



The Chemical Company

Clearfield® Plus Production System for Sunflower

Worldwide Technical Brochure



Clearfield® Plus

Production System for Sunflower



Clearfield® Plus

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Introduction

The **Clearfield**® Production System combines high-yielding seeds with broad-spectrum herbicides tailored to regional conditions, delivering efficient, long-lasting weed control, crop quality and global market acceptance. In 2003, in cooperation with leading global and regional seed partners, BASF introduced sunflowers into the growing family of successful **Clearfield** Production System crops that included canola/oilseed rape, maize, rice and wheat. Within a few years, the **Clearfield** Production System for sunflower had become known as an essential component in hybrid sunflower oil and confectionary production.

The original **Clearfield** trait in sunflowers – the ImiSun trait - is based on a natural acetohydroxy acid synthase (AHAS) mutation discovered in 1996 in a wild sunflower growing in a soybean field in the United States. In 2000, a research and development program was initiated with Nidera Semillas S.A. to deliver a more efficient, single-gene breeding system, sunflowers with greater crop tolerance regardless of environmental stresses, improved weed control, oil content and grain yield. By 2006, BASF confirmed the improved trait, which was developed through traditional breeding techniques and resulted in an elite cultivated sunflower line, **Clearfield Plus**. Like the original **Clearfield** sunflowers, **Clearfield Plus** sunflowers are classified as non-transgenic.

Launched in Argentina in 2010, and scheduled for registration in countries around the globe as early as 2012, the **Clearfield Plus** Production System for sunflowers will be available in North and South America, Russia, Ukraine, South Africa, Eastern Europe and Western Europe. The trait will be developed and sold in partnership with many seed companies worldwide.

The **Clearfield Plus** Production System for sunflowers provides multiple advantages to BASF seed partners, seed breeders and growers.



above:

*The **Clearfield Plus** trait can be placed in confection sunflowers or sunflowers grown for oil.*

Performance and Key Characteristics

The **Clearfield® Plus** Production System for sunflower delivers important agronomic benefits to both seed companies and growers including:



above:
*BASF provides molecular diagnostic tools to test for the presence of the **Clearfield Plus** trait.*

- Superior breeding efficiency
- Greater herbicide tolerance
- Improved weed control
- Higher oil production
- Potential for higher grain yield

Superior Breeding Efficiency

The inheritance of the original **Clearfield** sunflower trait is controlled by at least two or more genes; one gene is the natural AHAS mutation and the other(s) are known as modifiers or enhancers (i.e. “E” Factor). However, since there are no diagnostic methods yet available to detect the presence of the “E” Factor, breeding selections must rely on phenotypic or observed evaluations of plants that have been sprayed with **Clearfield** herbicides. This phenotypic selection process is very tedious and time-consuming.

In contrast to the original **Clearfield** trait, **Clearfield Plus** sunflowers involve only a single gene without an enhancer or “E” Factor. BASF has developed diagnostic methods to detect the **Clearfield Plus** trait, which makes breeding easier and more efficient. Resources originally used to select the complex herbicide tolerance trait in **Clearfield** hybrids can now be diverted to selecting for improved disease tolerance and higher yields in **Clearfield Plus** hybrids.

Greater Herbicide Tolerance

Early in its development, the **Clearfield Plus** trait was tested in the laboratory and greenhouse to identify differentiating features from **Clearfield** sunflowers as well as conventional sunflowers. A greenhouse study using rates up to six-times the recommended field dose of a **Clearfield** herbicide demonstrated that **Clearfield Plus**’ tolerance was considerably more than the tolerance observed with **Clearfield** sunflowers. Greater herbicide tolerance allows growers to use more active adjuvants or improved formulations, which provide greater weed control in situations where there is either high weed pressure or the presence of difficult to control weeds and when no difficult to control weeds are present, **Clearfield Plus** allows greater use rate flexibility.

More recent studies conducted by BASF and its seed partners with **Clearfield Plus** sunflowers have also shown significantly greater tolerance to **Clearfield** herbicides under a wide range of environmental and genotype differences on a variety of soil types.

Clearfield Plus sunflowers have demonstrated very high herbicide tolerance and exceptional agronomic performance under the arid growing conditions of the northern Great Plains in the United States, in sandier soil regions in Argentina, and in regions of

Europe where soil types, climate and certain parasitic weeds such as *Orobanche* (broomrape), have made sunflower cultivation challenging.

Improved Weed Control

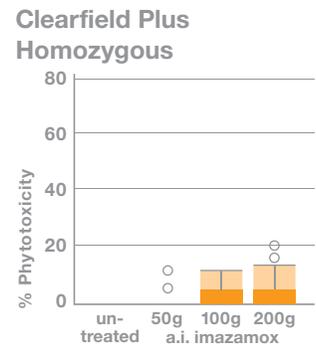
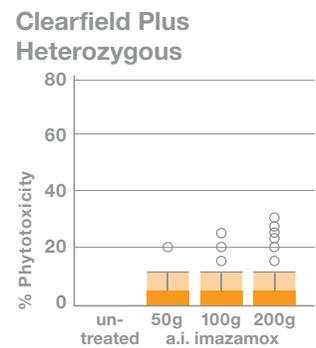
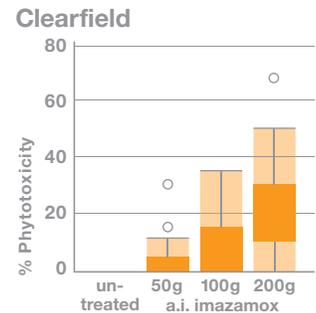
The **Clearfield**® Production System for sunflower has provided growers with a superior weed control system compared to non-herbicide tolerant or conventional sunflowers. The advantages include: post emergence broadleaf weed control; a wider spectrum of weed control; a higher level of consistency; greater flexibility in the timing of herbicide applications; long-lasting weed control, often requiring only one pass; and a low rate of application.



above, first row: Typical **Clearfield** sunflower tolerance to varying levels of **Clearfield** herbicides.
 above, second row: **Clearfield Plus** sunflowers treated with the same **Clearfield** herbicide at the same 2x, 4x, and 6x dosages, compared to an untreated plants on the far left.

Controlling weeds during critical growth stages and throughout the season reduces competition for water and nutrients that sunflowers need to thrive. A summary of data generated by BASF over the years 2008-2010 incorporating all growth stages and application timings has demonstrated improved grass and broadleaf weed control in **Clearfield Plus** fields when compared to **Clearfield**. Where there is high weed pressure or especially difficult to control weeds, improved formulations or adjuvants such as MSO (Methylated Seed Oil) or BASF's proprietary adjuvant, DASH® that enhance the activity of **Clearfield** herbicides can be used on **Clearfield Plus** sunflowers, whereas less aggressive adjuvants, such as non-ionic surfactants, are recommended for use on **Clearfield** sunflowers.

Crop Phytotoxicity



- majority result
- range of results
- outlying result

above:
 Data compiled from 16 trial sites (across four regions and six years) show that the lower level of crop phytotoxicity of **Clearfield Plus** heterozygous and homozygous sunflowers is much more reliable over a wide range of environments (shown by the smaller variation boxes across increasing herbicide rates) compared to **Clearfield** sunflowers.



above:

With the new **Clearfield Plus** trait, there is no decrease in oil content.

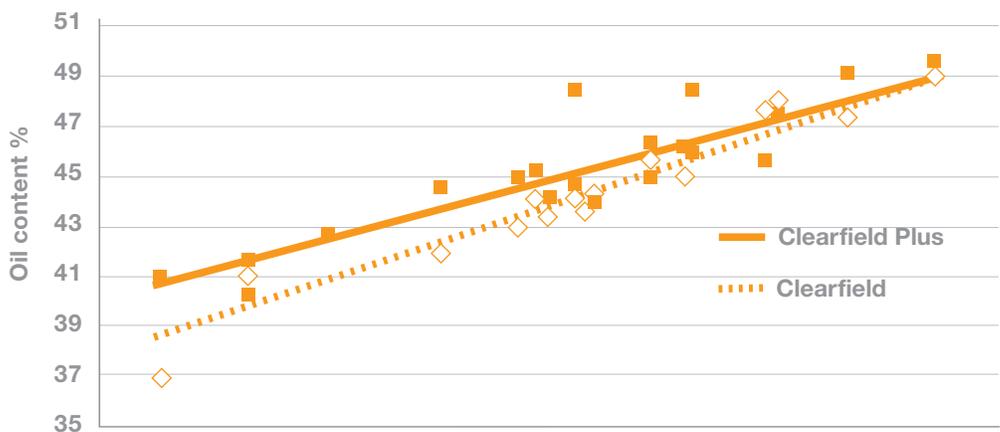
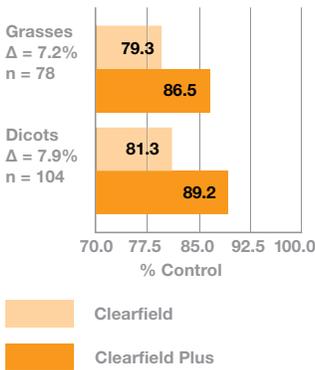
Clearfield® and **Clearfield Plus** herbicides are the only herbicides that deliver effective control of an extremely damaging and difficult to control parasitic weed, *Orobanche cumana* Wallr; a parasitic weed that feeds off the roots of the host sunflower plant, and can reduce sunflower grain yield by more than 50% depending on the level of infestation.

An extremely drought-resistant crop, sunflowers are often planted in dry climates. In conventional sunflower fields, herbicides must be sprayed preemergence and require rainfall to become activated. Oftentimes rainfall is insufficient to fully activate preemergence herbicides and the resulting weed control is only fair or even poor. **Clearfield** and **Clearfield Plus** herbicides can be applied over the top of **Clearfield Plus** sunflowers up to 10 weeks after crop emergence, reducing the need for preemergence herbicide applications, and rainfall is not required to activate the herbicide. Higher crop tolerance with less variation delivers peace of mind, allowing growers to plant their **Clearfield Plus** hybrids across a wider range of environments.

Effects of Environmental Stress on Grain Oil Yield

Clearfield and **Clearfield Plus** herbicides also provide long-lasting residual weed control, diminishing the soil weed seed bank and preventing weeds that may not have emerged at the time of herbicide application from growing and effectively competing with the sunflower crop. **Clearfield** and **Clearfield Plus** sunflowers often require only one postemergence herbicide treatment, delivering maximum convenience along with superb performance.

Weed Control in Clearfield versus Clearfield Plus



above:

The % grain oil content of a **Clearfield Plus** hybrid compared to its **Clearfield** isohybrid as a function of the environment (highest stress to lowest stress environment) at 20 locations over two seasons in Argentina.

Clearfield® and **Clearfield Plus** herbicides are used at relatively low rates of application and control a very wide spectrum of dicot and grass weed species. Sensitive weeds turn chlorotic or yellow/reddish soon after treatment, then become brown and necrotic in appearance, and finally die.

Higher Sunflower Oil Production

Preliminary data show that **Clearfield Plus** sunflowers provide higher oil content on a per acre or hectare basis than **Clearfield** sunflowers. Results shown at right from field trials over three seasons in Argentina and Europe using isohybrids demonstrate that **Clearfield Plus** sunflowers yielded similar oil content to conventional sunflowers and increased oil content compared to **Clearfield** sunflowers. It was also discovered that the difference in oil content between **Clearfield** and **Clearfield Plus** isohybrids was more pronounced in higher stressed environments, where **Clearfield Plus** hybrids showed upwards of 2% increase in grain oil in high stress environments as compared to **Clearfield** hybrids. In recent studies conducted in Argentina, Nidera Semillas S.A. documented such relative % oil reductions of the **Clearfield** (ImiSun) trait and associated these differences to wild sunflower traits transferred along with the ImiSun trait during **Clearfield** (ImiSun) hybrid development. Since the **Clearfield Plus** trait was not derived from wild sunflowers (instead it was selected in an elite cultivated inbred sunflower line) it does not contain the linkage drag for this and other traits such as grain size.

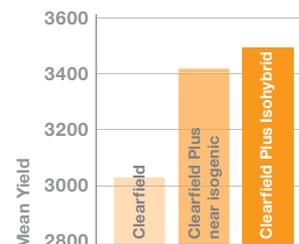
Greater Sunflower Grain Yield

Data from early field trials indicate that **Clearfield Plus** sunflower hybrids yield very well compared to conventional hybrids. The consistency of weed control provided by **Clearfield** and **Clearfield Plus** herbicides is much greater than the levels provided by preemergence herbicides in conventional sunflowers, leading to more consistent harvests. Additional testing will be conducted to provide data on **Clearfield Plus** yields across variable environments.

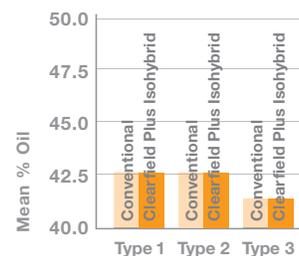
Improved grain yield can be a direct result of improved weed control and enhanced crop tolerance of the **Clearfield Plus** trait. Preliminary results in 2011 from two countries in the EU comparing **Clearfield Plus** hybrids (i.e., homozygous and heterozygous stack) and **Clearfield** isohybrids resulted in significantly greater grain yield following a 1x field application rate of a **Clearfield** herbicide (50 g ai/ha imazamox, Pulsar 40).

Grain Yield and Grain Oil Content

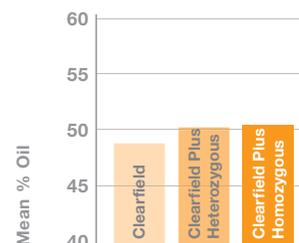
Clearfield Comparison
kg/ha (@10%moi (cv 12.6; LSD 246.1)



Clearfield Plus
% grain oil in conventional and Clearfield Plus isohybrids



Clearfield Comparison
When treated with 1x Pulsar® 40



top:

Mean yield from three EU 2011 field trials, treated with 1x Pulsar 40.

middle:

Mean % oil in grain from field trials in multiple locations in Argentina over two seasons.

bottom:

Mean % oil from three 2011 field trials, treated with 1x Pulsar 40.

Clearfield® and Clearfield Plus Herbicide Activity

Clearfield and **Clearfield Plus** herbicides are Group 2 acetohydroxyacid synthase or AHAS-inhibiting compounds based on the imidazolinone class of chemistry, which includes imazamox and imazapyr. Both **Clearfield** and **Clearfield Plus** herbicide applications result in leaf activity and soil residual activity. The ideal time to treat weeds with a **Clearfield** or **Clearfield Plus** herbicide is when the majority of the weeds have emerged and are still small and actively growing. At this time, systemic uptake by the leaves and roots results in outstanding long-lasting control of many dicot and grassy weeds.

Mode of Action

Clearfield and **Clearfield Plus** herbicides control weeds by targeting and inhibiting a protein or enzyme called acetohydroxyacid synthase or AHAS that catalyzes biosynthesis of branched-chain amino acids in plants. As a result of this inhibition, plants die from starvation of these critical amino acids after herbicide spray. However, **Clearfield** and **Clearfield Plus** sunflowers are not affected by imidazolinone herbicide spray because they have an altered AHAS enzyme that is insensitive or resistant to the inhibition of imidazolinone herbicides.



above:

A closeup of Orobanche and its effect on sunflowers.

right:

Clearfield and Clearfield Plus herbicides deliver a high level of Orobanche control, as seen on the left side of the photo. Sunflowers to the right were not treated.



Weeds Controlled with Clearfield® Herbicides

Scientific Name	Bayer Code	Common Name
Grasses and Monocots		
<i>Avena fatua</i>	AVEFA	Wild oat
<i>Avena sativa</i>	AVESA	Oat
<i>Brachiaria platyphylla</i>	BRAPP	Signalgrass, broadleaf
<i>Bromus spp.</i>	BROSS	Brome grass
<i>Cenchrus incertus</i>	CCHIN	Field Sandbur
<i>Cyperus spp.</i>	CYPSS	Sedges
<i>Dactyloctenium aegyptium</i>	DTTAE	Crowfootgrass
<i>Digitaria ssp.</i>	DIGSS	Crabgrass
<i>Echinochloa crus-galli</i>	ECHCG	Barnyardgrass
<i>Eleusine indica</i>	ELEIN	Goosegrass
<i>Elytrigia repens*</i>	AGRRE	Quackgrass
<i>Eriochloa villosa</i>	ERBVI	Woolly cupgrass
<i>Hordeum vulgare</i>	HORVX	Barley
<i>Leptochloa chinensis</i>	LEFCH	Chinese sprangletop
<i>Lolium multiflorum</i>	LOLMU	Italian ryegrass
<i>Lolium perenne</i>	LOLPE	Perennial ryegrass
<i>Lolium persicum</i>	LOLPS	Persian darnel
<i>Panicum miliaceum</i>	PANMI	Wild-proso millet
<i>Panicum spp.</i>	PANSS	Broomcorn millet
<i>Pharlaris spp.</i>	PHASS	Reed canary grass
<i>Poa annua</i>	POAAN	Annual bluegrass
<i>Rottboellia cochinchinensis</i>	ROOEX	Itchgrass
<i>Setaria glauca</i>	SETLU	Yellow foxtail
<i>Setaria spp.</i>	SETSS	Foxtails
<i>Setaria verticillata</i>	SETVE	Bristly foxtail
<i>Setaria viridis</i>	SETVI	Green foxtail
<i>Sorghum bicolor</i>	SORVU	Sorghum
<i>Sorghum halepense (seeds)</i>	SORHA(S)	Johnsongrass
<i>Triticum spp. (vol.)</i>	TRZSS	Wheat
<i>Zea mays (vol.) (non-CL)</i>	ZEAMX	Corn
<i>Eleusine indica</i>	ELEIN	Goosegrass

* Partial control.



top to bottom:
CAPBP, MATCH and CHEAL.

below:

Preemergent application and continued weed control.



Scientific Name	Bayer Code	Common Name
Broadleaves		
<i>Abutilon theophrasti</i>	ABUTH	Velvetleaf
<i>Aethusa ssp.</i>	AETCY	Foolsparsley
<i>Amaranthus spp.</i>	AMASS	Pigweeds, Waterhemp
<i>Ambrosia artemisiifolia</i>	AMBEL	Common ragweed
<i>Ambrósia trifida</i>	AMBTR	Giant ragweed
<i>Ammi majus</i>	AMIMA	Greater ammi
<i>Anagallis arvensis</i>	ANGAR	Scarlet pimpernel
<i>Anoda cristata</i>	ANVCR	Spurred anoda
<i>Atriplex ssp.</i>	ATXSS	Saltbrush
<i>Baccharis halimifolia</i>	BACHA	Eastern baccharis
<i>Beta vulgaris (vol.)</i>	BEAVA	Beet(s)
<i>Bidens pilosa</i>	BIDPI	Hairy beggartricks
<i>Bidens tripartita</i>	BIDTR	Bur beggartricks
<i>Brassica campestris</i>	BRSRA	Birdsrape mustard
Volunteer <i>Brassica napus (non-CL)</i>	BRSNN	Volunteer oilseed rape, canola
<i>Brassica spp.</i>	BRASS	Rapeseed
<i>Galystegia sepium*</i>	CAGSE	Hedge bindweed
<i>Capsella bursa-pastoris</i>	CAPBP	Shepherd's-purse
<i>Cirsium arvense*</i>	CIRAR	Creeping thistle
<i>Chenopodium album</i>	CHEAL	Common lambsquarters
<i>Chenopodium spp.</i>	CHESS	Goosefoot
<i>Convolvulus arvensis*</i>	CONAR	Field bindweed
<i>Datura ferox</i>	DATFE	Fierce thorn apple
<i>Datura stramonium</i>	DATST	Jimsonweed
<i>Daucus carota</i>	DAUCA	Wild carrot
<i>Descurainia pinnata</i>	DESRB	Tansymustard
<i>Descurainia sophia</i>	DESSO	Flixweed
<i>Euphorbia esula</i>	EPHES	Leafy spurge
<i>Fumaria officinalis</i>	FUMOF	Fumitory
<i>Galinsoga parviflora</i>	GASPA	Smallflower galinsoga
<i>Galium aparine</i>	GALAP	Catchweed bedstraw
<i>Geranium spp.</i>	GERSS	Geraniums
<i>Helianthus annuus (non-CL)</i>	HELAN	Venice mallow
<i>Hibiscus trionum</i>	HIBTR	Venice mallow
<i>Ipomoea spp.</i>	IPOSS	Smallflower morningglory
<i>Jacquemontia tamnifolia</i>	IAQTA	Hairy clustervine
<i>Kickxia spuria</i>	KICSP	Roundleaf cancerwort

* Partial control.

Scientific Name	Bayer Code	Common Name
Broadleaves		
<i>Lamium amplexicaule</i>	LAMAM	Deadnettle, hebit
<i>Lamium purpureum</i>	LAMPU	Deadnettle, red
<i>Matricaria chamomilla</i>	MATCH	Chamomile
<i>Mercurialis annua</i>	MERAN	Mercury, annual
<i>Mollugo verticillata</i>	MOLVE	Carpetweed
<i>Orobanche spp.</i>	ORASS	Broomrapes
<i>Polygonum aviculare</i>	POLAV	Prostrate knotweed
<i>Polygonum convolvulus</i>	POLCO	Wild buckwheat
<i>Polygonum lapathifolium</i>	POLLA	Pale smartweed
<i>Polygonum persicaria</i>	POLPE	Ladysthumb
<i>Portulaca oleracea*</i>	POROL	Common purslane
<i>Ranunculus spp.</i>	RANSS	Buttercups
<i>Raphanus raphanistrum</i>	RAPRA	Wild radish
<i>Senecio vulgaris</i>	SENVU	Common groundsel
<i>Sida spp.</i>	SIDSS	Sida
<i>Sinapis arvensis</i>	SINAR	Wild mustard
<i>Solanum nigrum</i>	SOLNI	Black nightshade
<i>Solanum sisymbriifolium</i>	SOLSI	Sticky nightshade
<i>Solanum spp.</i>	SOLSS	Nightshades
<i>Sonchus arvensis</i>	SONAR	Perennial sowthistle
<i>Stellaria media</i>	STEME	Common chickweed
<i>Stellaria pallida</i>	STEPD	Pale Starwort
<i>Tagetes minuta</i>	TAGMI	Wild Marigold
<i>Veronica spp.</i>	VER	Speedwells
<i>Xanthium strumarium</i>	XANST	Cocklebur common
<i>Xanthium spp.</i>	XANSS	Cockleburs

* Partial control.

Percent Control of Key Weeds in the EU at 38-56 Days After Treatment

Treatment	Rate (g ai/ha)	Rate							
		CHEAL	(n)	AMBEL	(n)	ECHCG	(n)	DIGSA	(n)
Clearfield®	40	78	(32)	70	(3)	69	(6)	66	(4)
Clearfield Plus	40	88	(32)	86	(3)	88	(6)	86	(4)

* Abbreviations: CHEAL, *Chenopodium album*; AMBEL, *Ambrosia elatior*; DATST, *Datura stramonium*; ECHCG, *Echinochloa crus-galli*; and DIGSA, *Digitaria sanguinalis*.

n = total number of trials



top:

Conventional sunflowers treated with preemergent herbicides.

bottom:

Clearfield Plus sunflowers prior to harvest.

Clearfield® Herbicide Brands Around the World

Clearfield and **Clearfield Plus** herbicides are customized for regional growing conditions, and have unique brand names, but for growers the world over, the unique **Clearfield** symbol on the seed bag and herbicide container points the way to maximized yields and optimization of resources.

Country	Product
<i>Argentina</i>	Clearsol® Plus
<i>Canada</i>	Solo®
<i>Bulgaria, Croatia, France, Greece, Hungary, Italy, Romania, Serbia, Slovakia, Spain, Turkey</i>	Pulsar® Plus
<i>South Africa, Ukraine, Kazakhstan, Moldova, Russia</i>	Euro-Lightning® Plus
<i>United States</i>	Beyond®

Clearfield Plus Qualification System

Once BASF transfers the **Clearfield Plus** trait to its seed partners in a donor line, the seed partners have a couple of different ways to determine if the **Clearfield Plus** trait is present in the offspring of the line. Seed partners can either spray greenhouse plants with the herbicide, or use the molecular diagnostic tools that BASF has developed and provides to breeders in the initial donor line introgression. BASF also has a seed germination assay for seed partners who want to be absolutely certain that the **Clearfield Plus** trait is present in a given breeding line before germinating any seeds. This method was developed several years ago for use with the **Clearfield** trait.

The goal of the **Clearfield Plus** qualification system is to ensure that commercial **Clearfield Plus** sunflower hybrids meet or exceed an acceptable level of tolerance to **Clearfield** herbicides. Qualifying **Clearfield Plus** sunflowers also allows BASF and its seed partners to better understand the agronomic characteristics of the many hybrids marketed around the world.

Sunflower hybrids qualify as **Clearfield Plus** if they sustain no greater crop injury than the commercial tolerance standard when treated with the specified **Clearfield** herbicide at the designated dose, time and method of application. Qualification is granted for each specific market only, whether it is North America, South America or Europe. A **Clearfield Plus** hybrid intended to be sold in many markets has to be qualified in each of them. Requirements for additional qualification can be adapted in such a situation, however.

Specific information about the Qualification System can be found in the document entitled **Clearfield Sunflower Variety Qualification System**, which can be requested from BASF Agricultural Products.

Clearfield® Care Protocol

BASF has developed a number of diagnostic tools and protocols to assist breeders in the selection process of both **Clearfield** and **Clearfield Plus** sunflowers. The **Clearfield Plus** Care Protocol program is designed to help companies ensure they have suitable controls in place to minimize the risk of adventitious presence of genetically modified sequence (AP) in their **Clearfield Plus** commercial hybrid seed. The protocols are not intended to replace any standards that seed partner companies or their producers have already established to prevent AP, if seed partner's standards and requirements are equivalent to, or exceed those of BASF.

Resistance Management and Stewardship Guidelines

Attention to stewardship is essential to preserve the long-term benefits of the **Clearfield® Plus** Production System for sunflower. The following stewardship guidelines should be followed:

Guidelines	Why?	How to do it?
Rotate crops	This allows use of alternate mode-of-action herbicides and tillage. Crop rotation is a good agronomic practice in general in that it reduces disease, <i>Orobanche</i> , and insect pressure in the sunflower crop.	ALWAYS grow Clearfield Plus sunflowers in rotation with other non- Clearfield crops, i.e cereals/maize. Use at least a three-year crop rotation.
Rotate herbicides with the crop rotation	This reduces the selection pressure caused by continuous use of ALS-inhibiting herbicides, and provides alternate mode-of-action to control volunteer Clearfield Plus sunflowers and other ALS-resistant weeds that may be present.	DO NOT exceed a maximum of two exclusive ALS inhibitor herbicides (HRAC group-B) on any one field, in any 4 year period. DO NOT solely rely on ALS chemistry in your crop rotation.
Control volunteers	Volunteer plants act as competitive weeds in rotation crops, and may contribute to the build-up and spread of major diseases. Cross-pollination from volunteer plants increases the risks of inadvertent herbicide tolerance spreading.	Clearfield Plus sunflower volunteers can be controlled by all herbicides currently registered for control of volunteer sunflowers, with the possible exception of sulfonylureas, where a low level of cross-tolerance could result in unacceptable control. Avoid seed production from volunteer plants in and outside of your fields.
*Control wild sunflower	This minimizes the potential of out-crossing to wild-type sunflowers with Clearfield Plus Sunflowers that could result in the herbicide tolerance trait being transferred to the wild-type sunflower.	Control wild sunflowers in areas around Clearfield Plus sunflower fields (road ditches, field borders, fence rows) through the use of non-ALS herbicides and/or mowing prior to seed set.
ONLY and ALWAYS use the registered dose rate	The rate of herbicide recommended provides the most effective control over a wide range of environmental conditions. This will help to ensure weed seed is not added to the seed bank in the soil, while minimizing selection pressure and avoiding development of weed resistance.	Follow the herbicide label rates, which are developed through rigorous efficacy trials designed to identify both crop yield response, and the optimum weed control.
**Avoid persistent ALS herbicides	To avoid a carry-over effect to Clearfield Plus sunflowers with a negative impact on crop tolerance.	NO "persistent" ALS compounds used in the previous crop.

* To communicate in the countries with wild sunflower population.

** Contact your local BASF representative for further information.

Growers should view the **Clearfield Plus** Production System as one tool in the toolbox, and use them on fields where they're needed.

BASF Crop Protection
Global Strategic Marketing,
Herbicides
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Clearfield® Plus

Production System for Sunflower