Sakura® 850 WG

The Agronomy Club – March 2010

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Kumiai Chemical Industry Co. discovered a new pre-emergent herbicide known as KIH-485

Initially tested in Australia by universities

2006 – Bayer CropScience trial work commenced
  ▪ Product renamed BAYER 191

2009 – Submission for registration
  ▪ Announcement of product name: Sakura® 850 WG

2011 – Registration expected in time for launch prior to pre-emergent herbicide season

An application for registration of Sakura has been made. Sakura is not a registered product.
Reliable pre-emergent control of annual ryegrass (including resistant biotypes), barley grass and other key weeds in wheat (not durum), barley and triticale

Very good residual control

Compatible with conservation farming

High level of crop safety in wheat (not durum) and triticale

Long application window (up to 14 days prior to seeding)

High concentration WG formulation with low application rate (118 g/ha)
- Active ingredient: 850 g/kg pyroxasulfone
- Formulation: WG (Wettable Granule)
- Vapour Pressure: 2.4 x 10^-6 Pa (20°C)
- Solubility: 3.49 mg/L (20°C)
- Hydrolysis: Stable at pH 5, 7 and 9 (20°C, 30 days)
- Sakura® 850 WG is a residual, soil applied, pre-emergent herbicide.
- It is absorbed by both the roots and shoots of germinating weeds.
- Weed control is optimised when Sakura is applied evenly to moist soil just prior to incorporation by sowing and there is sufficient rainfall soon after sowing to ensure uptake of the herbicide by germinating weeds.
- Weed control may be greatly reduced where seeds have been buried by cultivation prior to application.
- Weed control may also be reduced where there is insufficient soil moisture for herbicide uptake or in soils prone to leaching where rainfall is sufficiently heavy to cause movement of the herbicide out of the weed seed zone.
- Sakura will not reliably control emerged weeds. A knockdown herbicide should be used to control emerged weeds at sowing.
Crops:
- Wheat (not durum), barley, triticale

Weeds:
- Annual ryegrass (*Lolium rigidum*) & barley grass (*Hordeum leporinum*)

Additional weeds (subject to review):
- silver grass (*Vulpia* spp.), annual phalaris (*Phalaris paradoxa*) and toad rush (*Juncus bufonius*)

Seeding Systems:
- IBS - knife points and press wheels or narrow points and harrows

Use in other seeding systems, efficacy on other weeds and use in other crops will be further evaluated.
control of annual ryegrass

Average of NW50/07, NW07/07, SA04/07, WA19/07, VB01/07, VB02/07, VA07/08, VB02/08, VB02/09, NW08/09
All trials from 2007 contained prosulfocarb + s-metolachlor mixture (equivalent to Boxer Gold® @ 2.5 L/ha)
* Application rate proposed for registration
control of barley grass

Average of ND03/07, NW08/07, WB05/07, ND02/07, ND03/08, NW09/08, SA02/08, WB04/08, ND05/08, NW06/09
All trials from 2007, 2008 and 2009 that contained barley grass
* Application rate proposed for registration
control of silver grass (*Vulpia spp.*)*

Average of NW06/07, NW06/09, NW08/09, VB02/09, WB01/09, WA07/09

All trials from 2007, 2008 and 2009 that contained silvergrass

* Preliminary trial data only - no application for registration has been made

Trials excluded WA17/07, 269.4 mm between application and weed count, soil type sand, 50% stubble, no knockdown at sowing from graph: WA14/08 – 25 days sow to spray due to water logging, PSPE rating 100 for all Sakura rates
control of *Phalaris paradoxa*

<table>
<thead>
<tr>
<th>Product</th>
<th>% Control</th>
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<tbody>
<tr>
<td>Sakura 850 WG</td>
<td>88 g/ha</td>
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<tr>
<td>Sakura 850 WG</td>
<td>118 g/ha</td>
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<tr>
<td>Sakura 850 WG</td>
<td>176 g/ha</td>
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<tr>
<td>Sakura 850 WG</td>
<td>235 g/ha</td>
</tr>
</tbody>
</table>
| Boxer Gold 2.5 L/ha + Trifluralin 1.5 L/ha | **Average of ND32/07, NW35/08, NW21/09, ND06/09, VB01/09, VB02/09**
|                  |           |
|                  | All trials from 2007, 2008 and 2009 that contained phalaris |
|                  | All trials from 2007 contained prosulfocarb + s-metolachlor (equivalent to Boxer Gold @ 2.5 L/ha) |
|                  | * Preliminary trial data only - no application for registration has been made |

* Preliminary trial data only - no application for registration has been made
control of toad rush (\textit{Juncus bufonius})*

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Control</th>
<th>Rate (g/ha)</th>
<th>Rate (L/ha)</th>
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<tbody>
<tr>
<td>Sakura 850 WG</td>
<td>90</td>
<td>88</td>
<td>1.25</td>
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<td>Sakura 850 WG</td>
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<td>Sakura 850 WG</td>
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<td>Boxer Gold</td>
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<tr>
<td>Boxer Gold</td>
<td>70</td>
<td>2.5</td>
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Average of VA07/08, NW09/09, VA01/09, VB03/09, WB08/09, WA14/08
All trials from 2008 and 2009 that contained toad rush
* Preliminary trial data only - no application for registration has been made

WB08/09 – 456.8 mm rain between application and weed count, soil type loamy sand, 50% stubble.

WA14/08 – 25 days sow to spray due to water logging, PSPE rating 100 for all Sakura rates
Wild oat control with Sakura 850 WG 118 g/ha alone is too low and generally gives inadequate control.

Preliminary trial data only - no application for registration has been made.
control of brome grass (*Bromus diandrus*)

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<thead>
<tr>
<th>% Brome grass control</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
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<tr>
<td>Sakura 850 WG</td>
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<td>118 g/ha</td>
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<td>176 g/ha</td>
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Average of NW09/07, WA17/07, SA20/07, VD15/08, WA34/08, VA16/08
All trials from 2007 and 2008 that contained brome grass
* Preliminary trial data only - no application for registration has been made
Sakura is a very reliable herbicide when used as directed.

There are a number of factors that can influence the efficacy of pre-emergent herbicides.

In general these same factors impact all other pre-emergent herbicides to varying degrees.
Factors affecting control

- Soil moisture
- Cultivation
- Herbicide rate
- Weed species
- Application timing
- Soil type
- Clods and soil organic matter – OM%, stubble
- Burning – ash
- Crop tolerance
- Resistance
- Soil temperature
- Soil pH – not important for Sakura efficacy
- Photo degradation – not important to Sakura
- Volatilization – not important to Sakura
Annual ryegrass control by Sakura at 118 g/ha (2007 trials only)
factors affecting control

excluding sites with 50% or more trash

Annual ryegrass control by Sakura at 118 g/ha (2007 trials only)
excluding sites with 50% or more trash and/or cultivation in 2 weeks before sowing

Annual ryegrass control by Sakura at 118 g/ha (2007 trials only)
excluding sites with 50% or more trash and/or cultivation in 2 weeks before sowing and/or dry in the 2 weeks after planting

Annual ryegrass control by Sakura at 118 g/ha (2007 trials only)
Weed control may be adversely affected by uneven application, application to ridged or cloddy soil, stubble or trash cover particularly above 50%.

**Ryegrass control (W07-107)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Control Rating (0-100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil trash</td>
<td>90</td>
</tr>
<tr>
<td>25 % trash</td>
<td>80</td>
</tr>
<tr>
<td>50 % trash</td>
<td>70</td>
</tr>
<tr>
<td>75 % trash</td>
<td>60</td>
</tr>
<tr>
<td>Nil trash</td>
<td>50</td>
</tr>
<tr>
<td>50 % trash</td>
<td>40</td>
</tr>
<tr>
<td>Boxer Gold 2.5 L/ha</td>
<td>30</td>
</tr>
<tr>
<td>Triflur Xcel 1.6 L/ha</td>
<td>20</td>
</tr>
<tr>
<td>Sakura 850 WG 118 g/ha</td>
<td>10</td>
</tr>
</tbody>
</table>
To optimise weed control, apply directly to uncultivated soil. Weed control may be greatly reduced where weed seeds have been buried by cultivation prior to sowing.
NW22/06. Moist soil at application and over next 6 weeks. Enough moisture for weed germination and herbicide activity.

VB01/06. Dry at application, no moisture for weed germination or herbicide activity until rain 32 days later.

WA19/06. Very little soil moisture at application and dry for 3 weeks after. Enough moisture for some weed germination but limited herbicide activity expected.
## CRITICAL COMMENTS

| To optimise weed control apply directly to uncultivated soil. Weed control may be greatly reduced where weed seeds have been buried by cultivation prior to sowing. Weed control may be adversely affected by uneven application, application to ridged or cloddy soil, stubble or trash cover particularly above 50%, germinated and emerged weeds that are not controlled by a knockdown herbicide or insufficient rainfall within 7 to 10 days after application. These factors when combined may substantially reduce weed control. |

(Source: DRAFT LABEL)
Weed control reduced and results more variable on sandy soils.

Note: different trials in each bar.
Sand soils

Weed control may be reduced in soil prone to leaching where rainfall after application and sowing is sufficiently heavy to cause movement of the herbicide out of the weed seed zone.
when to assess

Sakura gives longer residual control

Sakura 850 WG – Update (for external use) Feb 2010 • Page 28
To optimise weed control incorporate by sowing as soon as practicable after the application of SAKURA 850 WG and no later than 14 days after application. Minor reductions in weed control may be expected where sowing is delayed beyond 7 days (DRAFT LABEL).

Sakura 850 WG – Update (for external use) Feb 2010 • Page 29
SAKURA 850 WG generally shows good crop selectivity when used as directed.

- Only wheat (not durum wheat), barley or triticale
- When using knife points and press wheels, avoid throwing treated soil into adjacent crop rows.
- Where deep furrows are formed, heavy rainfall immediately following sowing that results in soil movement into the crop row may increase the potential for crop damage.

Barley is more sensitive to SAKURA 850 WG than wheat and triticale, therefore crop effects are more likely and may be more pronounced than for wheat and triticale.

- Sow barley as soon as practicable after the application of SAKURA 850 WG.
- When sowing barley, only use knife points and press wheels; do not use harrows.
Current Draft label:

SAKURA 850 WG is compatible with any one of the following herbicides; Avadex® Xtra, Diuron 900WG, Dual® Gold, Glean®, glyphosate (Roundup® CT, Roundup PowerMax®, Sickle® 540), Gramoxone® 250, Logran®, Sprayseed®, Trifluralin 480 and Triflur Xcel® and insecticides; Endosulfan, Fastac® and Le-mat®. For advice on compatibilities not listed above, contact Bayer CropScience.

Additional claims (subject to review):

Roundup CT + Ally ®, Roundup CT + Logran B-Power ®, Roundup CT + Cadence ®, Roundup CT + Amicide 625 ®, Roundup CT + Estercide 800 ®, Roundup CT + Hammer ®, Roundup CT + Goal CT ®, Roundup CT + Monza ®
Crop Rotation Recommendations
Minimum recropping intervals have been established for the following crops after Sakura 850 WG use in the previous season. Rainfall of less than 250 mm following Sakura 850 WG use will result in extended recropping intervals.

<table>
<thead>
<tr>
<th>Crops</th>
<th>Recropping recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat (not durum wheat) and triticale</td>
<td>Can be sown immediately following application of Sakura 850 WG</td>
</tr>
<tr>
<td>Cotton, maize, mungbeans, sorghum, soybeans and sunflowers</td>
<td>Can be sown 5 months after the application of Sakura 850 WG</td>
</tr>
<tr>
<td>Barley, chickpeas, faba beans, field peas, lentils, lupins, vetch and subterranean clover</td>
<td>Can be sown 9 months after the application of Sakura 850 WG</td>
</tr>
</tbody>
</table>

For advice on crops not listed above, contact Bayer CropScience.

The following information is preliminary only, and has not been submitted for registration.

- Durum wheat, oats, lucerne and medic can be sown 21 month after application of Sakura (pending review)
- Canola can be sown 9 months after application of Sakura
Pyroxasulfone controls weeds by inhibiting the production of very long chain fatty acids.

It is expected that pyroxasulfone will be officially classified into a herbicide mode of action Group towards the end of 2010.

It will most likely be classified as a Group K herbicide.

Sakura has demonstrated excellent control of annual ryegrass resistant to Groups A, B, C and D.
trifluralin resistant ryegrass

Figure 1. Effect of Trifluralin, KIH and Boxer Gold on trifluralin resistant ryegrass. % Survival to trifluralin (white bars), KIH (black bars) and Boxer Gold (grey bars). Only white bars (trifluralin) are present because no resistance to KIH and Boxer Gold was detected. Sample 21 = known herbicide susceptible ryegrass

Dr Peter Boutsalis, Dr Christopher Preston and Dr Gurjeet Gill, University of Adelaide and GRDC 2007 New South Wales GRDC Grains Research Update
- New residual pre-emergent herbicide in wheat (not durum), barley and triticale
- Expected launch in 2011
- Highly concentrated WG formulation with low use rate
- Controls Groups A, B, C and D resistant ryegrass
- High level of control of annual ryegrass and barley grass (when used as according to the label)
- Active on wide spectrum of weeds
- Flexible application window
- Suitable for IBS
- Ideal product for direct drilling
- Control may be poorer on sandy soils