

A groundbreaking herbicide tolerance technology for maximizing Sorghum yields ...

Advanta's solution to rampant weed growth

igrowth® is a herbicide tolerance technology that was developed by Advanta Seeds in Argentina, using mutagenesis methods, which is a non-transgenic technology, so it is not genetically modified.

It has made a game changing difference in weed control to sorghum farmers. With it, Advanta has expanded the reach of its first commercially available, non-GMO herbicide-tolerant technology for grain sorghum and forage sorghum globally.

Weed growth, a major concern!

Grassy weed species can be hard to control due to a lack of chemicals that can be sprayed over the top without causing injuries to sorghum crops. Weed competition is a major cause of reduced yield potential as it competes with the sorghum crops for resources like water and nutrients. Depending on the region, wet or dry season, infestation and weed species, farmers face yield losses up to 70% in extreme cases.

This technology allows farmers to apply registered herbicides at the recommended rates to **igrowth**® sorghum plants without causing damage. If this herbicide were to be applied on sorghum without this technology, it could cause failure or irreversible damage to the crop.

The **igrowth**® technology will allow sorghum growers the freedom to utilize WSSA Group 2 herbicides to assist in their integrated weed control programs and will be particularly useful in controlling some tough to control weeds, like Texas panicum and foxtail.



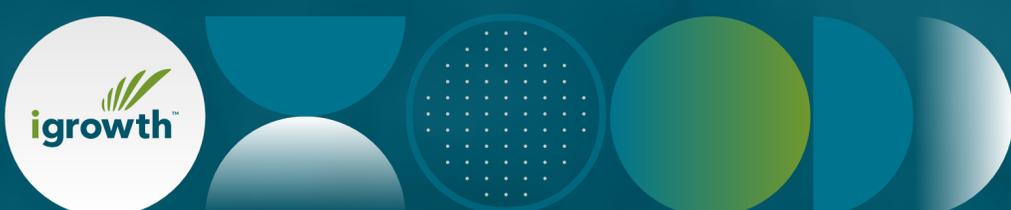


igrowth[®] - technology specifically for sorghum farmers

With **igrowth**[®], Advanta simplifies weed control with the possibility to spray imidazolinones herbicides as either Pre or Post Emergence, thus, reducing weed competition and their usage of water and nutrients preserving these essential resources for the sorghum crop.

igrowth[®] hybrids deliver groundbreaking performance that transforms sorghum cultivation and help realize its true potential with bigger and better yields.

The successful combination of **igrowth**[®], and top performing genetics has **accelerated sorghum growth** even in the face of unpredictability of weather, weed pressure, and challenging soils.



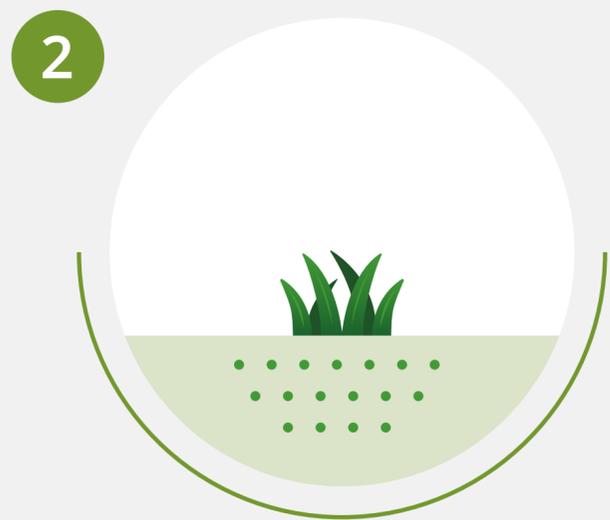
Responsible management of herbicide tolerant crops ...

It is important to **manage herbicide tolerance crops properly** to preserve the effectiveness and value of these technologies for the future. Several agronomic practices are recommended to reduce weed resistance pressure.

How do herbicide resistant weeds develop?



Herbicide application



Resistant plants survive and generate offspring



Repeated use of the same herbicides encourage an increase in herbicide resistant plants



In time, the resistant weeds come to dominate



SUSCEPTIBLE BIOTYPE



RESISTANT BIOTYPE

Best Management Practices (BMP) to delay IMI herbicide weeds resistance:



Continue utilizing existing pre and post-emergent herbicides (e.g. S-metalachlor, Mesotrione, Atrazine), thus reducing the development pressure of resistant weeds and increasing grass and broadleaf weed control.



DO NOT plant **igrowth[®]** sorghum in fields known to have ALS resistant johnsongrass or shattercane.



Rotate to a non-ALS inhibitor herbicide tolerant sorghum variety in the year following planting of **igrowth[®]** sorghum.



DO NOT replant **igrowth[®]** sorghum in consecutive years.



The grower must observe an 18-month interval between an application of IMIFLEX in one year and the next planting of **igrowth[®]** sorghum.



Key stewardship rules

1



Start clean – utilize a burndown herbicide at planting. The use of a certain herbicide-resistant crop does not limit the grower to using only that herbicide. Conventional herbicides registered for cultivation can and should remain part of the overall weed management system. Just as non-chemical options: crop competition, mechanical weeding can be utilized.

2



Limit the number of applications of the same herbicide, or herbicides in the same mode of action, in a single campaign (rotate chemical modes of action).

3



Always follow product labels for rates and application timings. Alternate your modes of actions to control hard to control weeds.

4



Always use those herbicides legally registered for use with sorghum seeds and/or sorghum seed containing **igrowth®** technology.

5



Control of **igrowth®** sorghum volunteer plants on a subsequent crop must be done with other herbicides, rather than imidazolinone mode of action (ALS inhibitors). After spraying herbicides, **assess the quality of field coverage to detect possible breaks in control.**

6



If a potential resistant weed or resistant weed population is found, use another available control method to prevent its spread in the field that could also be non-chemical options.

7



It is important to note the **residual period of the herbicide in the soil** for scheduling subsequent crop planting. Pay attention to crops that may be susceptible to imidazolinone-family herbicides.

8



Crop Rotation: Avoid continuous cropping of **igrowth®** sorghum on the same field or any other IMI herbicides family tolerant crop for volunteer control and active ingredient weed control rotation. **DO NOT** repeat sorghum as a crop in the following year after growing **igrowth®** sorghum. Rotate to another crop that will use alternate herbicide mode of action for weed management and control.



More sorghum, fewer weeds ...

Sorghum growers now have an easy way to get the most value from their sorghum acres. **IMIFLEX™** herbicide is the only IMI herbicide certified for use in the innovative, non-GMO igrowth® sorghum production system. Broad-spectrum and residual IMIFLEX herbicide controls even the toughest grass and broadleaf weeds in igrowth® sorghum, helping realize the full potential of your sorghum acres. IMIFLEX™ herbicide is also flexible, as it can be used pre- or post-emergence in conservation and in conventional tillage production systems.

IMIFLEX™ Herbicide Product Benefits



Broad-spectrum systemic herbicide for use in sorghum containing the Alta Seeds **igrowth®** tolerance technology.



Excellent crop safety with igrowth® sorghum.
Consistent performance across geographical regions.



Flexible application timing can be used pre- or post-emergence.



Long-lasting control of hard-to-kill grassy weeds including Texas panicum, crabgrass and foxtail.



Compatibility with traditional sorghum herbicide programs.



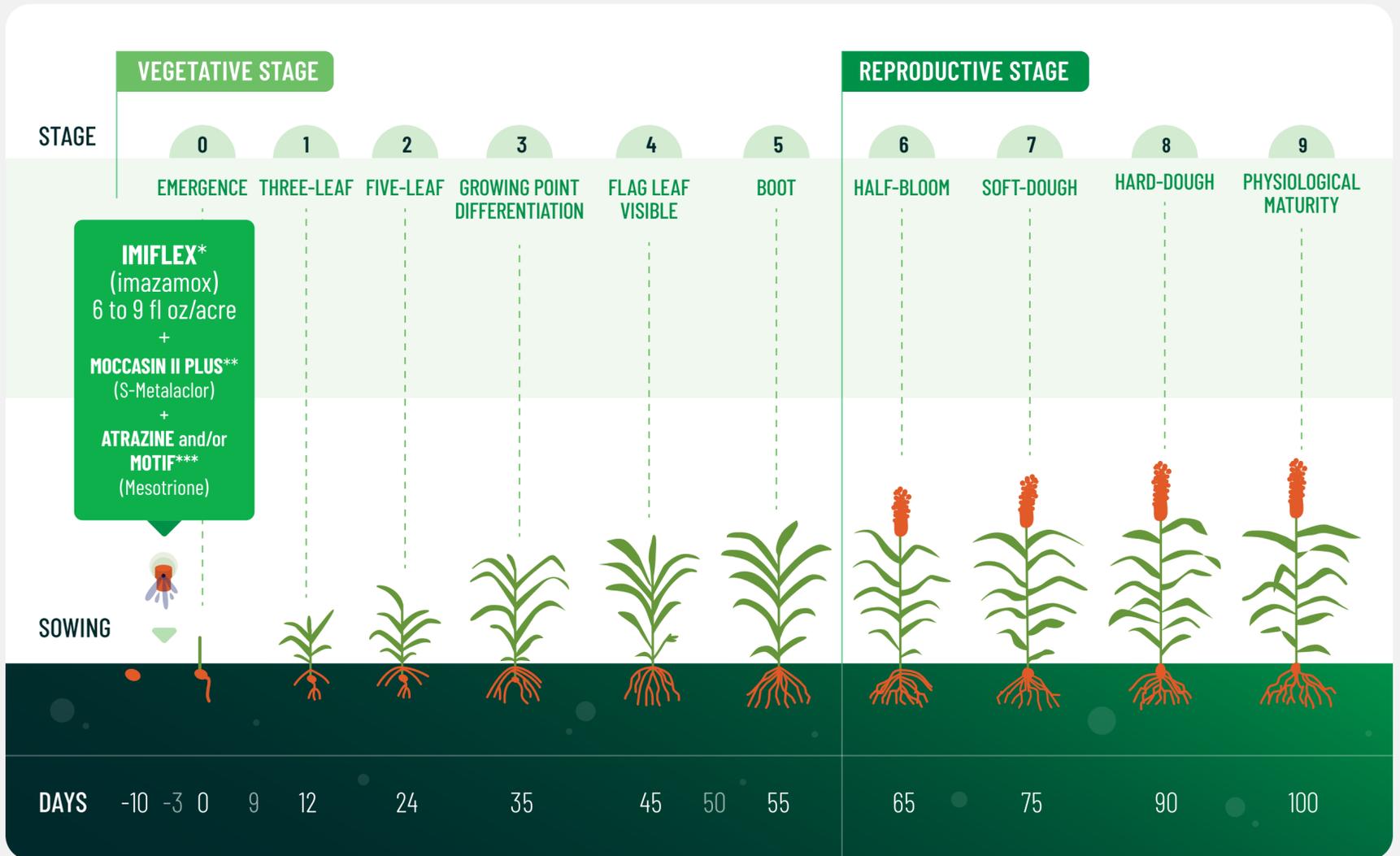
 **PORPOSED USE**

IMIFLEX™ effectively controls weeds in conservation tillage and conventional tillage production systems. IMIFLEX™ can be applied pre-emergence or early post-emergence in igrowth® (imidazolinone-resistant sorghum) varieties. Apply only on selected sorghum varieties labeled “**igrowth®**”.

Apply IMIFLEX™ pre-emergence or early post-emergence when weeds are actively growing and before broadleaf weeds exceed a height of 3 inches and grass weeds exceed 4 to 5 leaves (unless otherwise indicated, refer to Weeds Controlled section for specific weed sizes). Apply when the majority of weeds are at the specified growth stage.



CASE 1 | SPRAY IMIFLEX IN PRE-EMERGENCY ...



IMIFLEX

APPLICATION

For pre-emergence use in **igrowth[®]** sorghum, apply IMIFLEX at 6 fl oz (0.047 lb ae)/A to 9 fl. Oz (0.072 lb ae)/A. At the lower rate, 1 gallon of IMIFLEX will treat 21.3 acres of **igrowth[®]** sorghum.

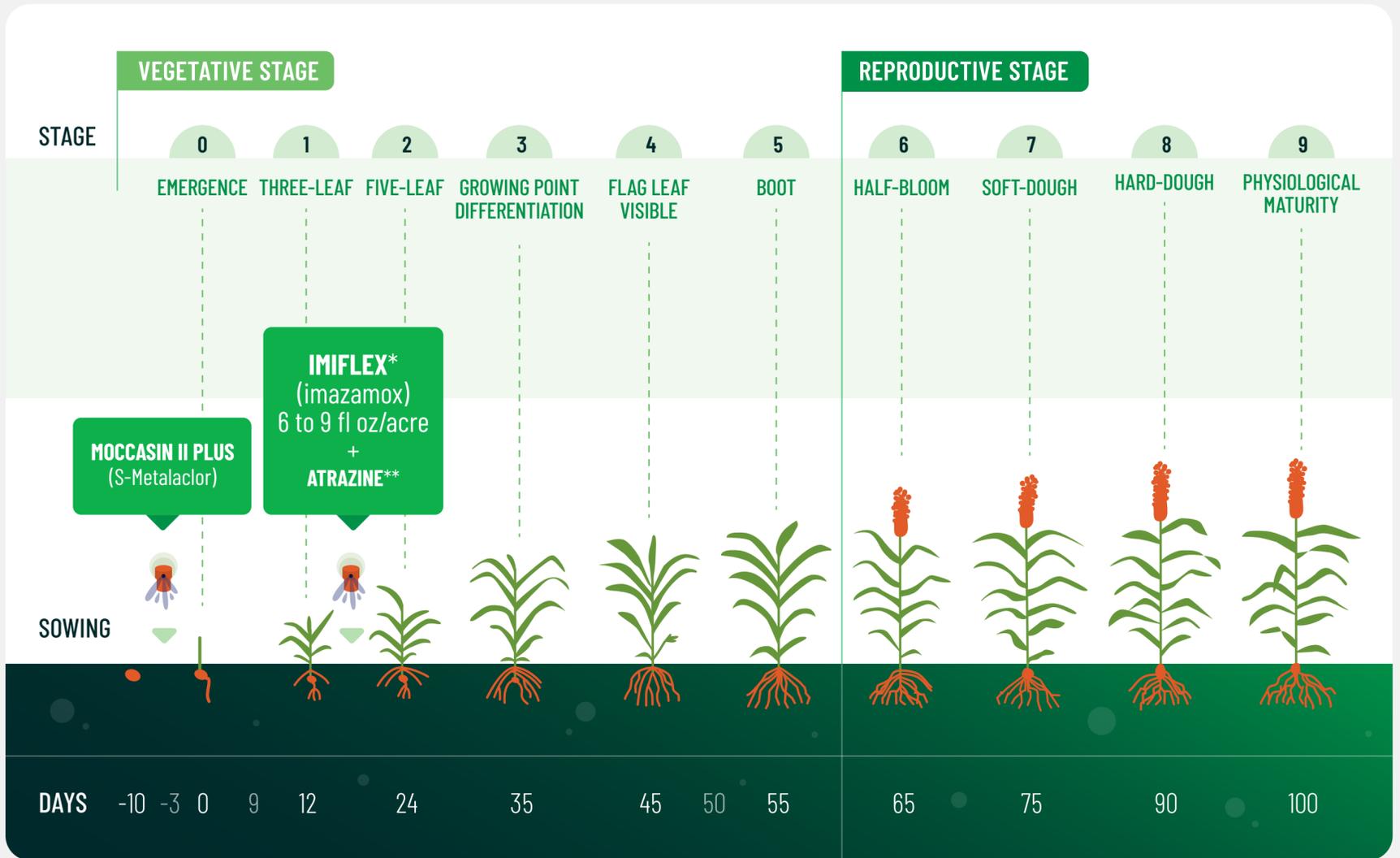
*For improved weed control, crop oil concentrate or methylated seed oil may be substituted for nonionic surfactant.

**Tank mix for superior annual grassy weeds control.

***Tank mix for superior broadleaves weeds control.



CASE 2 | SPRAY IMIFLEX IN POST-EMERGENCY ...



IMIFLEX

APPLICATION

For post-emergence use in **igrowth**[®] sorghum, apply IMIFLEX at 6 fl oz (0.047 lb ae)/A. Oz (0.072 lb ae)/A. At this rate, 1 gallon of IMIFLEX will treat 21.3 acres of **igrowth**[®] sorghum.

*For improved weed control, crop oil concentrate or methylated seed oil may be substituted for nonionic surfactant. Use of COC or MSO in place of NIS in **igrowth**[®] sorghum may increase crop response. When IMIFLEX is tank mixed with another herbicide, using COC or MSO in **igrowth**[®] sorghum is only advised when an IMIFLEX[™] tank mix partner allows use of COC or MSO. See Adjuvants section under Mixing Instructions for specific instructions.

**Tank mix most reliable weed control program.

Imiflex herbicide rotational crop restrictions ...

Imidazolinone crops were developed for an **ease of weed control** utilizing different approved and registered active ingredients that may vary on doses and residual effect on the soil. Subsequent crops must attend **minimum residual effect period to avoid any type of crop injury** due to susceptibility to any chemical residual effect. To **avoid potential damage to follow-up crops**, the waiting periods indicated below must be adhered to following application of IMIFLEX™.

RE-CROPPING INTERVALS (MONTHS)

▶ Dry beans, soybeans, dry peas, Edamame, English peas, Lima beans (succulent), Snap beans, and any 'imidazolinone tolerant' crops	Anytime
▶ Alfalfa, Wheat (non-Clearfield)	3 months
▶ Rye	4 months
▶ Corn (non-Clearfield field, seed, sweet, and popcorn)	8.5 months
▶ Barley, cotton, millet, oat, peanut, rice, sunflower, tobacco	9 months
▶ Sorghum (all types, including igrowth)	18 months

MORE INFORMATION

For more information, contact an Advanta Seeds representative and check the registered chemical label for additional details.





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seeds™
by ADVANTA

altaseeds.com