemical Weed Control in Potatoes**

Successful weed management will: 1) improve potato yield through reduced competition for light, nutrients, and water; 2) reduce availability of alternate hosts for disease and insect pests; 3) improve harvest efficiency. Use of herbicides (chemical control) is an important tool for controlling weeds in potato fields. This guide currently focuses on chemical weed control. Herbicides are listed below in alphabetical order according to their active ingredient, with remarks about application and rates provided. Efficacy tables showing how well different herbicides control broadleaf and grass weeds of interest are given at the end of this section, as is a list of web sites that may be useful in identifying weeds. Other management tools besides herbicides are also important for controlling weeds. Cultivation and hilling play a large role in weed control with potatoes. Weeds between the rows are destroyed, and emerging weeds within the row may be buried during cultivation and hilling. Crop rotation is another important management tool. By shifting crops and control measures, one decreases the possibilities for a weed that is very competitive with any particular crop to dominate the system. Prevention of weeds from seeding in and around fields decreases the weed "seed bank" in the soil and helps prevent new weeds from entering the field. In more intensive systems, use of a stale seedbed and mulching are additional management options for weed control.

Chemical-based weed control requires attention to detail. Label instructions should always be followed. The label instructions are the result of extensive research and provide complete timing and rate information. Timing of application relative to stage of growth of the weeds and the crop, rate of application, coverage, and environmental conditions (e.g. wind speed, temperature) are important variables to consider. Failure to pay attention to each factor when applying herbicides may lead to poor weed control (wasted application), damage to the crop sprayed, and sometimes damage to neighboring fields. Coverage is affected by sprayer calibration, which results primarily from sprayer pressure, ground speed, and nozzle type. Proper sprayer calibration is required to achieve maximum control. In general, low spray pressures improve coverage and reduce drift. Please refer to “Pesticide Drift Management - A Guide for Applicators” for additional information on sprayer equipment and calibration. This publication is available in Maine from your local Extension office.

Note: ALWAYS FOLLOW LABEL INSTRUCTIONS. The information provided here is based on product labels at the time of writing. If there is any discrepancy between the label and the information below, follow label instructions. The current label for any given product is "the law" regarding its application. Also the products listed here are based on what is currently labeled for use in the state of Maine - these products may or may not be approved for use in other jurisdictions.

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**Chemical: Carfentrazone**

Remarks: Herbicide resistance group E; cell membrane disruptor. Apply alone or with other herbicides as a burn-down treatment prior to planting or within 24 hours of planting. Helps to control small broadleaf weeds less than 4 inches tall. Coverage is essential for good control. Use a non-ionic surfactant (NIS) at 0.25% v/v (2 pints per 100 gallons of spray solution). Optimum broad spectrum control requires a tank mix with another burn-down herbicide such as glyphosate. This is a contact herbicide. PHI of 7 days when used as a vine desiccant. REI of 12 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Aim EC** | 0.5 to 2.0 oz | Preplant burn-down treatment. |

**Chemical: Clethodium**

Remarks: Herbicide resistance group A; inhibits lipid synthesis. Post-emergence when grasses are 2 to 6 inches tall (4 to 8 inches for perennial grasses e.g. quackgrass). Use a crop oil concentrate (1qt/ac or 1 % v/v); addition of liquid fertilizer (i.e. ammonium sulfate) at 1-2 qt/ac will enhance control of grasses. Apply to actively growing grasses. For perennial grasses, repeat application if regrowth occurs. PHI of 30 days. REI of 24 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Select 2EC** | 6 to 16 fl oz | |
| **Arrow 2EC** | 6 to 16 fl oz | |

**Chemical: Dimethenamid**

Remarks: Herbicide resistance group K3; inhibits cell division. Pre-emergence application only. Will not control emerged weeds. For effective control, rainfall or sprinkler irrigation is required to move the product into the soil where weed seeds germinate. In wet or cold conditions, this herbicide may cause delayed emergence or stunting of potatoes. Do not apply within 35 feet of endangered plant populations. Maximum application rate of 21 fluid ounces on medium and fine textured soils, and 18 fluid ounces on coarse textured soil. Labeled tank mixtures: Outlook/Sencor; Outlook/Eptam; Outlook/Gramoxone; Outlook/Lorox; Outlook/Matrix; Outlook/Prowl; Outlook/Roundup. PHI of 40 days. REI of 12 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Outlook** | 12 to 21 oz | Use lower rates on coarser soils and on low organic matter soils (see label). |

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**Chemical: EPTC**

Remarks: Herbicide resistance group N; blocks lipid synthesis. Preplant, pre-emergence, or post-emergence (directed spray if liquid, use a cloth drag if granular to avoid contact with the crop). Must be incorporated into soil immediately. The variety 'Superior' is more sensitive to EPTC than other varieties and may be stunted under stress conditions. Post-emergence applications must be applied directly to the soil (not on the crop). Will not control established weeds. Perennial weeds must be turned under and chopped up thoroughly prior to treatment. Use higher rates for quackgrass and nutsedge control. Tank mixtures (see label): Eptam 7-E/Matrix; Eptam 7-E/Metribuzin; Eptam 7-E/Outlook. PHI of 30 days. REI of 12 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Eptam 7-E** | Preplant: 3.5 to 9 pt<br>Drag-off and Post:<br>3.5 to 7 pt | <br>Use lower rate on<br>coarse textured soil. |
| **Eptam 20-G** | Preplant and Drag-off:<br>15 to 30 lb<br>Post: 15 to 20 lb | Use lower rate on<br>coarse textured soil. |

**Chemical: Glyphosate**

Remarks: Herbicide resistance group G; inhibits amino acid/protein synthesis. Apply in spring BEFORE crop emergence. Applications made at emergence will result in injury or death of the emerging crop plants. In coarse sandy soil apply before seed begins to sprout in order to minimize risk of injury. Application may be made in the fall after harvest on actively growing weeds. Tillage should be delayed at least 3 days, preferably 7, following application to allow translocation of the herbicide within the weed. Check label regarding addition of adjuvants (product may be formulated with an adjuvant). Ammonium sulfate (1% w/w) may enhance activity. REI of 4 hours. PHI not stated.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Roundup OriginalMax (5.5 lb/gal)** | 16 to 32 oz. | Rate depends on type and size of weeds (see label). |
| Many formulations are available. | Rate depends on formulation and use | |

**Chemical: Linuron**

Remarks: Herbicide resistance group C2; inhibits photosynthesis. Pre-emergence application after final "dragging" of field. Preferably just before or when weeds emerge. Add surfactant (1 pt/25gal) if emerged weeds are present. Seed should be at least 2 inches deep or crop injury may result. Requires rainfall to be activated. Heavy rainfall occurring soon after application may cause crop injury. Do not spray emerged potatoes. Use lower rates on soils with less than 2% organic matter. Tank Mixture (see label): Lorox DF / Dual. PHI not stated. REI of 24 hours.

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| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Lorox DF** | 2.5 to 3 lb on heavier soil: (>2% organic matter)<br>1.5 to 2.5 lb on coarser soil: (<2% organic matter) | |

**Chemical: Metolachlor**

Remarks: Herbicide resistance group K3; inhibits cell division. Preplant incorporated or pre-emergence. For preplant application, incorporate to a depth of 3 inches. WILL NOT CONTROL EMERGED WEEDS. May reduce yield and/or delay maturity of 'Superior' and other early-maturing varieties. Do not use on muck or peat soils. Do not apply more than 3.6 pt per acre in a single season. Use directed spray if applied post-emergence with Sencor. Tank Mixtures (see labels): Dual/Sencor; Dual/Lorox; Dual/Prowl; Dual/Prowl/Eptam. PHI of 60 days for preemergence application and 40 days for post-emergence application. REI of 24 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Dual Magnum** | Preemerg: 1.0 to 2.0 pt<br>Post: 1.67 pt | Use lower rate on coarse textured or low organic matter soils. |
| **Me-Too-Lachlor** | Preemerg: 1.0 to 2.0 pt<br>Post: 1.67 pt | Use lower rate on coarse textured or low organic matter soils. |
| **Cinch** | Preemerg: 1.0 to 2.0 pt | Use lower rate on coarse textured or low organic matter soils. |

**Chemical: Metribuzin**

Remarks: Herbicide resistance group C1; inhibits photosynthesis. Pre-emergence, post-emergence, or split-shot. Do not exceed 1.3 lb/ac/season. On sandy soils or with sensitive varieties, do not exceed 0.67 lb/ac pre-emergence application rates. Avoid post-emergence applications on sensitive varieties. Early maturing smooth skinned white and all red-skinned varieties may be injured by post-emergence applications. Crop injury is more likely to occur under high soil pH, and on coarse textured soils. The varieties Atlantic, Bellchip, Centennial, Chipbelle, and Shepody are sensitive to Sencor. For optimum control, apply before weeds are one inch tall. Do not make post-emergence applications within 3 days after cool, wet weather or crop injury may occur. Also post-emergence application followed by rain or irrigation on recently cultivated potatoes may result in crop injury. Low preemergence application rates (< 0.67 lb/ac) may only control wild mustard species. Tank Mixtures (see label): Sencor/Dual; Sencor/Eptam; Sencor/Prowl; Sencor/Matrix. PHI of 60 days. REI of 12 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Sencor DF** | Preemerg.: 0.33 to 1.3 lb | |

| | |
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| | Post: 0.33 to 0.67 lb |
| **Metribuzin 75** | Preemerg.: 0.33 to 1.3 lb |
| | Post: 0.33 to 0.67 lb |

**Chemicals: premix of Metolachlor and Metribuzin**
Remarks: Herbicide resistance group C1 and K3; inhibits cell division and photosynthesis. Pre-emergence only unless applied through a center pivot. To avoid crop injury, post-emergence applications should be made only on russetted or white skinned varieties that are not early maturing. Do not make post-emergence applications within 3 days after cool, wet weather or crop injury may occur. Do not apply post-emergence except through a center pivot (see label for rates). Rotation limitations and other considerations that apply for use of metribuzin will also be relevant for the use of this product. Do not preplant incorporate. PHI of 60 days. REI of 12 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Boundary - preemergence** | coarse soil ( < 3% OM): 1.5 to 2.0 pt<br>medium or fine soil (< 3 % OM): 2.4 to 2.75 pt<br>coarse soil (> 3% OM): 2.0 to 2.4 pt.<br>medium or fine soil (> 3 % OM): 2.75 to 2.9 pt<br>Sands: do not exceed 1.5 pt per acre. | |

**Chemical: Paraquat**
Remarks: Herbicide resistance group D; disrupts green (photosynthetically active) cells. Preplant or pre-emergence. Add either NIS (0.125 to 0.25 % v/v) or COC (1 % v/v). Apply up to ground cracking before potatoes have emerged. This is a nonselective, contact herbicide. REI of 12 hours for preplant applications.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Gramoxone Inteon** | 1.0 to 2.0 pt | |
| **Firestorm** | 0.7 to 1.3 pt | |

**Chemical: Pendimethalin**
Remarks: Herbicide resistance group K1; inhibits cell division. Pre-emergence or early post-emergence (up to 6 inches of growth). Will not control emerged weeds. Needs rainfall within 7 days of application, or it may be thoroughly incorporated into the surface one to two inches of soil for activation. If incorporated, take care not to damage seed pieces or sprouts. Do not apply post-emergence if crop is under stress (cold/wet or hot/dry). Make only one application per season. The variety 'White Rose' is sensitive to pendimethalin. Tank Mixtures: Prowl/Eptam; Prowl/Lorox; Prowl/Sencor; Prowl/Matrix. PHI not stated. REI of 24 hours.

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| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Prowl H2O** | 1.5 to 3.0 pt | Use lower rates on coarser soils and on low organic matter soils (see label). |
| **Prowl 3.3EC** | 1.8 to 3.6 pt | Use lower rates on coarser soils and on low organic matter soils (see label). |
| **Pendimax 3.3** | 1.2 to 3.6 pt | Use lower rates on coarser soils and on low organic matter soils (see label). |
| **Stealth** | 1.8 to 3.6 pt | Use lower rates on coarser soils and on low organic matter soils (see label). |

**Chemical: Rimsulfuron**

Remarks: Herbicide resistance group B; an ALS inhibitor – blocks protein synthesis. Pre-emergence and post-emergence. Requires rainfall or irrigation within 5 days of application for pre-emergence weed control. In the absence of rainfall or irrigation, post-emergence application would result in better weed control. Include a surfactant (0.125 to 0.25 % v/v NIS, or 1 % v/v COC or MSO) for control of emerged weeds when Matrix is applied by itself. When Matrix is tank-mixed with Sencor post-emergence, use a NIS at 0.125 % v/v; do not use COC or MSO in this case; note use of an adjuvant with Sencor increases the possibility of crop damage occurring. Avoid using COC or MSO adjuvants at temp. > 85 F or crop injury may result. Addition of fungicides may increase risk of crop injury under high temperatures. May be split applied with 14 to 28 days between applications (1 to 1.5 oz pre-emergence followed by 1 oz post-emergence; or sequential post emergence applications). For seed potatoes, if sequential post-emergence applications are made use a 1.0 oz rate for both applications. Do not exceed 2.5 oz/ac/year. For a single pre-emergence application, use the 1.5 oz. rate. Provides poor control of lambsquarter. Do not apply to potatoes grown from microtubers, minitubers, or transplants, or to plants under stress. Tank Mixtures (see label) - Pre-emergence: Matrix/Sencor; Matrix/Lorox; Matrix/Prowl; Matrix/Eptam; Matrix/Dual; Post: - Matrix/Sencor; Matrix/Eptam. PHI of 60 days. REI of 4 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Matrix** | Preemerg.: 1 to 1.5 oz<br>Post: 1 to 1.5 oz | |

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**Chemical: Sethoxydim**
Remarks: Herbicide resistance group A; inhibits lipid synthesis. Post-emergence. Add MSO (1.5 pt/ac) or COC (2 pt/ac). Addition of a nitrogen source (UAN at 4 to 8 pt/ac or AMS at 2.5 lb/ac) will enhance control. There is a potential for crop injury at temperatures > 90 F. Use a rate of 1.5 pt/ac to control volunteer oats or barley and apply before they are 4 inches tall. Repeat applications may be needed to control perennial grasses or large annual grasses. Do not apply more than 5 pints per acre in one season. PHI of 30 days. REI of 12 hours.

| Trade Name | Product rate per acre | Comments |
|---|---|---|
| **Poast** | 1.0 to 1.5 pt | Max. rate of 2.5 pt for rescue treatment of large annual grasses or heavy quackgrass infestation (see label). |

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**Herbicide Comparison Table for Control of Common Broadleaf Weeds**

| | *Broadleaf Weeds* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Herbicides*** | **Galinsoga** | **Lambsquarter** | **Mustard** | **Nightshade** | **Pigweed** | **Purslane** | **Ragweed** | **Shepherd's Purse** | **Smartweed** | | **REI (Hours)** | **PHI (Days)** |
| **Dimethenamid (Outlook)** | **G** | **P** | **F-P** | **F** | **G** | **F** | **P** | | **P** | | 12h | 40d |
| **EPTC (Eptam)** | | **F** | **P** | **F** | **F** | **F** | | **F** | **F-P** | | 12h | 45d |
| **Glyphosate (Roundup and others)** | **G** | **G** | **G** | **G** | **G** | **G** | **G** | **G** | **G** | | 4h | |
| **Linuron (Lorox)** | **G** | **G** | **G** | **P** | **G** | **G** | **G** | **F** | **G** | | 24h | |
| **Metolachlor (Dual Magnum)** | **G** | **P** | **P** | **F** | **F** | **F** | **P** | **P** | **F-P** | | 24h | 40d |
| **Metribuzin (Sencor)** | **G** | **F** | **F** | **P** | **F** | **F** | **G** | **F** | **F** | | 12h | 60d |
| **Paraquat (Gramaxone)** | **G** | **F** | **F** | **F** | **F** | **F** | **F** | **F** | **F** | | 12h | |
| **Pendimethalin (Prowl / Pendimax)** | **P** | **F** | **P** | **P** | **F** | **G** | | | **F** | | 24h | |
| **Rimsulfuron (Matrix)** | **G** | **P** | **F** | **F** | **G** | **F**** | **P** | | **F-P** | | 4h | 60d |

**G = Good, F = Fair, P = Poor, Blank = no information or no control**

*** = post-emergence use only**

**** = pre-emergence use only**

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**Herbicide Comparison Table for Control of Common Grass Weeds**

| *Grass Weeds* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herbicides** | **Barnyardgrass** | **Crabgrass** | **Foxtail species** | **Quackgrass** | **Vol. Cereals** | **Yellow Nutsedge** | **Wild Oat** | | **REI** | **PHI** |
| **Clethodim (Select / Arrow)** | **F** | | **F** | **F** | **F** | | **F** | | 24h | 30d |
| **Dimethenamid (Outlook)** | **F** | **G** | **G** | | **F** | **G** | **P** | | 12h | 40d |
| **EPTC (Eptam)** | **G** | **G** | **G** | **F** | **F** | **F** | **F** | | 12h | 45d |
| **Glyphosate (Roundup and others)** | **G** | **G** | **G** | **F** | **G** | **F** | **G** | | 4h | |
| **Linuron (Lorox)** | **F** | **F** | **F** | **P** | | **P** | | | 24h | |
| **Metolachlor (Dual Magnum)** | **G** | **G** | **G** | | | **F** | | | 24h | 40d |
| **Metribuzin (Sencor)** | **F-P** | **F** | **F** | **P** | **F-P** | **P** | **F-P** | | 12h | 60d |
| **Paraquat (Gramaxone)** | **F** | **F** | **F** | **P** | **F** | **P** | **F-P** | | 12h | 3d |
| **Pendimethalin (Prowl / Pendimax)** | **G** | **G** | **G** | **P** | | **P** | **P** | | 24h | |
| **Rimsulfuron (Matrix)** | **G** | **F-P** | **G** | **F*** | **G** | **P** | **F-P** | | 4h | 60d |
| **Sethoxydim (Poast)** | **F** | | **G** | **F** | **G** | | **G** | | 12h | 30d |

**G = Good, F = Fair, P = Poor, Blank = no information or no control**
*** = post-emergence use only**
**** = pre-emergence use only**

Data in these tables on weed control are a synthesis of extension publications from the University of Maine, Cornell University, North Dakota State University, Manitoba Dept. of Agriculture and Food, Oregon State University, and UC-Davis.

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**Some Internet Sites for Weed Identification:**

New Jersey – Rutgers University
http://www.rce.rutgers.edu/weeds/

Michigan State University
http://www.msue.msu.edu/msue/iac/e1363/e1363.htm#broadleaf

Illinois Council on Food and Ag. Research
http://web.aces.uiuc.edu/weedid/

Virginia Tech.
http://www.ppws.vt.edu/weedindex.htm

Iowa State Univeristy
http://www.weeds.iastate.edu/weed-id/weedid.htm