

## TABLE 2N – Weed Management in No-Till Soybean

Effective weed control in no-till soybeans requires control of **all weeds and cover crops** prior to soybean emergence. This can be accomplished by:

1. Late fall applications prior to planting soybeans the following spring (**FALL**).
2. Early spring applications — up to 30 days prior to soybean planting (**EPP**).
3. Applications at or very close to the time of planting (**PRE**).

Regardless of the time of herbicide application, burndown herbicide(s) must be applied to control **all** of the existing vegetation. If some plant species are not controlled prior to soybean emergence, they will be competitive with the soybean crop, ultimately leading to soybean yield loss.

Burndown herbicide options include herbicides without residual activity: glyphosate (Table 10), *Gramoxone* (paraquat), *Liberty*, 2,4-D ester, *Aim*, *Express*, *Vida*, *Sharpen*, and *Verdict*. These herbicides control only existing vegetation and **DO NOT** have residual activity to control weeds that have not yet emerged. The following table lists the effectiveness of these herbicides in burndown applications to control existing vegetation. Selection of these herbicides should be made on the basis of weed type, weed height and the speed of control. In general, *Gramoxone* and *Liberty* will provide faster control than glyphosate or 2,4-D ester, but glyphosate will provide better control of dense weeds or cover crops. Glyphosate is preferred for control of perennial weeds or grasses prior to the completion of tillering.

2,4-D ester provides effective control of several annual, biennial and perennial broadleaf weeds but does not control grasses. Each of these herbicides has one or more weed species that it does not control (e.g., 2,4-D ester does not control chickweed). Therefore, these herbicides are often tank-mixed for broad-spectrum burndown applications. Sometimes application rates of burndown herbicides need to be increased to control large weeds or dense weed infestations. Please consult the herbicide labels for information. None of these burndown herbicides have soil activity to stop new weeds from emerging. Herbicides that persist in the soil to stop new weeds from emerging may be included in the burndown application.

Certain residual herbicides have burndown activity on some weed species. **Table 2N** gives the maximum weed height for **burndown** control of summer annual broadleaves and grasses. These herbicides are not as broad-spectrum as glyphosate, *Gramoxone*, *Liberty* or 2,4-D ester for burndown of existing vegetation. Therefore, the residual herbicides are always tank mixed with glyphosate, 2,4-D ester, *Gramoxone*, *Liberty* or combinations of glyphosate + 2,4-D ester. These residual herbicides will control germinating summer annual grasses and broadleaf weeds. The **effectiveness** of these residual herbicides on summer annual grass and broadleaf weed control is not the same. **Table 2A** gives the effectiveness ratings of these residual herbicides on annual weeds. The **length of weed control** from these residual herbicides is not the same. Some herbicides persist longer in the soil and are, therefore, more effective than other her-

bicides when applied in the fall. There are fewer noticeable differences in the length of summer annual weed control when these herbicides are applied in the spring (EPP) or at planting (PRE). **Table 2N** gives the **length of summer weed control** (0 = no residual weed control; 1 = short residual control; 2 = moderate residual control; 3 = long residual control). When applying residual herbicides in the FALL for summer annual weed control, choose a herbicide with a “3” rating. When applying residual herbicides in the spring, EPP, choose a herbicide with a “3” or “2” rating. When applying residual herbicides at or very close to the time of planting (PRE), choose a herbicide with a “3”, “2” or “1” rating.

A few important comments for each herbicide in **Table 2N** are listed below.

### Burndown Herbicides without Residual Activity

**Glyphosate:** Glyphosate can be applied in the **Fall**, **EPP** or **PRE** to control existing vegetation. Application rates range from 0.75 to 1.13 lb a.e./A, depending on weed size. Lower rates may be used to control smaller weeds at lower spray volumes — consult label. Consult **Table 2N** for maximum weed heights and effectiveness ratings. There are many formulations of glyphosate. Consult **Table 10** for a list of glyphosate products, use rates and the need for additional surfactant. Ammonium sulfate (AMS) at 17 lb/100 gal should be added to glyphosate, regardless of formulation. The addition of 2,4-D ester greatly improves control of horseweed (marestail), giant ragweed, mustards and some other key no-till weeds (see the following comments about 2,4-D ester). Herbicides with residual activity can also be tank mixed with glyphosate or glyphosate + 2,4-D ester.

**Gramoxone SL 2.0 (2 SL):** *Gramoxone SL 2.0* can be applied **EPP** or **PRE** to control existing vegetation. Apply *Gramoxone SL 2.0* at 2 pt/A for weeds less than 3 inches tall and 3.0 pt/A for weeds less from 3 to 6 inches tall. Consult **Table 2N** for maximum weed heights and effectiveness ratings. Always add surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Regrowth of rye or wheat may occur if plants are not fully tillered when treated. Burndown effectiveness is highly dependent on the environment, with better burndown in warm, sunny conditions. For improved burndown control, *Gramoxone* can be tank mixed with 2,4-D ester or with a herbicide with residual activity.

**Parazone (3 SL):** *Parazone* contains the same active ingredient as *Gramoxone SL 2.0* (paraquat). However, *Parazone* is at a different concentration — 2 pints of *Parazone* is equal to 3 pints of *Gramoxone SL 2.0*. Refer to the *Gramoxone SL 2.0* section for further remarks on *Parazone*.

**Liberty (2.34 L):** *Liberty* can be applied **preplant** or **PRE** to control existing vegetation. Apply *Liberty* at 29 to 36 oz/A with ammonium sulfate at 17 lb/100 gal. If *Liberty* is used as a burndown herbicide, in-season applications of *Liberty* are prohibited. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications. Burndown effectiveness is highly dependent on the environment, with better burndown activity in warm, sunny condi-

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tions. Spray coverage is extremely important. *Liberty* requires a minimum of 15 gal/A of spray solution. Consult label and Table 12 for crop rotation restrictions. *Liberty* can be tank-mixed with 2,4-D ester or with a herbicide with residual activity to broaden the spectrum of weed control.

**2,4-D ester:** 2,4-D-ester can be applied in the **Fall** or **EPP** to control existing annual, biennial and perennial broadleaf weeds. One qt/A of 2,4-D ester can be applied in the fall and up to 30 days prior to soybean planting; 1 pt/A of 2,4-D ester can be applied up to 7 days prior to soybean planting. Consult **Table 2N** for maximum weed heights and effectiveness ratings. 2,4-D ester does not control common chickweed. 2,4-D can be tank mixed with a number of herbicides for improved weed control.

**Express (50 SG):** *Express* can be applied in the **fall** and in the **spring 14 days or more** prior to soybean planting. Apply *Express* at 0.25 to 0.5 oz/A — use the higher rate for denser weed populations or weeds that are only partially controlled. Consult **Table 2N** for maximum weed heights and effectiveness ratings. Always add crop oil concentrate at 1% v/v. *Express* is very effective on common chickweed. For best burndown results, the addition of 2,4-D ester is recommended. *Express* can also be tank mixed with herbicides that have residual activity.

**Aim (2 EC):** *Aim* (carfentrazone) is labeled for preplant (EPP) through PRE burndown applications. Apply *Aim* at 0.5 to 2 oz/A; use the higher rate to control larger weeds (4 inches tall). *Aim* is a contact herbicide without residual activity and is effective only on broadleaf weeds. Always add surfactant (0.25% v/v) or crop oil concentrate (1% v/v). Visual injury symptoms appear soon after *Aim* application. *Aim* can be tank mixed with glyphosate, 2,4-D ester and/or herbicides with residual activity. Consult **Table 2N** for maximum weed heights and effectiveness ratings.

**Vida (0.2 L):** *Vida* (pyraflufen) is labeled for preplant (**EPP**) burndown applications. Apply *Vida* at 0.5 to 2 oz/A; use the higher rate to control larger weeds (4 inches tall). *Vida* is a contact herbicide without residual activity and is effective only on broadleaf weeds. Always add surfactant (0.25% v/v) or crop oil concentrate (1% v/v). Visual injury symptoms appear soon after *Vida* application. *Vida* can be tank mixed with glyphosate, 2,4-D ester and/or herbicides with residual activity. The pH of the spray solution needs to be less than 7.5 or hydrolysis will occur. Consult **Table 2N** for maximum weed heights and effectiveness ratings.

**Sharpen (2.85 L):** *Sharpen* can be applied **preplant** or **PRE** to control existing broadleaf vegetation. Apply *Sharpen* at 1 oz/A prior to soybean emergence. For enhanced burndown activity, higher rates of *Sharpen* can be applied. However, longer intervals are required between *Sharpen* application and soybean planting; a minimum of 14 days for 1.5 oz/A and 30 days for 2 oz/A of *Sharpen*. Always add a methylated seed oil (1% v/v) and ammonium sulfate (AMS) at 17 lb/100 gal. DO NOT apply *Sharpen* after soybean emergence or severe crop injury will occur. DO NOT apply to coarse-textured soils with 2% less organic matter unless soybean is planted 1 month after application; *Sharpen* at 2 oz/A requires 44 days. DO NOT tank mix or apply *Sharpen* within 30 days of products containing flumioxazin (*Valor*), sulfentrazone (*Authority* or *Spartan*) or fomesafen (*Reflex*).

Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications. Consult label and Table 12 for crop rotation restrictions. Rotation restrictions are longer for application rates greater than 1 oz/A. *Sharpen* is a very effective herbicide on horseweed (marestail) and may provide 2 to 4 weeks of residual control against this weed. *Sharpen* should be tank mixed with glyphosate or glyphosate + 2,4-D ester to broaden the spectrum of burndown weed control.

**Verdict (5.57 L):** *Verdict* can be applied in the **Fall, preplant** or **PRE** to control existing broadleaf vegetation. *Verdict* contains *Sharpen* (saflufenacil) and *Outlook* (dimethenamid-P) (see **Table 2C**). The labeled rate of *Verdict* for use in soybean is 5 to 10 oz/A. The soybean rate of 5 oz/A of *Verdict* will not provide residual weed control. For additional residual control and enhanced burndown activity, higher rates of *Verdict* can be applied. However, longer intervals are required between *Verdict* application and soybean planting; a minimum of 14 days for 7.5 oz/A and 30 days for 10 oz/A of *Verdict*. Always add a methylated seed oil (1% v/v) and ammonium sulfate (AMS) at 17 lb/100 gal. DO NOT apply *Verdict* after soybean emergence or severe crop injury will occur. DO NOT apply to coarse textured soils with less than 2% organic matter, unless soybean is planted 30 days after application. DO NOT tank-mix or apply *Verdict* within 30 days of soil-applied applications of flumioxazin (*Valor*), sulfentrazone (*Authority* or *Spartan*), or fomesafen (*Reflex*, *Flexstar*) containing products. However, fomesafen (*Flexstar*, *Reflex*) and other POST PPO-inhibiting herbicides can be used 14 days after soybean emergence. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications. Consult label and Table 12 for crop rotation restrictions. Rotation restrictions are longer for *Verdict* applications rates greater than 5 oz/A. *Verdict* is a very effective herbicide on horseweed (marestail) and may provide 2 to 4 weeks of residual control against this weed. *Verdict* should be tank-mixed with glyphosate to broaden the spectrum of burndown weed control.

### **Burndown Herbicides with Residual Activity**

**Authority Assist (4 L):** *Authority Assist* can be applied in the **Fall, EPP** (up to 45 days) or **PRE** to control existing vegetation and to provide residual control. *Authority Assist* contains *Spartan* (sulfentrazone) and *Pursuit* (see Table 2C). Apply *Authority Assist* at 4 to 8 oz/A as part of a planned two-pass program in glyphosate-resistant soybean or at 6 to 12 oz/A in conventional soybean. DO NOT apply *Authority Assist* to soils with pH of 7.5 or higher. Always add a crop oil concentrate or a methylated seed oil (1% v/v). Soybean varieties vary in their sensitivity to sulfentrazone, a component in *Authority Assist*; consult your local seed dealer for information. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. *Authority Assist* should be tank-mixed with 2,4-D ester, glyphosate, glyphosate + 2,4-D ester or *Gramoxone* to broaden the spectrum of burndown weed control.

**Authority First/Sonic (70 DF):** *Authority First/Sonic* can be applied **EPP** (up to 14 days) or **PRE** to control existing vegetation and to provide residual weed control. *Authority First/Sonic* contains

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*Spartan* (sulfentrazone) and *FirstRate* (see Table 2C). Apply *Authority First/Sonic* at 3.2 oz/A prior to planned 2-pass programs in glyphosate-resistant soybean and 6.4 oz/A in conventional soybean. Always add surfactant at 0.25% v/v + 28% N or ammonium sulfate (AMS) or crop oil concentrate + 28% N or AMS. Soybean varieties vary in their sensitivity to sulfentrazone, a component in *Authority First/Sonic*. Consult your local seed dealer for information. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. *Authority First/Sonic* should be tank mixed with 2,4-D ester, glyphosate, glyphosate + 2,4-D ester, or *Gramoxone* to broaden the spectrum of burndown weed control.

**Authority MAXX (66 WG):** *Authority MAXX* can be applied in the **Fall, preplant** or **PRE** to control existing broadleaf vegetation. *Authority MAXX* contains *Spartan* (sulfentrazone) and *Classic* (chlorimuron-ethyl) (see **Table 2C**). Apply *Authority MAXX* at 5 oz/A as part of a planned 2-pass program. DO NOT apply *Authority MAXX* to soils with pH greater than 7.6. Always add a crop oil concentrate or a methylated seed oil at 1% v/v or a non-ionic surfactant at 0.25% v/v. The addition of ammonium sulfate (AMS) at 17 lb/100 gal may aid in control when tank-mixed with glyphosate. Soybean varieties vary in their sensitivity to sulfentrazone a component in *Authority MAXX*; consult your local seed dealer for information. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. *Authority MAXX* should be tank-mixed with 2,4-D ester, glyphosate, *Gramoxone*, *Sharpen*, *Express*, or *Express* + 2,4-D ester to broaden the spectrum of burndown weed control.

**Authority MTZ (45 DF):** *Authority MTZ* can be applied in the **Fall, EPP** (up to 45 days) or **PRE** to control existing vegetation and to provide residual weed control. *Authority MTZ* contains *Spartan* (sulfentrazone) and *Sencor* (see Table 2C). Apply *Authority MTZ* at 8 to 12 oz/A as part of a planned 2-pass program in glyphosate-resistant soybean or at 12 to 20 oz/A in conventional soybean. DO NOT apply *Authority MTZ* at rates greater than 12 oz/A if the soil pH is greater than 7.5. Always add crop oil concentrate (1% v/v). Soybean varieties vary in their sensitivity to sulfentrazone and metribuzin components in *Authority MTZ*; consult your local seed dealer for information. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. *Authority MTZ* should be tank mixed with 2,4-D ester, glyphosate, glyphosate + 2,4-D ester, or *Gramoxone* to broaden the spectrum of burndown weed control.

**Authority XL (70 WG):** *Authority XL* can be applied in the **Fall, preplant** or **PRE** to control existing broadleaf vegetation. *Authority XL* contains *Spartan* (sulfentrazone) and *Classic* (chlorimuron-ethyl) (see Table 2C). Apply *Authority XL* at 3 to 5 oz/A as part of a planned 2-pass program. DO NOT apply *Authority XL* to soils with pH greater than 7.6. Always add a crop oil concentrate or a methylated seed oil at 1% v/v or a non-ionic surfactant at 0.25% v/v. The addition of ammonium sulfate (AMS) at 17 lb/100 gal may aid in control when tank-mixed with glyphosate. Soybean varieties vary in their sensitivity

to sulfentrazone a component in *Authority XL*; consult your local seed dealer for information. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. *Authority XL* should be tank-mixed with 2,4-D ester, glyphosate, *Gramoxone*, *Express*, or *Express* + 2,4-D ester to broaden the spectrum of burndown weed control.

**Autumn (10 WG):** *Autumn* (iodosulfuron) at 0.3 oz/A may be applied in the **Fall only** to control existing vegetation of certain weeds and provide some residual weed control. Always add crop oil concentrate (1% v/v) and ammonium sulfate (2.5 lb/A). *Autumn* will not control ALS-resistant weeds. Consult **Table 2N** for maximum weed heights and effectiveness ratings. For improved burndown control, tank mixes with 2,4-D ester or glyphosate are recommended. Consult label and Table 12 for crop rotation restrictions.

**Autumn Super 51 WDG (51 WG):** *Autumn Super 51 WDG* at 0.5 oz/A may be applied in the **Fall only** to control existing vegetation of certain weeds and provide some residual weed control. *Autumn Super 51 WDG* contains *Autumn* (iodosulfuron) and thiencazuron-methyl (see Table 2C). Always add a crop oil concentrate or a methylated seed oil (1% v/v) and ammonium sulfate (2.5 lb/A). *Autumn Super 51 WDG* will not control ALS-resistant weeds. Consult **Table 2N** for maximum weed heights and effectiveness ratings. For improved burndown control, tank mixes with 2,4-D ester or glyphosate are recommended. Consult label and Table 12 for crop rotation restrictions.

**Canopy (75 WG):** *Canopy* can be applied in the **Fall, EPP** (up to 45 days) or **PRE** to control existing vegetation and to provide residual weed control. *Canopy* contains *Classic* (chlorimuron) and *Sencor* (see Table 2F). *Canopy* use rates range between 2.25 and 4 oz/A. DO NOT apply *Canopy* at rates greater than 2.25 oz/A to soils with a composite pH greater than 7.0; use of higher rates may result in unacceptable injury to this year's crop and the following crop. DO NOT apply *Canopy* to soils with a composite pH exceeding 7.6. Always add a crop oil concentrate at 1% v/v or surfactant at 0.25% v/v. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Fall applications of *Canopy* provide early-season residual control of certain weeds including common lambsquarters. However, effectiveness from the residual components of *Canopy* is greater the closer it is applied to planting. Consult label and Table 12 for crop rotation restrictions. For fall applications, adjust the rotational crop intervals by basing the interval on the date of soybean planting, not herbicide application. The addition of 2,4-D ester in fall or EPP applications is recommended and is required for control of certain weeds. *Canopy* can be tank mixed with *Express* (fall) or glyphosate to improve common chickweed control.

**Canopy EX (29.5 WG):** *Canopy EX* can be applied in the **Fall** and in the spring 7 days or more prior to soybean planting. *Canopy EX* contains *Classic* (chlorimuron) and *Express* (see Table 2F). *Canopy EX* use rates range from 1.1 to 2.2 oz/A, depending on soil pH. DO NOT apply *Canopy EX* at rates greater than 1.1 oz/A to soils with a composite pH greater than 7.0. DO NOT apply *Canopy EX* to soils with a composite pH exceeding 7.6. Always add a crop oil concen-

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trate at 1% v/v or surfactant at 0.25% v/v. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. For fall applications, adjust the rotational crop intervals by basing the interval on the date of soybean planting, not herbicide application. Fall applications of *Canopy EX* provide early-season residual control of certain weeds including common lambsquarters. However, effectiveness from the residual component of *Canopy EX* is greater the closer it is to planting. *Canopy EX* will not control ALS-resistant weeds. For best burndown results, the addition of 2,4-D ester is recommended.

**Envive (41.3 WG):** *Envive* can be applied in the **Fall, EPP** or **PRE** to control existing vegetation and to provide residual weed control. *Envive* contains *Classic* (chlorimuron), *Harmony*, and *Valor* (see Table 2C). *Envive* use rates range between 2.5 and 5.3 oz/A, for portions of Michigan south of highway I-96. The maximum use rate of *Envive* for portions of the Michigan north of I-96 is 2.5 oz/A. Soil pH also influences the maximum use rate of *Envive*. If the composite soil pH is between 7.1 and 7.6, do not apply more than 2.5 oz/A. DO NOT apply to soils with a composite pH exceeding 7.6. Always add a crop oil concentrate at 1% v/v. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Fall applications of *Envive* provide early-season residual control of certain weeds including common lambsquarters. However, effectiveness from the residual components of *Envive* is greater the closer it is applied to planting. Consult label and Table 12 for crop rotation restrictions. For best burndown results, the addition of 2,4-D ester is recommended.

**Extreme (2.17 L):** *Extreme* can be applied in the **Fall, EPP** (up to 45 days) or **PRE** to control existing vegetation and to provide residual weed control. *Extreme* contains glyphosate and *Pursuit* (see Table 2C). Apply *Extreme* at 3 pt/A. Always add surfactant at 0.25% v/v + 17 lb/100 gal of ammonium sulfate (AMS). Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control (*Pursuit*). Effectiveness from the residual component of *Extreme* is greater the closer it is applied to planting. Consult label and Table 12 for crop rotation restrictions. For fall applications, adjust the rotational crop intervals by basing the interval on the date of soybean planting, not herbicide application. Apply with 2,4-D ester for improved horseweed (marestalk) and perennial weed control.

**Fierce (76 WG):** *Fierce* can be applied in the **Fall, preplant** or **PRE** to control existing vegetation and to provide residual weed control. *Fierce* contains *Valor* (flumioxazin) and *Zidua* (pyroxasulfone) (see **Table 2C**). Apply *Fierce* at 3 or 3.75 oz/A depending on soil type and application timing. Always add a crop oil concentrate or a methylated seed oil at 1% v/v or a non-ionic surfactant at 0.25% v/v. The addition of ammonium sulfate (AMS) at 17 lb/100 gal may aid in control when tank-mixed with glyphosate. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. The effectiveness of *Fierce* is greater the closer it is to planting. Consult label and Table 12 for crop rotation restrictions. *Fierce* should be tank-mixed with 2,4-D ester, glyphosate, 2,4-D ester + glyphosate, *Gramoxone*, or *Liberty* to broaden the spectrum of burndown weed control.

**FirstRate (84 WG):** *FirstRate* can be applied **EPP** (up to 14 days) or **PRE** for control of existing vegetation and to provide residual weed control. Apply *FirstRate* at 0.3 to 0.6 oz/A, use the 0.6 oz/A rate for improved residual control. Always add crop oil concentrate at 1% v/v and 28% N at 2.5% v/v. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. *FirstRate* will not control ALS-resistant weeds. To broaden the spectrum of weed control, tank mix with glyphosate, *Gramoxone* or 2,4-D ester. More effective burndown occurs when conditions are warm and sunny.

**Flexstar 3.5 GT (2.82 L):** *Flexstar GT 3.5* can be applied **pre-plant** or **PRE** to control existing vegetation and to provide some residual weed control. *Flexstar GT 3.5* contains glyphosate and *Flexstar* (see Table 2C). Apply *Flexstar GT 3.5* at 3 pt/A. Crop oil concentrate at 1% v/v and ammonium sulfate (AMS) at 17 lb/100 gal. should be added to *Flexstar GT 3.5*. DO NOT apply products containing fomesafen (*Flexstar*, *Flexstar GT 3.5*, *Prefix* or *Reflex*) to the same field in CONSECUTIVE years. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications. Consult label and Table 12 for crop rotation restrictions. The addition of 2,4-D ester may enhance horseweed (marestalk) and perennial weed control.

**Linex/Lorox (4 L):** *Linex/Lorox* can be applied **EPP** (up to 30 days) or **PRE** for control of existing vegetation and to provide residual weed control. Apply *Linex/Lorox* at 1 pt/A. Always add crop oil concentrate at 1% v/v (preferred) or 0.25% v/v surfactant. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Effectiveness from *Linex/Lorox* is greater the closer it is applied to planting. To broaden the spectrum of weed control, tankmix with glyphosate or 2,4-D ester.

**OpTill (68 WG):** *OpTill* can be applied **preplant** or **PRE** to control existing vegetation and to provide residual control. *OpTill* contains *Sharpen* (saflufenacil) and *Pursuit* (see Table 2C). Apply *OpTill* at 2 oz/A. Always add a methylated seed oil (1% v/v) and ammonium sulfate (AMS) at 17 lb/100 gal. DO NOT apply *OpTill* after soybean emergence or severe crop injury will occur. DO NOT apply to coarse-textured soils with less than 2% organic matter unless soybean is planted 1 month after application. DO NOT tank mix or apply *OpTill* within 30 days of products containing flumioxazin (*Valor*), sulfentrazone (*Authority* or *Spartan*), fomesafen (*Reflex*) or clomazone (*Command*). Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. *OpTill* should be tank mixed with glyphosate or glyphosate + 2,4-D ester to broaden the spectrum of burndown weed control.

**OpTill PRO (co-pack):** *OpTill PRO* can be applied in the **Fall, preplant** or **PRE** to control existing vegetation and to provide residual control. *OpTill PRO* is a co-pack of *OpTill* (*Sharpen* + *Pursuit*) and *Outlook* (see **Table 2C**). Apply *OpTill PRO* at 2 oz/A (dry) and 10 oz/A (liquid). Always add a methylated seed oil (1% v/v) and ammonium sulfate (AMS) at 17 lb/100 gal. DO NOT apply *OpTill PRO* after soybean emergence or severe crop injury will occur. DO NOT apply to coarse textured soils with less than 2% organic matter, unless soy-

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bean is planted 1 month after application. DO NOT tank-mix or apply *Optill PRO* within 30 days of preemergence applications of flumioxazin (*Valor*), sulfentrazone (*Authority* or *Spartan*), fomesafen (*Reflex*), or clomazone (*Command*) containing products. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. *Optill PRO* should be tank-mixed with glyphosate, or glyphosate + 2,4-D ester to broaden the spectrum of burndown weed control.

**Python WDG (80 WG):** *Python* can be applied **EPP** (up to 30 days) or **PRE** for control of existing vegetation and to provide residual weed control. Apply *Python* at 1.14 oz/A. Always add crop oil concentrate at 1% v/v. *Python* can also be applied in the **Fall** for burndown activity of winter annual weeds, but it is not likely to provide extended residual control in the spring. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Effectiveness from *Python* is greater the closer it is applied to planting. *Python* will not control ALS-resistant weeds. To broaden the spectrum of weed control, tank-mix with glyphosate, *Gramoxone* or 2,4-D ester. More effective burndown occurs when conditions are warm and sunny.

**Sencor (75 DF):** *Sencor* can be applied **EPP** (up to 30 days) or **PRE** for control of existing vegetation and to provide residual weed control. Apply *Sencor* at 5.33 oz/A. Always add crop oil concentrate at 1% v/v. *Sencor* can also be applied in the fall for burndown activity of winter annual weeds, but it is not likely to provide extended residual control in the spring. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Effectiveness from *Sencor* is greater the closer it is applied to planting. *Sencor* will not control triazine-resistant weeds. To broaden the spectrum of weed control, tank mix with glyphosate, *Gramoxone* or 2,4-D ester.

**Sequence (5.25 L):** *Sequence* can be applied **EPP** (up to 30 days) or **PRE** to control existing vegetation and to provide residual weed control. *Sequence* contains glyphosate and *Dual Magnum* (see Table 2C). Apply *Sequence* at 2.5 pt/A. Ammonium sulfate (AMS) at 17 lb/100 gal should be added. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control (*Dual Magnum*). The addition of 2,4-D ester may enhance horseweed (maretail) and perennial weed control.

**Spartan Charge (3.5 SC):** *Spartan Charge* can be applied in the **Fall**, **EPP** or **PRE** to control existing vegetation and to provide residual control. *Spartan Charge* contains *Spartan* (sulfentrazone) and *Aim* (see Table 2C). Apply *Spartan Charge* at 6 oz/A as part of a planned two-pass program in glyphosate resistant soybean or at 8 oz/A in conventional soybean. Use the lower end of the rate range when the pH is greater than 7.0. DO NOT apply *Spartan Charge* to soils with pH of 7.5 or higher or on sands with less than 1% organic matter. Always add a 0.5% v/v of a non-ionic surfactant and 17 lb/100 gal of ammonium sulfate. Soybean varieties vary in their sensitivity to sulfentrazone, a component in *Spartan Charge*; consult your local seed dealer for information. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications

and **Table 2A** for residual weed control. Consult label and Table 12 for crop rotation restrictions. For improved burndown control, tank mixes with 2,4-D ester or glyphosate are recommended.

**Synchrony XP (28.4 WG):** *Synchrony XP* can be applied **EPP** (up to 45 days) or **PRE** to control existing vegetation and to provide residual weed control. *Synchrony XP* contains *Classic* (chlorimuron) and *Harmony* (see Table 2C). *Synchrony XP* use rates range between 1 and 3 oz/A, depending on soil pH. If the composite soil pH is between 7.1 and 7.6, do not apply more than 1 oz/A. DO NOT apply to soils with a composite pH exceeding 7.6. Use a minimum of 1 oz/A of *Synchrony XP* for burndown activity and a minimum of 1.25 oz/A for residual control of labeled weeds. Always add a crop oil concentrate at 1% v/v. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Fall applications of *Synchrony XP* provide early-season residual control of certain weeds including common lambsquarters. However, effectiveness from the residual components of *Synchrony XP* is greater the closer it is applied to planting. Consult label and Table 12 for crop rotation restrictions. *Synchrony XP* will not control ALS-resistant weeds. For best burndown results, the addition of 2,4-D ester is recommended.

**Valor (51 WG):** *Valor* can be applied **EPP** (up to 14 days) or **PRE** for control of existing vegetation and to provide residual weed control. Apply *Valor* at 2 to 3 oz/A, 2.5 oz/A is the typical use rate. Always add crop oil concentrate at 1% v/v; for burndown activity. *Valor* can also be applied in the **Fall** for burndown activity of winter annual weeds, but it is not likely to provide extended residual control in the spring. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Effectiveness from *Valor* is greater the closer it is applied to planting. More effective burndown occurs when conditions are warm and sunny. *Valor* has poor postemergence activity on horseweed (maretail), but it had good preemergence activity. *Valor* should be tank-mixed with 2,4-D ester, glyphosate, glyphosate + 2,4-D ester, or *Gramoxone* to broaden the spectrum of burndown weed control.

**Valor XLT (40.3 WG):** *Valor XLT* can be applied in the **Fall**, **EPP** or **PRE** to control existing vegetation and to provide residual weed control. *Valor XLT* contains *Classic* (chlorimuron) and *Valor* (see Table 2C). *Valor XLT* use rates range between 3 and 5 oz/A, depending on soil pH. If the composite soil pH is greater than 6.8, do not apply more than 2.5 oz/A. Weeds will only be suppressed at this rate. DO NOT apply to soils with a composite pH exceeding 7.6. Always add a crop oil concentrate at 1% v/v; ammonium sulfate is also recommended. Consult **Table 2N** for maximum weed heights and effectiveness ratings for burndown applications and **Table 2A** for residual weed control. Fall applications of *Valor XLT* provide early-season residual control of certain weeds including common lambsquarters. However, effectiveness from the residual components of *Valor XLT* is greater the closer it is applied to planting. Consult label and Table 12 for crop rotation restrictions. For best burndown results, the addition of 2,4-D ester, glyphosate, or glyphosate + 2,4-D ester is recommended.

## Effectiveness of Herbicides for No-Till Soybean

Fall or Spring Burndown	LENGTH OF CONTROL <sup>d</sup>	ANNUAL BROADLEAVES / GRASSES											WINTER ANNUALS / PERENNIALS								COVER CROPS					
		Cocklebur	Jimsonweed	Lambsquarters	Nightshade (E. Black)	Pigweed	Ragweed (Common)	Ragweed (Giant)	Smartweed	Velvetleaf	Wild mustard	Barnyardgrass	Foxtails	Chickweed (Common)	Deadnettle	Henbit	Horseweed (Marestail)	Pennycress	Shepherd's-purse	Yellow rocket	Dandelion	Quackgrass	Rye	Wheat	Clover	Hairy Vetch
		Maximum Weed Height (inches)											Herbicide Effectiveness													
Glyphosate (0.75 lb ae/A) <sup>a</sup>	0	6	6	6	6	6	6	6	6	6	6	6	<b>F</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>G</b> <sup>e</sup>	<b>G</b>	<b>F</b>	<b>F</b>	F	F
Glyphosate (1.13 lb ae/A) <sup>a</sup>	0	12	12	12	12	12	12	12	12	12	12	12	<b>F</b>	<b>G</b>	<b>G</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>G</b> <sup>e</sup>	<b>G</b>	<b>F</b>	<b>F</b>	F	F
Gramoxone SL 2.0 (2 pt/A)	0	3	3	3	3	3	3	-	3	3	3	3	<b>F</b>	P	<b>G</b>	P	<b>G</b>	<b>G</b>	<b>G</b>	P	P	F	F	P	P	
Gramoxone SL 2.0 (3 pt/A)	0	6	6	6	6	6	6	-	6	6	6	6	<b>F</b>	F	<b>G</b>	P	<b>F</b>	<b>F</b>	<b>F</b>	P	P	<b>G</b>	<b>G</b>	F	F	
Liberty (29 oz/A)	0	14	10	6	8	4	10	12	14	4	6	5	12	<b>F</b>	F	F	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	F	N	P	F	P	<b>G</b>
2,4-D ester <sup>b</sup> (1 pt/A)	0	3	-	3	3	3	3	-	2	3	-	-	P	P	P	<b>F</b>	<b>G</b>	<b>G</b>	<b>G</b>	P	N	N	N	F	F	
2,4-D ester <sup>c</sup> (1 qt/A)	1	6	3	6	6	6	6	3	5	6	-	-	P	F	F	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	F	N	N	N	<b>G</b>	<b>G</b>	
Express (0.25 oz/A)	0	-	-	3	-	-	-	-	-	3	-	-	<b>F</b>	<b>G</b>	<b>G</b>	P	<b>G</b>	F	P	F	N	N	N	N	N	
Aim + glyphosate (1 oz + 0.75 lb ae/A)	0	4	4	4	4	4	4	4	4	4	4	4	<b>G</b>	F	<b>G</b>	<b>G</b>	<b>F</b>	<b>F</b>	<b>F</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	F	F	
Sharpen (1 oz/A)	0	6	-	6	6	6	6	6	6	6	-	-	F	P	P	<b>F</b>	<b>G</b>	<b>G</b>	<b>G</b>	P	N	N	N	F	N	
Sharpen + glyphosate (1 oz + 0.75 lb ae/A)	0	6	6	6	6	6	6	6	6	6	6	6	<b>G</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	F	F	
Verdict + glyphosate (5 oz + 0.75 lb ae/A)	0	6	6	6	6	6	6	6	6	6	6	6	<b>G</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	F	F	
Vida + glyphosate (1 oz + 0.75 lb ae/A)	0	4	-	4	4	4	4	4	4	-	-	-	<b>F</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	F	<b>G</b>	<b>F</b>	<b>F</b>	F	F	
Authority Assist (5 oz/A)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	N	N	N	N	
Authority First/Sonic (3.2 oz/A)	2	10	4	-	-	-	8	10	6	6	2	-	-	P	P	P	<b>F</b>	<b>G</b>	F	F	P	N	N	N	P	P
Authority MAXX (5 oz/A)	2	-	-	-	-	-	-	-	-	-	-	-	F	F	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	F <sup>e</sup>	N	P	P	P	P	
Authority MTZ (10 oz/A)	2	-	-	-	-	-	-	-	-	-	-	-	F	P	P	F	F	F	F	P	N	N	N	P	P	
Authority XL (3.2 oz/A)	3	-	-	3	3	3	3	3	-	3	1	1	F	F	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b> <sup>e</sup>	N	P	P	P	P	
Autumn (0.3 oz/A)	2	-	-	-	-	3	-	-	-	3	-	-	F	F	<b>G</b>	-	<b>G</b>	<b>G</b>	<b>G</b>	F	N	-	-	-	-	

(continued on next page)

## Effectiveness of Herbicides for No-Till Soybean (continued)

Fall or Spring Burndown	LENGTH OF CONTROL <sup>d</sup>	ANNUAL BROADLEAVES / GRASSES													WINTER ANNUALS / PERENNIALS								COVER CROPS			
		Cocklebur	Jimsonweed	Lambsquarters	Nightshade (E. Black)	Pigweed	Ragweed (Common)	Ragweed (Giant)	Smartweed	Velvetleaf	Wild mustard	Barnyardgrass	Foxtails	Chickweed (Common)	Deadnettle	Henbit	Horseweed (Marestail)	Pennycress	Shepherd's-purse	Yellow rocket	Dandelion	Quackgrass	Rye	Wheat	Clover	Hairy Vetch
		Maximum Weed Height (inches)													Herbicide Effectiveness											
Autumn Super (0.5 oz/A)	2	-	-	-	-	3	-	-	-	-	3	-	-	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>G</b>	N	-	-	<b>G</b>	<b>G</b>
Canopy (3 oz/A)	3	-	-	3	-	3	3	3	-	3	2	2	<b>G</b>	<b>G</b>	<b>G</b>	F	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>G</b> <sup>e</sup>	N	P	P	P	P
Canopy EX (1.65 oz/A)	3	-	-	-	-	3	3	3	3	3	-	-	<b>E</b>	<b>G</b>	<b>G</b>	<b>G</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>G</b> <sup>e</sup>	N	P	P	P	P
Envive (3.5 oz/A)	3	-	-	-	-	3	3	3	3	3	-	-	P	<b>G</b>	<b>G</b>	F	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>G</b> <sup>e</sup>	N	P	P	P	P
Extreme (3 pt/A)	2	18	6	8	12	18	9	9	6	5	18	6	18	<b>E</b>	F	<b>G</b>	<b>G</b>	<b>G</b>	<b>E</b>	<b>G</b>	F	<b>G</b>	<b>G</b>	<b>G</b>	P	P
Fierce (3 oz/A)	2	-	-	-	-	-	-	-	-	-	-	-	-	P	F	F	P	<b>G</b>	<b>E</b>	<b>G</b>	F	N	N	N	P	P
FirstRate (0.3 - 0.6 oz/A)	2	10	4	-	-	-	8	10	6	6	2	-	-	P	P	P	<b>E</b>	<b>G</b>	F	F	P	N	N	N	P	P
Flexstar GT 3.5 (3.5 pt/A)	1	4	4	4	4	4	4	4	4	4	6	6	18	<b>E</b>	<b>G</b>	<b>G</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>	F	<b>G</b>	<b>E</b>	<b>E</b>	F	F
Linex/Lorox (1 pt/A)	2	6	-	6	-	-	6	-	6	6	6	2	2	<b>G</b>	P	P	P	P	P	P	P	P	P	P	P	P
OpTill (2 oz/A)	2	8	3	6	6	6	6	6	6	6	6	3	3-6	F	P	P	<b>E</b>	<b>G</b>	<b>G</b>	<b>G</b>	P	N	N	P	F	N
OpTill PRO (2 + 10 oz/A)	2	8	3	6	6	6	6	6	6	6	6	3	3-6	F	P	P	<b>E</b>	<b>G</b>	<b>G</b>	<b>G</b>	P	N	N	P	F	N
Python WDG (1.14 oz/A)	2	-	-	-	-	-	-	-	-	-	-	-	-	<b>G</b>	P	P	<b>G</b>	<b>G</b>	F	<b>G</b>	P	N	N	N	P	P
Sencor (5.33 oz/A)	1	1	-	1	-	1	1	-	-	-	-	-	-	<b>G</b>	<b>G</b>	<b>G</b>	F	<b>G</b>	<b>G</b>	<b>G</b>	P	N	N	N	P	P
Sequence (2.5 pt/A)	2	12	12	6	6	12	12	12	6	6	18	6	18	<b>E</b>	F	<b>G</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>	F	<b>G</b>	<b>E</b>	<b>E</b>	F	F
Spartan Charge (6 oz/A)	2	-	3	3	3	3	-	-	3	3	3	-	-	-	-	-	-	<b>G</b>	<b>G</b>	<b>G</b>	P	N	-	-	-	-
Synchrony XP (1.5 oz/A)	3	-	-	3	-	3	3	3	3	3	3	-	-	P	<b>G</b>	<b>G</b>	F	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>G</b> <sup>e</sup>	N	P	P	P
Valor (2.5 oz/A)	2	-	-	-	-	-	-	-	-	-	-	-	-	P	F	F	P	<b>G</b>	<b>E</b>	<b>G</b>	F	N	N	N	P	P

P = Poor; F = Fair; **G** = Good; **E** = Excellent; N = None; - = Not labeled or recommended.

<sup>a</sup> See Table 10 for glyphosate products, formulations and rates. Lower glyphosate rates may be used for smaller weeds at lower spray volumes. Consult label.

<sup>b</sup> Wait a minimum of 7 days before planting soybean.

<sup>c</sup> Wait a minimum of 30 days before planting soybean.

<sup>d</sup> Length of summer weed control: 0 = no residual control; 1 = short residual control; 2 = moderate residual control; 3 = long residual control.

<sup>e</sup> Dandelion control from fall applications.