Frontier® Optima

Reg. No.: L7011; N-AR 0803

Act No. 36 of 1947

FOR FULL PARTICULARS, SEE ENCLOSED PAMPHLET

HRAC HERBICIDE GROUP CODE K3

An emulsiﬁable concentrate pre-emergent herbicide, for control of annual grasses and annual broadleaf weeds (as indicated), and under certain conditions also yellow nutsedge, in dry beans, grain sorghum, groundnuts, kidney beans, maize, potatoes, soya beans, sunﬂower and tobacco.

Active ingredient: Dimethenamid-P (chloroacetamide) ............... 720 g/l

Aktiewe bestanddeel: Argel of chloroacetamide

Reg. Nr: L7011; N-AR 0803

Wet Nr 36 van 1947

VIR VOLLE BESONDERHEDE, SIEN INGESLOTE PAMFLET

HRAC ONKRUIDDODERGROEPKODE K3

‘n Emulgeerbare konsentraat voor-opkomsonkruiddoder, vir die beheer van eenjarige grasse en eenjarige breëbлаarokruid (soos aangetoon), en onder sekere omstandighede ook geelwellies, in aartappels, droëbonde, graansorghum, grondbone, melies, nierbone, sojabone, sunblom en tabak.

Registered by / Geregistrer deur:
BASF South Africa (Pty) Ltd. / BASF Suid-Afrika (Edms) Bpk.
(Co. Reg. No. / Mpy. Reg. Nr. 66/10235/07)
P.O. Box / Posbus 2801, Halfway House / Haltweghuis 1685.

EMERGENCY NUMBER / NOODNOMMER: 083 265 3805

UN No. / VN Nr: 3082

Batch Number / Lotnummer and Date manufactured / Datum vervaardig

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CAUTION VERSIGTIG
WARNINGS

- Harmful when swallowed.
- Keep locked up, out of the reach of children, uninformed persons and animals.
- Keep in the original container and store in a cool place away from food and feeds.
- Prevent contamination of food, feed, drinking water and eating utensils.
- Irritating to eyes and skin; avoid contact, ingestion and inhalation.
- May cause sensitization in contact with skin.
- Toxic to fish.

Although this remedy has been extensively tested under a large variety of conditions, the registration holder does not warrant that it will be efficacious under all conditions, because the action and effect thereof, may be affected by factors such as abnormal soil, climatic and storage conditions, quality of dilution water, compatibility with other substances not indicated on the label and the occurrence of resistance of the weed against the remedy concerned, as well as by the method, time and accuracy of application. The registration holder furthermore does not accept responsibility for damage to crops, vegetation, the environment, harm to man or animal, or for lack of performance of the remedy concerned due to failure of the user to follow the label instructions, or to the occurrence of conditions, which could not have been foreseen in terms of the registration. Consult the supplier in the event of any uncertainty.

PRECAUTIONS

- Wear rubber gloves and boots, overall and face shield, when handling the concentrate and whilst applying.
- Wash contaminated clothing after use.
- Do not inhale spray mist.
- Do not eat, drink or smoke whilst mixing or applying the product.
- Wash hands and face with soap and water after use and accidental skin contact.
- TRIPLE RINSE empty container in the following manner: Invert the empty container over the spray or mixing tank and allow to drain for at least 30 seconds after the flow has slowed down to a drip. Thereafter rinse empty container three times with a volume of water equal to a minimum of 10% of that of the container. Add the rinsings to the contents of the spray tank before destroying the container by perforation, flattening and burying, and never re-use for any other purpose.
- Clean application equipment after use.
- Dispose of equipment wash water where it will not contaminate crops, grazing, rivers, dams etc.

USE RESTRICTIONS

- Avoid spray drift onto desirable vegetation, or non-target areas.
- Prevent contamination of grazing, rivers, dams and areas not under treatment.
- Avoid overlapping spray swaths.

WITHHOLDING PERIOD

- Following normal harvest of crop treated with Frontier® Optima, there is no restriction on planting any other follow-up crops.
- In the event of weather induced failure of a crop treated with Frontier® Optima alone, lands can be immediately replanted with any Frontier® Optima registered crop. Under such conditions, reliance should be made on post-emergent weed control.
- In the event of Frontier® Optima having been applied with another herbicide, refer to the specific label for that herbicide.

RESISTANCE WARNING

Frontier® Optima is a member of the chloroacetamide group of herbicides. The mode of action of this group is primarily the inhibition of cell division, and as such it is classified by HRAC as a Group Code K3 herbicide.
Certain naturally-occurring weed biotypes resistant to Frontier® Optima and other cell division inhibiting herbicides may exist through normal genetic variability in any weed population. The resistant individuals can eventually dominate the weed population, if this group of herbicides are used repeatedly. These resistant weeds will not be controlled by Frontier® Optima and are unlikely to be controlled by other herbicides which inhibit cell division.

Since the presence of resistant weeds is difficult to detect prior to herbicide application, it is of the utmost importance that treated areas be inspected at regular intervals to timely identify the occurrence of herbicide-resistant weeds. BASF SA (Pty) Ltd will not accept liability for performance failures in the event of a build-up of resistant weeds, resulting from inadequate resistance management practices.

To delay herbicide resistance:

- Avoid exclusive, repeated use of herbicides from the same Herbicide Group Code. Integrate other control methods (chemical rotation, cultural, crop rotation, biological), into weed control programmes.

FOR SPECIFIC INFORMATION ON RESISTANCE MANAGEMENT, CONTACT YOUR LOCAL BASF SA (Pty) Ltd REPRESENTATIVE.

DIRECTIONS FOR USE:

USE ONLY AS DIRECTED

General information:

- **Frontier® Optima** is a pre-emergent, broad-spectrum herbicide for the control of annual grasses and annual broadleaf weeds (as indicated) and under certain conditions also yellow nutsedge.
- The site of uptake of **Frontier® Optima** by weeds is through the coleoptile in monocotyledonous plants (grasses) and through the hypocotyl and developing roots in dicotyledonous plants (broadleaf weeds). Uptake occurs between germination of the seed and emergence of the seedling from the soil.
- The timing of application should therefore occur in time to enable **Frontier® Optima** to enter the soil moisture (activation) and reach the target site, prior to the emergence of the weeds.
- Rain or irrigation is required prior to weed emergence, to facilitate activation.
- Late applications or activation, or applications to already emerged weeds will result in greatly reduced efficacy.

Compatibility:

**Frontier® Optima** is compatible with:

- Registered atrazine SC formulations containing 500 g/l active ingredient.
- **Hammer** (L5201), refer to the **Hammer** label for further details.
- Gesaprim Super® 600 SC (L3914).

Always refer to the relevant product labels mentioned.

The compatibility of other / alternate formulations of the above products is unknown.

Mixing instructions:

- Three-quarter fill the spray tank with clean water. Shake the **Frontier® Optima** container well.
- Measure the required volume of **Frontier® Optima** and pre-mix this with at least 10 l of water before adding to the spray tank.
- Fill the spray tank with water to the required level, while maintaining agitation to ensure thorough mixing of the spray mixture.
- If any other products are to be mixed with **Frontier® Optima**, individually pre-mix the required volume of each product in similar fashion before adding to the spray water.
- When **Frontier® Optima** is tank mixed with herbicides of an SC or WG formulation, these herbicides should be added to the spray water first.
- Maintain agitation while mixing and spraying.
- The prepared spray mixture must not be left in the spray tank for any length of time, e.g. overnight.
APPLICATION INSTRUCTIONS

**Ground application:**
- **Frontier Optima** can be applied as either an overall application, using a minimum of 200 l of water/hectare, or as a band application, using the corresponding amount of water per sprayed hectare.
- Any medium or high volume tractor-mounted sprayer can be used, as long as the sprayer can be properly calibrated and is fitted with effective tank agitation.
- The spray-boom should be fitted with flat fan type spray nozzles to ensure a uniform, even distribution of the herbicide on the soil surface.

**Aerial application:**
**For aerial application, increase all given rates by 10%**.
Aerial application of **Frontier Optima** may only be done by a registered aerial application operator using a correctly calibrated, registered aircraft according to the instructions of SANS Code 10118 (Aerial Application of Agricultural Pesticides). Ensure that the spray mixture is distributed evenly over the target area and that the loss of spray material during application is restricted to a minimum. It is therefore essential that the following criteria be met:
- **Volume:** A spray mixture volume of 30 l per hectare is recommended. As this product has not been evaluated at a reduced volume rate, the registration holder cannot guarantee efficacy, or be held responsible for any adverse effects if this product is applied aerially at a lower volume rate than recommended above.
- **Droplet coverage:** 20 - 30 droplets per cm² must be recovered at the target area.
- **Droplet size:** A droplet spectrum with a VMD of 350 - 400 micron is recommended. Limit the production of fine droplets less than 150 micron (high drift and evaporation potential) to a minimum.
- **Flying height:** Maintain the height of the spray boom at 3 - 4 metres above the target. Do not spray when aircraft dives, is in a climb or when banking.
- Use suitable **atomising equipment** that will produce the desired droplet size and coverage, but which will ensure the minimum loss of product. The spraying system must produce a droplet spectrum with the lowest possible Relative Span.
- **Position** all the atomisers within the inner 60 - 75% of the wingspan to prevent droplets from entering the wingtip vortices.
- **The difference in temperature** between the wet and dry bulb thermometers, of a whirling hygrometer, should not exceed 8 °C.
- **Stop spraying if the wind speed** exceeds 15 km/h.
- **Stop spraying** under turbulent, unstable and dry conditions during the heat of the day.
- **Spraying under temperature inversion conditions** (spraying in or above the inversion layer) and / or high humidity conditions (relative humidity 80% and above) may lead to the following:
  - Reduced efficacy due to suspension and evaporation of small droplets in the air (inadequate coverage).
  - Damage to other sensitive crops and / or non-target areas through drifting of the suspended spray cloud away from the target field.
- Ensure that the aerial spray operator knows exactly which fields to spray.
- Obtain an assurance from the aerial spray operator that the above requirements will be met and that relevant data will be compiled in a logbook and kept for future reference.

**Centre pivot application:**
**Frontier Optima** may be applied through centre pivot application, in accordance with the **APPLICATION RATES and DIRECTIONS FOR APPLICATIONS**, as indicated below and provided that the following conditions are met:
- Use only centre pivot systems that apply water uniformly.
- Use only injection pumps that can be calibrated accurately.
- Apply in a maximum of 10 mm water. **Do not exceed this water volume.**
- Keep the herbicide in suspension with sufficient continuous agitation.
- The centre pivot system must have anti-syphon and check valves, to prevent contamination of the water source during shutdown and possible overflow of the mixing tank.
- Inject the herbicide mixture ahead of any right angle bend in the main water line, to ensure adequate mixing.
- Simultaneous shut-off of the chemical injection and water pumps must be possible.
- Application in windy conditions that may result in spray drift, must be prevented. Leaking joints and nozzles not providing uniform application, may cause crop injury.
- Sprinkler distribution patterns not overlapping sufficiently, may result in poor weed control. Excessive overlapping may cause crop damage, or lead to high residues.

**Method:**
Prepare a mixture with a minimum of one part of herbicide to one part of water and inject this mixture into the centre pivot system, using a positive displacement pump. Injecting a larger volume (more dilute mixture per hour), will usually provide more accurate calibration of the injection pump system.

**WARNING**

Due to depressions and uneven soil surfaces, pivot applications could result in puddle formation. Should this occur directly over the crop seedlings, damage will occur. Apply to an even land.

**TABLE 1. APPLICATION RATES ON DRY BEANS, KIDNEY BEANS AND SOYA BEANS.**

<table>
<thead>
<tr>
<th>CROP</th>
<th>% CLAY</th>
<th>DOSAGE l/ha</th>
<th>DIRECTIONS FOR APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRY BEANS, KIDNEY BEANS SOYA BEANS</td>
<td>11 - 20</td>
<td>0,5 - 0,75</td>
<td>Use the lower rate only for control of annual grasses.</td>
</tr>
<tr>
<td></td>
<td>21 - 30</td>
<td>0,75 - 1,0</td>
<td>Use the higher rate, if yellow nutsedge and / or broadleaf weeds are a problem.</td>
</tr>
<tr>
<td></td>
<td>31 - 40</td>
<td>1,0 - 1,25</td>
<td></td>
</tr>
</tbody>
</table>

**WARNING**

Do not apply Frontier® Optima to dry beans, kidney beans or soya beans planted in a soil with a clay content of less than 10 %, as under certain climatic conditions crop damage may occur.

**NB: ALSO REFER TO USE RESTRICTIONS, RESISTANCE WARNING, DIRECTIONS FOR USE AND IMPORTANT NOTES.**

**TABLE 2. APPLICATION RATES ON GRAIN SORGHUM.**

<table>
<thead>
<tr>
<th>CROP</th>
<th>% CLAY</th>
<th>DOSAGE l/ha</th>
<th>DIRECTIONS FOR APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAIN SORGHUM</td>
<td>0 – 20</td>
<td>0,4 – 0,7</td>
<td>Use the lower rate only for control of annual grasses.</td>
</tr>
<tr>
<td></td>
<td>21 – 30</td>
<td>0,7 – 0,9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>31 – 40</td>
<td>0,9 – 1,2</td>
<td>Use the higher rate, if yellow nutsedge and / or broadleaf weeds are a problem.</td>
</tr>
<tr>
<td></td>
<td>&gt; 40</td>
<td>1,2</td>
<td></td>
</tr>
</tbody>
</table>
WARNINGS

BASF SA (Pty) Ltd. accepts no liability for any damage that may occur to cultivars not reflected on this label.

Frontier® Optima is only recommended on the following grain sorghum cultivars that have undergone seed treatment with Concep® (L5051):
The effect of Frontier® Optima on other cultivars is unknown.

<table>
<thead>
<tr>
<th>CRN 7610</th>
<th>PAN 8509</th>
<th>PAN 8591</th>
<th>NK 283</th>
<th>SNK 3727</th>
<th>CRN 7611</th>
<th>PAN 8560</th>
</tr>
</thead>
<tbody>
<tr>
<td>NK 222</td>
<td>NK 286</td>
<td>VS 881</td>
<td>DC 75</td>
<td>PAN 8564</td>
<td>NK 280W</td>
<td>NK 304</td>
</tr>
</tbody>
</table>

NB: ALSO REFER TO USE RESTRICTIONS, RESISTANCE WARNING, DIRECTIONS FOR USE AND IMPORTANT NOTES.

TABLE 3. APPLICATION RATES ON GROUNDNUTS.

<table>
<thead>
<tr>
<th>CROP</th>
<th>% CLAY</th>
<th>DOSAGE l/ha</th>
<th>DIRECTIONS FOR APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUNDNUTS</td>
<td>0 – 10</td>
<td>0,5</td>
<td>Use the lower rate only for control of annual grasses.</td>
</tr>
<tr>
<td></td>
<td>11 - 20</td>
<td>0,5 – 0,75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21 - 30</td>
<td>0,75 – 1,0</td>
<td>Use the higher rate, if yellow nutsedge and / or broadleaf weeds are a problem.</td>
</tr>
<tr>
<td></td>
<td>31 - 40</td>
<td>1 - 1,25</td>
<td></td>
</tr>
</tbody>
</table>

WARNING

Application of Frontier® Optima to groundnuts planted in soils with a clay content of less than 10 %, may sustain damage under certain climatic conditions.

NB: ALSO REFER TO USE RESTRICTIONS, RESISTANCE WARNING, DIRECTIONS FOR USE AND IMPORTANT NOTES.
TABLE 4. APPLICATION RATES ON MAIZE.

<table>
<thead>
<tr>
<th>CROP</th>
<th>% CLAY</th>
<th>DOSAGE l/ha</th>
<th>DIRECTIONS FOR APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIZE</td>
<td>0 – 10</td>
<td>0,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11 – 20</td>
<td>0,5 - 0,75</td>
<td>Use the lower rate only for control of annual grasses.</td>
</tr>
<tr>
<td></td>
<td>21 – 30</td>
<td>0,75 – 1,0</td>
<td>Use the higher rate, if yellow nutsedge and / or broadleaf weeds are a problem.</td>
</tr>
<tr>
<td></td>
<td>31 – 40</td>
<td>1,0 - 1,25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 40</td>
<td>1,25</td>
<td></td>
</tr>
</tbody>
</table>

Pre-emergent weed control with Frontier® Optima alone:
- Where broadleaf weeds are not a major problem, Frontier® Optima may be applied alone.

Pre-emergent weed control with Frontier® Optima in tank mixtures (all soil types):
- Where broadleaf weeds are a major problem, the following tank-mix options are recommended:
  - Atrazine 500 SC or Gesaprim Super® 600 SC at 1 – 2 l/ha.
  - Later applications may be applied, provided they are applied as a directed spray and prior to the emergence of weeds (e.g. after a cultivation). Weeds that have emerged at the time of application will not be controlled.

NB: Frontier® Optima may be applied on sweet corn and popcorn.
- If using a tank-mix, ensure that the partner product is also registered for use on sweet corn and / or popcorn.

For late germinating weeds the following post-emergent products are registered:
- Basagran® (L2916)
- Basagran® plus Atrazine 500 g / ha.
- Stellar® (L8522)
- Campus® (L8521)

Refer to the respective product labels.

NB: ALSO REFER TO USE RESTRICTIONS, RESISTANCE WARNING, DIRECTIONS FOR USE AND IMPORTANT NOTES.

TABLE 5. APPLICATION RATES ON POTATOES.

<table>
<thead>
<tr>
<th>CROP</th>
<th>% CLAY</th>
<th>DOSAGE l/ha</th>
<th>DIRECTIONS FOR APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>POTATOES</td>
<td>0 – 10</td>
<td>0,4 - 0,5</td>
<td>Apply after ridging. Where applicable, use the lower rate only for control of annual grasses.</td>
</tr>
<tr>
<td></td>
<td>11 – 20</td>
<td>0,5 - 0,7</td>
<td>Use the higher rate, if yellow nutsedge and / or broadleaf weeds are a problem.</td>
</tr>
<tr>
<td></td>
<td>21 – 30</td>
<td>0,7 – 0,9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>31 – 40</td>
<td>0,9 - 1,2</td>
<td></td>
</tr>
</tbody>
</table>
NB: ALSO REFER TO USE RESTRICTIONS, RESISTANCE WARNING, DIRECTIONS FOR USE AND IMPORTANT NOTES.

TABLE 6. APPLICATION RATES ON SUNFLOWERS.

<table>
<thead>
<tr>
<th>CROP</th>
<th>% CLAY</th>
<th>DOSAGE l/ha</th>
<th>DIRECTIONS FOR APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUNFLOWERS</td>
<td>0 – 10</td>
<td>0,4</td>
<td>Where applicable, use the lower rate only for control of annual grasses.</td>
</tr>
<tr>
<td></td>
<td>11 – 20</td>
<td>0,5 – 0,7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21 – 30</td>
<td>0,7 – 0,9</td>
<td>Use the higher rate, if yellow nutsedge and / or broadleaf weeds are a problem.</td>
</tr>
<tr>
<td></td>
<td>31 – 40</td>
<td>0,9 – 1,2</td>
<td></td>
</tr>
</tbody>
</table>

WARNINGS

- Application of Frontier® Optima to sunflowers planted in soils with a clay content of less than 10 %, may sustain damage under certain climatic conditions.
- Any retardation of emergence of the sunflower seedling, will result in greater exposure to Frontier® Optima during its most sensitive growth stage. This will result in crop damage.
- Crop damage can also be expected where soil capping occurs, prior to the emergence of the sunflower seedlings.
- Frontier® Optima has only been tested on the cultivars shown below. The effect of Frontier® Optima on other cultivars is unknown.
- BASF SA (Pty) Ltd. accepts no liability for any damage that may occur to cultivars not reflected on this label.

<table>
<thead>
<tr>
<th>CRN 1006</th>
<th>PAN 7204</th>
<th>PAN 7392</th>
<th>SNK 37</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRN 1020</td>
<td>PAN 7364</td>
<td>NS 920</td>
<td>SO 50</td>
</tr>
<tr>
<td>CRN 1042</td>
<td>PAN 7382</td>
<td>SNK 33</td>
<td>SO 222</td>
</tr>
<tr>
<td>SO 323</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NB: ALSO REFER TO USE RESTRICTIONS, RESISTANCE WARNING, DIRECTIONS FOR USE AND IMPORTANT NOTES.

TABLE 7. APPLICATION RATES ON TOBACCO.

<table>
<thead>
<tr>
<th>CROP</th>
<th>% CLAY</th>
<th>DOSAGE l/ha</th>
<th>DIRECTIONS FOR APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOBACCO</td>
<td>0 - 20</td>
<td>0,7</td>
<td>Only strong healthy plants should be used, with roots well settled into the soil.</td>
</tr>
<tr>
<td></td>
<td>21 - 30</td>
<td>1,0</td>
<td>Do not use Frontier® Optima on tray transplants.</td>
</tr>
<tr>
<td></td>
<td>31 - 40</td>
<td>1,2</td>
<td></td>
</tr>
</tbody>
</table>
**Method and timing of application in tobacco:**
- Apply Frontier® Optima as a total surface application, within three days after planting of the tobacco, while the plants are still wilted.
- Where tobacco is planted on ridges, apply using a boom fitted with 110° nozzles, positioned between the ridges. This will ensure a more even distribution of the herbicide.
- Within 3 - 4 days after application of Frontier® Optima, not more than 15 mm of irrigation should be applied, to avoid washing out and to ensure activation of product.
- FLUE CURED TOBACCO - Apply Authority® 75 WG (L6262) for Cyperus rotundus control as well as improved Cyperus esculentus and broadleaf control, as a sequential spray (not as a tank mix), immediately after application of Frontier® Optima. Consult the respective label of Authority® 75 WG.

**WARNINGS**

After the Frontier® Optima application on tobacco, a slight yellowing of the sand leaves and / or plant stunting may occur. This is of a temporary nature and should not have any negative effect on the yield. However, certain precautions should be observed, as the likelihood of damage occurring is enhanced by the following conditions:
- When diseased, weak and / or damaged plants are used for transplanting;
- When plants are incorrectly planted with roots curled up or roots exposed to the herbicide, at the time of application;
- When tobacco is planted in very stony or gravel soil;
- When rainfall or irrigation in excess of 15 mm occurs shortly after herbicide application;
- When treated soil comes into contact with roots of inter-plants;
- When plants are less than 150 mm tall;
- When applied over hail damaged tobacco plants.

**NB: ALSO REFER TO USE RESTRICTIONS, RESISTANCE WARNING, DIRECTIONS FOR USE AND IMPORTANT NOTES.**

**IMPORTANT NOTES**

1. **Frontier® Optima** must be applied at, or after planting, but prior to the emergence of weeds.
2. When **planting into moist soil**, **Frontier® Optima** must be applied within three days after planting (but preferably at planting), onto a fine, even, firm and freshly prepared weed-free seedbed. **No more than three days should elapse between cultivation and application.**
   - To obtain good results, it is necessary that the application be followed by 10 - 15 mm of rain or sprinkler irrigation, before the weeds emerge.
   - If rainfall does not occur in time, emerging weeds will be stunted and can easily be controlled with a shallow cultivation that will simultaneously mix the herbicide with the top 10 - 20 mm of soil.
   - Deep cultivation should be avoided, as this will dilute the product in the soil and deposit untreated soil on the surface. This will result in poor weed control.
3. When **planting into dry soil**, (insufficient moisture for germination), **Frontier® Optima** must be applied as close to, but definitely before, the first rain. Weeds that have already emerged at the time of application, will not be controlled.
   - Under dry conditions, efficacy will be improved by a shallow incorporation of the product - not deeper than 10 - 20 mm.
   - Deep cultivation should be avoided, as this will dilute the product in the soil and deposit untreated soil on the surface. This will result in poor weed control.
4. **Soil displacement**
   - On light sandy soils of 0 – 10 % clay, (e.g.: Certain top soils in the North West Province, north west Free State and Northern Cape), weed control will be reduced, if winds remove Frontier® Optima treated soils and re-deposit them elsewhere.
- Weed control may also be reduced, if heavy rains erode or wash away the soil surface containing the herbicide.
- Application to a poorly prepared seedbed with clods on the soil surface will result in reduced efficacy.
- Where crops have been planted in furrows and rains redeposit the treated soil from the sides of the furrow into a concentrated layer directly above the planted seeds, crop damage may occur.

5. **Minimum cultivation or no-till situations:**
   - Surface trash may reduce herbicidal efficacy penetration into the soil. The higher rate for the relevant soil type, will give a better result.

6. Prolonged cool and wet weather conditions, excessive irrigation, infection of seed and young seedlings by soil- or seed borne diseases, seeds planted too deep or too shallow etc. may lead to crop damage. Where applicable, seeds should therefore preferably be treated with a suitable seed treatment fungicide.

7. **Do not apply Frontier® Optima in the following situations as crop damage may occur:**
   - On poorly drained soils, soils with a compaction layer or soils with nutrient deficiencies.
   - On inbred parent plants of maize hybrids, or experimental, or newly released cultivars of all Frontier® Optima registered crops, including any seed production of any of the Frontier® Optima registered crops, without first consulting the advice of the distributor or manufacturer.
   - Crop damage can also be expected where soil capping occurs, prior to the emergence of the seedlings, or if seedling germination is retarded.

**WEEDS CONTROLLED**

The following plant species are normally controlled by a pre-emergent application of Frontier® Optima, at the indicated dosage rates.

### GRASSES

<table>
<thead>
<tr>
<th>Brachiaria eruciformis</th>
<th>Sweet Signal Grass</th>
<th>Panicum schinzi</th>
<th>Sweet Buffalo Grass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digitaria sanguinalis</td>
<td>Crab Finger Grass</td>
<td>Setaria faberi</td>
<td>Giants foxtail</td>
</tr>
<tr>
<td>Digitaria ciliaris</td>
<td>Tropical finger-grass</td>
<td>Setaria pallide-fusca</td>
<td>Red Bristle Grass</td>
</tr>
<tr>
<td>Echinochloa crus-galli</td>
<td>Barnyard Grass</td>
<td>Setaria verticillata</td>
<td>Sticky Bristle Grass</td>
</tr>
<tr>
<td>Eleusine coecana</td>
<td>Goose Grass</td>
<td>Urochloa panicoides</td>
<td>Herringbone Grass</td>
</tr>
<tr>
<td>Panicum maximum</td>
<td>Guineagras</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BROADLEAFS

| Amaranthus hybridus  | Common Pigweed     | 1. Datura stramonium | Thorn Apple |
| Amaranthus spinosus  | Thorny Pigweed     | Galinsoga parviflora | Gallant soldier |
| Amaranthus deflexus  | Perennial Pigweed  | Nicandra physaloides | Apple of Peru |
| 1. Bidens pilosa     | Black jack         | Portulaca oleracea   | Purslane |
| 1. Chenopodium album | White Goosefoot    | Richardia brasiliensis | Tropical Richardia |
| Cleome monophylla   | Spindlepod         | Schkuhria pinnata    | Dwarf Marigold |
| 1. Commelina benghalensis | Bengal Wandering Jew | 1. Tagetes minuta | Khaki Weed |
| 1. Crotalaria sphaerocarpa | Mealie Crotalaria | 1. Tribulus terrestris | Devil’s Thorn |
| 1. Datura ferox      | Large Thorn Apple  | 1. Xanthium strumarium | Cocklebur |
The control of these weeds is variable. Late and deep germinating weeds will not be effectively controlled.

### SEDGES

<table>
<thead>
<tr>
<th>Cyperus esulentus</th>
<th>Yellow Nutsedge</th>
</tr>
</thead>
</table>

Control of yellow nutsedge can be improved, provided the following conditions are met:

- Planting is immediately preceded by thorough ploughing, with a mouldboard plough.
- A fine, even and firm seedbed is prepared.
- Application is followed by at least 10 - 15 mm of soft penetrating rain (or irrigation), to wash the herbicide into the soil, prior to the emergence of yellow nutsedge (normally 7 - 10 days after ploughing). More rain is required on heavier soils to obtain good results. Insufficient moisture is often the reason why poor control is experienced on turf soils.
- When planting into moist soil, application of Frontier® Optima should be made at, or immediately after, planting, to ensure herbicide activation prior to emergence of yellow nutsedge.
- When planting into dry soil (insufficient moisture for yellow nutsedge germination), application should be timed as close as possible to, but definitely before the first rain.

Other plant species that were not present during the development trials with Frontier® Optima, may also be controlled to a certain degree. The registration holder does not accept any responsibility for unlisted plant species.

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### WAARSKUWINGS

- Skadelik indien ingesluk.
- Bêre agter slot en grendel buite bereik van kinders, oningeïlige persone en diere.
- Bêre in die oorspronlike houer, op 'n koel plek en weg van voedsel en voer.
- Verhoed kontaminasie van voedsel, voer, drinkwater en eetgerei.
- Irriterend vir oë en vel. Vermi kontakt, inaseming of inname.
- Mag sensitiviteit veroorsaak indien met vel in kontak kom.
- Giftig vir visse.

Alhoewel hierdie middel omvattend onder 'n groot verskeidenheid toestande getoets is, waarborg die registrasiehouer nie dat dit onder alle toestande doeltreffend sal wees nie, aangeneem die werking en effek daarvan beïnvloed kan word deur faktore soos abnormale klimaats- en bergingstoestande, kwaliteit van verdunningswater, verenigbaarheid met ander stowwe wat nie op die etiket aangedui is nie en die voorkoms van weerstand van die onkruid teen die betrokke middel, sowel as die metode, tyd en akkuraatheid van toediening. Verder aanvaar die registrasiehouer nie verantwoordelikheid vir skade aan gewasse, plantegroei, die omgewing of vir nadelige effek op mens of dier, of vir 'n gebrek aan prestasie, as gevolg van die versuim van die gebruiker om etiketaanwyings na te kom nie, of as gevolg van die ontstaan van toestande, wat nie kragtig die registrasie voorsien kon word nie. Raadpleeg die verskaffer in die geval van enige onsekere.