A REPORT OF THE

NATIONAL SUNFLOWER VARIETY REVIEW BOARD



ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

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AOSCA MAY 2012



NATIONAL SUNFLOWER VARIETY REVIEW BOARD

ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES (April 2012)

The Association of Official Seed Certifying Agencies (AOSCA) National Sunflower Variety Review Board (NSFVRB), reviewed the following varieties on April 26, 2012, in Fargo, North Dakota. The Board recommended the inclusion of these varieties for certification. Seed of these varieties may be certified, providing production meets all standards of the Certifying Agency of the jurisdiction in which the seed is grown.

All variety information, including descriptions, claims, and research data to support any claim was supplied to the National Sunflower Variety Review Board by the applicants. The National Sunflower Variety Review Board makes judgment regarding recommendation of varieties for inclusion in certification based on the data supplied. Beyond this, the National Sunflower Variety Review Board takes no position on the accuracy or truthfulness of any description or claim made by the applicants.

Further information on current procedures, application forms, and details regarding the National Sunflower Variety Review Board can be obtained from:

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Respectfully submitted,

Ronald Larson, Chairman National Sunflower Variety Review Board

AOSCA MAY 2012

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OI2468B

- OI2468B is a high oleic IMI resistant maintainer oilseed line derived from the pedigree CN7479B*2/OIN757B.
 CN7479B and OIN757B are proprietary Mycogen Seeds parent lines used for development and selection of
 OI2468B for high oleic and imidazolinone herbicide resistance by conventional pedigreed breeding method.
 OI2468B is derived from a bulk of a BC1F8 family tracing to a single BC1F7 plant homozygous for high oleic
 and imidazolinone resistance. The male-sterile component of OI2468B, named OI2468A, uses the Cms PET 1
 [H. petiolaris (French)] cytoplasm.
- 2 Hybrids utilizing OI2468B are adapted to the major sunflower growing regions of North America and Europe, and will be used primarily for vegetable oil.

3.	Flowering (rela	tively early, medium, or late?):		Medium	
	Physiological n	naturity (relatively early, medium, or la	ate?):	Medium	
	Height (relative	ely short, medium or tall?):		Medium	
	Stem branching	g: No			
	Leaf shape:	Cordate	Leat	margins:	Coarsely serrate
	Leaf attitude:	Descending	_ Leaf	surface:	Crinkled
	Leaf color:	Green	_		
	Ray flowers:	Present	_ Ray	flower colo	or: Yellow
	Disk flower col	or: Yellow	Stig	ma anthocy	vanin: Absent
	Pollen color:	Yellow	– Papj	oi color:	Green
	Receptacle shap	pe: Convex	Hea	d (neck) att	titude: Descending
	Seed outer peri	carp color: Nearly solid black	Seed	l middle pe	ericarp color: White
	Stripe appearan	ce: Narrow dark-gray striping	Seed	l shape:	Broadly ovate
	Seed cross-sect	ion: Curved			

State expected variants or other varietal traits that will assist in identification in the field:

OI2468B is a medium height, medium maturing inbred – approximately 16 cm taller than HA89, and 5 days later to flower and maturity. Leaves are of average width and length and high in number to exhibit a full canopy. Leaves have deep serrations and obvious ridging to cause wavy edges. Seed is nearly solid black and of larger than average size for an oilseed inbred. In some environments, up to 15% of plants may express basal branching

- 4 OI2468B is resistant to imidazolinone herbicides. It does not appear to have qualitative resistance to major diseases or insects.
- 5. Breeder seed increases are maintained by Mycogen Seeds under cloth bagged heads in nursery rows or in isolation cages. Up to two generations beyond breeder's seed are allowed for increase by open pollination in isolated fields for production of Foundation Seed. Isolation and other requirements will be according to the Seed Certification regulations of the state where seed is grown.
- 6. Certified seed of hybrids using this variety may be made available for the 2013 season. Please do not publish certified acreage.
- 7. It is not anticipated that a PVP application will be made on this variety.



OIN608R

- OIN608R is a high oleic IMI resistant oilseed restorer line derived from the backcross pedigree ONN608R*5/CIN117R. The recurrent and donor parents ONN608R and CIN117R are proprietary Mycogen Seeds parent lines used for development and selection of OIN608R for high oleic fatty acid and imidazolinone herbicide resistance. OIN608R is derived from a bulk of a BC4F7 family tracing to a single BC4F6 plant homozygous for high oleic and imidazolinone resistance. OIN608R has the male sterile inducing cytoplasm from PET1 [H. petiolaris (French)] and gene conferring fertility restoration.
- Hybrids utilizing OIN608R are adapted to the major sunflower growing regions of North America and Europe, and will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	te?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Fully branched	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Descending	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Present strong
	Pollen color: Yellow	Pappi color: Rust
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Nearly solid black	Seed middle pericarp color: White
	Stripe appearance: Narrow dark-gray striping	Seed shape: Narrowly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

OIN608R is a medium height, medium maturing inbred – approximately 7 cm taller than RHA274, and 5 and 6 days later to flower and maturity. Petioles and branches appear longer than average therefore more descending than average. Likewise, the main head is more descending than observed on most inbreds.

- 4 OIN608R is resistant to imidazolinone herbicides. It does not appear to have qualitative resistance to major diseases or insects.
- 5. Breeder seed increases are maintained by Mycogen Seeds under cloth bagged heads in nursery rows or in isolation cages. Up to two generations beyond breeder's seed are allowed for increase by open pollination in isolated fields for production of Foundation Seed. Isolation and other requirements will be according to the Seed Certification regulations of the state where seed is grown.
- 6. Certified seed of hybrids using this variety may be made available for the 2013 season. Please do not publish certified acreage.
- 7. It is not anticipated that a PVP application will be made on this variety.



ZN1443B

- 1. ZN1443B was developed by Mycogen Seeds. It is a high oleic maintainer oilseed line derived from the backcross pedigree ON2343B*3/ON1982. The recurrent and donor parents ON2343B and ON1982 are proprietary Mycogen Seeds parent lines used for development and selection of ZN1443B having oleic acid content greater than 93%. ZN1443B is derived from a bulk of a BC2F6 family tracing to a single BC2F5 plant homozygous for high oleic. The male-sterile component of ZN1443B, named ZN1443A, uses the Cms PET 1 [H. petiolaris (French)] cytoplasm.
- 2 Hybrids utilizing ZN1443B are adapted to the major sunflower growing regions of North America and Europe, and will be used primarily for vegetable oil.

5.	Flowering (relatively early, medium, or late?):	Medium-late
	Physiological maturity (relatively early, medium, or lat	re?): Medium-late
	Height (relatively short, medium or tall?):	Medium
	Stem branching: No	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Descending	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Nearly solid black	Seed middle pericarp color: White
	Stripe appearance: Narrow dark-gray striping	Seed shape: Broadly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

ZN1443B is of medium height, approximately 12 cm taller than HA89. Maturity is considered to be medium late – days to flower and maturity are approximately 7 and 10 days later than HA89. Head attitude is similar to HA89. Ray flowers appear longer than average. Seed is less broadly ovate than HA89. In some environments, up to 15% of plants may express basal branching.

- 4 ZN1443B does not appear to have obvious qualitative genetic resistance to major diseases, insects, or herbicides.
- 5. Breeder seed increases are maintained by Mycogen Seeds under cloth bagged heads in nursery rows or in isolation cages. Up to two generations beyond breeder's seed are allowed for increase by open pollination in isolated fields for production of Foundation Seed. Isolation and other requirements will be according to the Seed Certification regulations of the state where seed is grown.
- 6. Certified seed of hybrids using this variety may be made available for the 2013 season. Please do not publish certified acreage.
- 7. It is not anticipated that a PVP application will be made on this variety.



ZN1479B

- 1. ZN1479B is a high oleic maintainer oilseed line derived from the backcross pedigree ON7479B*3/ON1982. The recurrent and donor parents ON7479B and ON1982 are proprietary Mycogen Seeds parent lines used for development and selection of ZN1479B having oleic acid content greater than 93%. ZN1479B is derived from a bulk of a BC2F6 family tracing to a single BC2F5 plant homozygous for high oleic. The male-sterile component of ZN1479B, named ZN1479A, uses the Cms PET 1 [*H. petiolaris* (French)] cytoplasm.
- 2 Hybrids utilizing ZN1479B are adapted to the major sunflower growing regions of North America and Europe, and will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	te?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: No	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Descending	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Nearly solid black	Seed middle pericarp color: White
	Stripe appearance: Narrow dark-gray striping	Seed shape: Broadly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

ZN1479B is a medium height, medium maturing inbred - it is approximately 21 cm taller than HA89, and 5 days later to flower and maturity. Ray flowers are noticeably short and narrow, and sparse in number. Leaves are smaller than average making a narrow leaf canopy. In some environments, up to 15% of plants may express basal branching.

- 4 ZN1479B does not appear to have obvious qualitative genetic resistance to major diseases, insects, or herbicides.
- 5. Breeder seed increases are maintained by Mycogen Seeds under cloth bagged heads in nursery rows or in isolation cages. Up to two generations beyond breeder's seed are allowed for increase by open pollination in isolated fields for production of Foundation Seed. Isolation and other requirements will be according to the Seed Certification regulations of the state where seed is grown.
- 6. Certified seed of hybrids using this variety may be made available for the 2013 season. Please do not publish certified acreage.
- 7. It is not anticipated that a PVP application will be made on this variety.



ZN2343B

- 1. ZN2343B was developed by Mycogen Seeds. It is a high oleic maintainer oilseed line derived from the backcross pedigree ON2343B*3/ON1982. The recurrent and donor parents ON2343B and ON1982 are proprietary Mycogen Seeds parent lines used for development and selection of ZN2343B having oleic acid content greater than 93%. ZN2343B is derived from a bulk of a BC2F6 family tracing to a single BC2F5 plant homozygous for high oleic. The male-sterile component of ZN2343B, named ZN2343A, uses the Cms PET 1 [H. petiolaris (French)] cytoplasm.
- Hybrids utilizing ZN2343B are adapted to the major sunflower growing regions of North America and Europe, and will be used primarily for vegetable oil.

5.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: No	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Descending	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Nearly solid black	Seed middle pericarp color: White
	Stripe appearance: Narrow dark-gray striping	Seed shape: Broadly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

ZN2343B is of medium plant height approximately 18 cm taller than HA89; days to flower and maturity about 4 and 6 days later; and head attitude and leaf size are similar as HA89. Ray flowers are obviously long. Seed is less broadly ovate than HA89. In some environments, up to 15% of plants may express basal branching.

- 4 ZN2343B does not appear to have obvious qualitative genetic resistance to major diseases, insects, or herbicides.
- 5. Breeder seed increases are maintained by Mycogen Seeds under cloth bagged heads in nursery rows or in isolation cages. Up to two generations beyond breeder's seed are allowed for increase by open pollination in isolated fields for production of Foundation Seed. Isolation and other requirements will be according to the Seed Certification regulations of the state where seed is grown.
- 6. Certified seed of hybrids using this variety may be made available for the 2013 season. Please do not publish certified acreage.
- 7. It is not anticipated that a PVP application will be made on this variety.



ZN7321R

- 1. ZN7321R was developed by Mycogen Seeds. It is a high oleic oilseed restorer derived from the backcross pedigree ON7321R*3/ON1982. The recurrent and donor parents ON7321R and ON1982, respectively, are proprietary Mycogen Seeds parent lines used for development and selection of ZN7321R having oleic acid content greater than 92.5%. ZN7321R is derived from a bulk of a BC2F6 family tracing to a single BC2F5 plant homozygous for high oleic, and recessive branching. ZN7321R has the male sterile inducing cytoplasm from PET1 [*H. petiolaris* (French)] and gene conferring fertility restoration.
- 2 Hybrids utilizing ZN7321R are adapted to the major sunflower growing regions of North America and Europe, and will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Early
	Physiological maturity (relatively early, medium, or lat	e?): Early
	Height (relatively short, medium or tall?):	Short
	Stem branching: Fully branched	
	Leaf shape: Cordate	Leaf margins: Finely serrate
	Leaf attitude: Descending	Leaf surface: Slightly crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Present weak
	Pollen color: Yellow	Pappi color: Rust
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Nearly solid black	Seed middle pericarp color: White
	Stripe appearance: Narrow dark-gray striping	Seed shape: Narrowly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

ZN7321R is a medium short fully branched R-line with relatively sparse number of leaves of approximately 21 per plant. The leaf petioles exhibit a brown streak along its center for at least half its length. Anthocyanin is weakly expressed in stigmas and pappi. Leaves have a more droopy appearance than observed in most sunflower varieties.

- 4 ZN7321R does not appear to have obvious qualitative resistance to major diseases or insects.
- 5. Breeder seed increases are maintained by Mycogen Seeds under cloth bagged heads in nursery rows or in isolation cages. Up to two generations beyond breeder's seed are allowed for increase by open pollination in isolated fields for production of Foundation Seed. Isolation and other requirements will be according to the Seed Certification regulations of the state where seed is grown.
- 6. Certified seed of hybrids using this variety may be made available for the 2013 season. Please do not publish certified acreage.
- 7. It is not anticipated that a PVP application will be made on this variety.



ZND163R

- 1. ZND163R was developed by Mycogen Seeds. It is a high oleic oilseed restorer derived from the backcross pedigree HO817114R*5/ON1982. The recurrent and donor parents HO817114R and ON1982, respectively, are proprietary Mycogen Seeds parent lines used for development and selection of ZND163R having oleic acid content greater than 93%, and the Pl7 gene for downy mildew resistance. ZND163R is derived from a bulk of a BC4F6 family tracing to a single BC4F5 plant homozygous for high oleic, Pl7, and recessive branching. ZND163R has the male sterile inducing cytoplasm from PET1 [*H. petiolaris* (French)] and gene conferring fertility restoration.
- Hybrids utilizing ZND163R are adapted to the major sunflower growing regions of North America and Europe, and will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or la	te?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Fully branched	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Descending	Leaf surface: Slightly crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Present strong
	Pollen color: Yellow	Pappi color: Rust
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Brown	Seed middle pericarp color: White
	Stripe appearance: Narrow white marginal stripes	Seed shape: Narrowly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

ZND163R is 3 and 4 days later flowering and maturing than RHA274. ZND163R has rust colored pappi, a strong expression of stigma anthocyanin, and ray flower length approximately 2 mm shorter than RHA274. Only a few rows of disk flowers emerge on a daily basis after R5.1, extending the flowering period of the main head up to approximately 10 days. ZND163R is approximately 8 cm taller in height with larger leaves compared to RHA274. Seeds of ZND163R are short, plump, and brown with fine white marginal stripes.

- 4 ZND163R is resistant to downy mildew races 730, 733, and 770. It does not appear to have obvious qualitative resistance to other major diseases or insects.
- 5. Breeder seed increases are maintained by Mycogen Seeds under cloth bagged heads in nursery rows or in isolation cages. Up to two generations beyond breeder's seed are allowed for increase by open pollination in isolated fields for production of Foundation Seed. Isolation and other requirements will be according to the Seed Certification regulations of the state where seed is grown.
- 6. Certified seed of hybrids using this variety may be made available for the 2013 season. Please do not publish certified acreage.
- 7. It is not anticipated that a PVP application will be made on this variety.



B0505HG

- 1. B0505HG is an Express® resistant, oleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross B0408HG*2/B0389LG. B0408HG and B0389LG are both Pioneer proprietary lines. Selections were made for fatty acid, oil content, Express® resistance and recurrent parent traits. The backcross and pedigree methods were used in the development of B0505HG. It is a bulk of BC1F5 seed tracing back to a single BC1F4 selection. The sterile analog derives from the CMS PET1 cytoplasm following 3 generations of backcrossing. It is homozygous dominant for single heads.
- 2 Hybrids utilizing B0505HG are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Late
	Physiological maturity (relatively early, medium, or la	te?): Late
	Height (relatively short, medium or tall?):	Medium
	Stem branching: None	
	Leaf shape: Cordate	Leaf margins: Finely Serrate
	Leaf attitude: Ascending	Leaf surface: Crinkled
	Leaf color: Green	<u>- </u>
	Ray flowers: Broad Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal and Lateral Narrow	Seed shape: Narrowly Ovate
	Dark-Grey Stripping	
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line HA89, B0505HG blooms 10 days later and matures 7 days later. It is about 14 cm taller than HA89, and the cordate leaves are longer than HA89. The broadly ovate, yellow ray flowers are longer and wider than HA89. The seed is narrowly ovate, heavier and longer, than HA89. B0505HG has seed that are nearly solid black with grey lateral and marginal stripes. Hypocotyl anthocyanin is absent.

- 4 This variety is resistant to tribenuron-methyl herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



B0610LM

- 1. B0610LM is an Express® resistant, linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross D966MLM*4/SU7M. D966MLM and SU7M are Pioneer proprietary lines. Selections were made for Express® resistance and recurrent parent traits. The backcross and pedigree methods were used in the development of B0610LM. It is a bulk of BC3F9 seed tracing back to a single BC3F8 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- Hybrids utilizing B0610LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):		Early	
	Physiological maturity (relatively early, medium, or la	te?):	Early	_
	Height (relatively short, medium or tall?):		Short	_
	Stem branching: Top Branching with Central Head			
	Leaf shape: Cordate	Lea	f margins:	Finely Serrate
	Leaf attitude: Horizontal	Lea	f surface:	Crinkled
	Leaf color: Green	_		
	Ray flowers: Fusiform	Ray	flower colo	or: Yellow
	Disk flower color: Yellow	Stig	ma anthoc <u>y</u>	vanin: Weakly Present
	Pollen color: Yellow	Pap	pi color:	Green
	Receptacle shape: Convex	Hea	d (neck) att	itude: Descending
	Seed outer pericarp color: Medium Brown	Seed	d middle pe	ericarp color: White
	Stripe appearance: Absent	Seed	d shape: _l	Narrowly Ovate
	Seed cross-section: Curved	_	· <u></u>	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, B0610LM blooms 2 days earlier and matures 2 days earlier. It is about 4 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The fusiform yellow ray flowers are longer and narrower than RHA274. The seed is narrowly ovate and medium brown with no stripes, longer and lighter than RHA274. Hypocotyl anthocyanin is weakly present.

- 4 This variety is resistant to tribenuron-methyl herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



B0617LM

- 1. B0617LM is an Express® resistant, linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross J9756LM*2/B0336HM. J9756LM and B0336HM are both Pioneer proprietary lines. Selections were made for Express® resistance and recurrent parent traits. The backcross and pedigree methods were used in the development of B0617LM. It is a bulk of BC1F10 seed tracing back to a single BC1F9 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- Hybrids utilizing B0617LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Early
	Physiological maturity (relatively early, medium, or lat	te?): Early
	Height (relatively short, medium or tall?):	Short
	Stem branching: Fully Branching with Central Head	d
	Leaf shape: Cordate	Leaf margins: Entire
	Leaf attitude: Horizontal	Leaf surface: Crinkled
	Leaf color: Light Green	<u>- </u>
	Ray flowers: Narrowly ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Lateral and Marginal Narrow	Seed shape: Broadly Ovate
	Stripe appearance: dark grey stripes	Seed shape. Broadly Ovale
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, B0617LM blooms 6 days earlier and matures 6 days earlier. It is about 60 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The narrowly ovate, yellow ray flowers are the same length as RHA274 but narrower. The seed is broadly ovate, black with grey stripes both lateral and marginal, and longer and lighter than RHA274. Hypocotyl anthocyanin is absent.

- This variety is resistant to tribenuron-methyl herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



B0620LM

- 1. B0620LM is an Express® resistant, linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross PK79M*3/B0317LM. PK79M and B0317LM are both Pioneer proprietary lines. Selections were made for Express® resistance and recurrent parent traits. The backcross and pedigree methods were used in the development of B0620LM. It is a bulk of BC2F8 seed tracing back to a single BC2F7 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing B0620LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Short
	Stem branching: Top Branching with Central Head	
	Leaf shape: Cordate	Leaf margins: Finely Serrate
	Leaf attitude: Ascending	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Fusiform	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Medium Brown	Seed middle pericarp color: White
	Stripe appearance: Absent	Seed shape: Oblong
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, B0620LM blooms 2 days later and matures 2 days later. It is about 30 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The fusiform yellow ray flowers are longer and narrower than RHA274. The seed is oblong, longer and heavier than RHA274. B0620LM has seed that are medium brown with no stripes. Hypocotyl anthocyanin is absent.

- 4 This variety is resistant to tribenuron-methyl herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



B0622LM

- 1. B0622LM is an Express® resistant, linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross S9856LM*5/B0344LM. S9856LM and B0344LM are both Pioneer proprietary lines. Selections were made for Express® resistance and recurrent parent traits. The backcross and pedigree methods were used in the development of B0622LM. It is a bulk of BC4F6 seed tracing back to a single BC4F5 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing B0622LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (rela	tively early, medium, or late?):		Late	
	Physiological n	naturity (relatively early, medium, or la	te?):	Late	
	Height (relative	ly short, medium or tall?):	-	Short	
	Stem branching	: Fully Branching with Central Head	d		
	Leaf shape:	Cordate	Leaf	margins:	Medium Serrate
	Leaf attitude:	Horizontal	Leaf	surface:	Crinkled (Ridged)
	Leaf color:	Green	_		
	Ray flowers:	Narrowly Ovate and Flat	Ray	flower col	or: Yellow
	Disk flower col	or: Yellow	Stign	na anthoc	yanin: Weakly Present
	Pollen color:	Yellow	Papp	i color:	Green
	Receptacle shap	e: Convex	Head	l (neck) at	titude: Descending
	Seed outer perio	carp color: Black	Seed	middle p	ericarp color: White
	Stripe appearan	ce: Absent	Seed	shape:	Narrowly Ovate
	Seed cross-sect	ion: Curved	_		

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, B0622LM blooms 19 days later and matures 9 days later. It is about 23 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The narrowly ovate, yellow ray flowers are shorter and narrower than RHA274. The seed is narrowly ovate and black without stripes, longer and lighter than RHA274. Hypocotyl anthocyanin is absent.

- 4 This variety is resistant to tribenuron-methyl herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



F0704LG

- F0704LG is a linoleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross S9801LG/U9605LG. S9801LG and U9605LG are both Pioneer proprietary lines. Selections were made for earlier flowering, shorter plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of F0704LG. It is a bulk of F8 seed tracing back to a single F7 selection. The sterile analog derives from the CMS PET1 cytoplasm following 6 generations of backcrossing. It is homozygous dominant for single heads.
- 2 Hybrids utilizing F0704LG are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or la	ite?): Late
	Height (relatively short, medium or tall?):	Tall
	Stem branching: None	
	Leaf shape: Cordate	Leaf margins: Finely Serrate
	Leaf attitude: Horizontal	Leaf surface: Slightly Crinkled
	Leaf color: Green	
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal and Lateral Narrow Dark-Grey Stripping	Seed shape: Oblong
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line HA89, F0704LG blooms 4 days later and matures 12 days later. It is about 42 cm taller than HA89, and the cordate leaves are shorter than HA89. The narrowly ovate, yellow ray flowers are narrower than HA89. The seed is oblong, longer and heavier than HA89. F0704LG has seed that are nearly solid black with grey stripes on and between margins. Hypocotyl anthocyanin is absent.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2012. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



F0956LM

- 1. F0956LM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross F0001LM/U9612LM. F0001LM and U9612LM are both Pioneer proprietary lines. Selections were made for oil content, shorter plant stature and yield, as assessed in hybrid combination. The pedigree method was used in the development of F0956LM. It is a bulk of F8 seed tracing back to a single F7 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing F0956LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (rela	tively early, medium, or late?):		Medium	
	Physiological r	naturity (relatively early, medium, or lat	te?):	Medium	_
	Height (relative	ely short, medium or tall?):		Medium	_
	Stem branching	g: Fully branched with central head			
	Leaf shape:	Cordate	Leat	margins:	Medium Serrate
	Leaf attitude:	Horizontal	Lea	surface:	Slightly Crinkled
	Leaf color:	Green	-		
	Ray flowers:	Broadly Ovate and Flat	Ray	flower colo	or: Yellow
	Disk flower col	or: Yellow	Stig	ma anthoc <u>y</u>	vanin: Strongly Present
	Pollen color:	Yellow	Pap	oi color:	Green
	Receptacle shap	pe: Convex	Hea	d (neck) att	itude: Descending
	Seed outer peri	carp color: Brown	Seed	l middle pe	ericarp color: White
	Stripe appearar	ice: Absent	Seed	l shape: _l	Broadly Ovate
	Seed cross-sect	ion: Curved			

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, F0956LM blooms 11 days later and matures 5 days later. It is about 2 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The broadly ovate and flat, yellow ray flowers are shorter than RHA274. The seed is narrowly ovate, longer and lighter than RHA274. F0956LM has seed that are brown. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



F0968LM

- F0968LM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the
 cross S9867LM/U01P6LM. S9867LM and U01P6LM are both Pioneer proprietary lines. Selections were made
 for oil content, shorter plant stature and yield, as assessed in hybrid combination. The pedigree method was
 used in the development of F0968LM. It is a bulk of F8 seed tracing back to a single F7 selection. It is
 homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing F0968LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

١.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Fully branched with central head.	
	Leaf shape: Cordate	Leaf margins: Medium Serrate
	Leaf attitude: Horizontal	Leaf surface: Slightly Crinkled
	Leaf color: Green	
	Ray flowers: Fusiform	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Weakly Present
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal and lateral Dark- Gray Stripe	Seed shape: Narrowly Ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, F0968LM blooms 4 days later and matures 5 days later. It is about 8 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The fusiform, yellow ray flowers are narrower than RHA274. The narrowly ovate seed is black with grey stripes on both the margins and between margins and is longer and lighter than RHA274. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



F09AMLM

- F09AMLM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the
 cross E9730LM/LC1066R/U9612LM. E9730LM and U9612LM are both Pioneer proprietary lines. LC1066R
 is a line developed by the Fundulea Institute in Romania and licensed for use by Pioneer. Selections were made
 for oil content, self fertility, shorter plant stature, and yield, as assessed in hybrid combination. The pedigree
 method was used in the development of F09AMLM. It is a bulk of F6 seed tracing back to a single F5 selection.
 It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing F09AMLM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Top Branching with Central Head	
	Leaf shape: Cordate	Leaf margins: Finely Serrate
	Leaf attitude: Ascending	Leaf surface: Slightly Crinkled
	Leaf color: Green	
	Ray flowers: Narrowly Ovate and flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Weakly Present
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Black	Seed middle pericarp color: White
	Stripe appearance: Absent	Seed shape: Broadly Ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, F09AMLM blooms 2 days later and matures 5 days later. It is about 18 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The narrowly ovate and flat, yellow ray flowers are narrower than RHA274. The seed is broadly ovate, longer and lighter than RHA274. F09AMLM has seed that are black with no stripes. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



PH5035R

- 1. PH5035R is an Express® resistant, linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross F0143LM*8/B0644LM. F0143LM and B0644LM are both Pioneer proprietary lines. Selections were made for Express® resistance and recurrent parent traits. The backcross and pedigree methods were used in the development of PH5035R. It is a bulk of BC7F5 seed tracing back to a single BC7F4 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing PH5035R are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

٥.	Flowering (relatively early, medium, or late?):	Late
	Physiological maturity (relatively early, medium, or lat	te?): Late
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Fully branched with central head	
	Leaf shape: Cordate	Leaf margins: Entire
	Leaf attitude: Ascending	Leaf surface: Smooth
	Leaf color: Green	•
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Descending
	Seed outer pericarp color: Brown	Seed middle pericarp color: White
	Stripe appearance: Marginal and Lateral Narrow White Stripes	Seed shape: Oblong
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, PH5035R blooms 19 days later and matures 11 days later. It is about 10 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The broadly ovate and flat, yellow ray flowers are shorter and narrower than RHA274. The broadly oblong seed is brown with white lateral and marginal stripes, longer and lighter than RHA274. Hypocotyl anthocyanin is absent.

- 4 This variety is resistant to tribenuron-methyl herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T0268SA1LM

- 1. T0268SA1LM is an Express® resistant, linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross T0268LM*3/B0520LM. T0268LM and B0520LM are both Pioneer proprietary lines. Selections were made for Express® resistance and recurrent parent traits. The backcross and pedigree methods were used in the development of T0268SA1LM. It is a bulk of BC2F5 seed tracing back to a single BC2F4 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- Hybrids utilizing T0268SA1LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):		Meaium	
	Physiological maturity (relatively early, medium, or lat	te?):	Medium	_
	Height (relatively short, medium or tall?):		Medium	_
	Stem branching: Fully Branched with central head			
	Leaf shape: Cordate	Lea	margins:	Finely Serrate
	Leaf attitude: Ascending	Lea	f surface:	Smooth
	Leaf color: Green			
	Ray flowers: Narrowly Ovate and Flat	Ray	flower colo	or: Yellow
	Disk flower color: Yellow	Stig	ma anthoc <u>y</u>	vanin: Absent
	Pollen color: Yellow	Pap	oi color:	Green
	Receptacle shape: Convex	Hea	d (neck) att	itude: Descending
	Seed outer pericarp color: Medium Brown	Seed	l middle pe	ericarp color: White
	Stripe appearance: Absent	Seed	d shape:(Oblong
	Seed cross-section: Curved	='		

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, T0268SA1LM blooms 7 days later and matures 7 days later. It is about 32 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The narrowly ovate and flat, yellow ray flowers are longer and narrower than RHA274. The oblong seed is medium brown with no stripes and is the same length as RHA274, but lighter. Hypocotyl anthocyanin is absent.

- 4 This variety is resistant to tribenuron-methyl herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T0592HM

- T0592HM is an oleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross LSW022QM/T9885QM. LSW022QM and T9885QM are all Pioneer proprietary line. Selections were made for oil content, fatty acid content, shorter plant stature and yield, as assessed in hybrid combination. The pedigree method was used in the development of T0592HM. It is a bulk of F6 seed tracing back to a single F5 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- Hybrids utilizing T0592HM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	ate?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Top branching with central head	
	Leaf shape: Lanceolate	Leaf margins: Medium Serrate
	Leaf attitude: Ascending	Leaf surface: Slightly Crinkled
	Leaf color: Green	
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal and Lateral Narrow dark-gray stripes	Seed shape: Narrowly Ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, T0592HM blooms 7 days later and matures 5 days later. It is about 31 cm shorter than RHA274, and the lanceolate leaves are longer than RHA274. The narrowly ovate and flat, yellow ray flowers are narrower than RHA274. The seed is narrowly ovate and lighter than RHA274. T0592HM has seed that are striped black, with grey stripes. Hypocotyl anthocyanin is absent.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T0929HG

- T0929HG is an oleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the
 cross T00A8HG/T00D3HG. T00A8HG and T00D3HG are both Pioneer proprietary lines. Selections were
 made for earlier flowering, shorter stature, fatty acid & oil content and yield, as assessed in hybrid combination.
 The pedigree method was used in the development of T0929HG. It is a bulk of F6 seed tracing back to a single
 F5 selection. The sterile analog derives from the CMS PET1 cytoplasm following 4 generations of
 backcrossing. It is homozygous dominant for single heads.
- 2 Hybrids utilizing T0929HG are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or la	ite?): Late
	Height (relatively short, medium or tall?):	Tall
	Stem branching: None	
	Leaf shape: Cordate	Leaf margins: Finely Serrate
	Leaf attitude: Erect	Leaf surface: Slightly Crinkled
	Leaf color: Green	
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Concave	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal Narrow Dark-Grey Stripping	Seed shape: Oblong
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line HA89, T0929HG blooms 6 days later and matures 11 days later. It is about 27 cm taller than HA89, and the cordate leaves are longer than HA89. The narrowly ovate, yellow ray flowers are narrower than HA89. The seed is oblong and longer than HA89. T0929HG has seed that are nearly solid black with grey strips on margins. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T0946HG

- 1. T0946HG is an oleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross PHB247/T0001LG//T00D3HG. PHB247, T0001LG, and T00D3HG are Pioneer proprietary lines. Selections were made for earlier flowering, shorter plant stature, fatty acid & oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of T0946HG. It is a bulk of F8 seed tracing back to a single F7 selection. The sterile analog derives from the CMS PET1 cytoplasm following 5 generations of backcrossing. It is homozygous dominant for single heads.
- 2 Hybrids utilizing T0946HG are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or la	ite?): Late
	Height (relatively short, medium or tall?):	Tall
	Stem branching: None	
	Leaf shape: Cordate	Leaf margins: Medium Serrate
	Leaf attitude: Erect	Leaf surface: Slightly Crinkled
	Leaf color: Green	
	Ray flowers: Broadly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Lateral and Marginal Narrow Dark-Grey Stripping	Seed shape: Oblong
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line HA89, T0946HG blooms 6 days later and matures 13 days later. It is about 18 cm taller than HA89, and the cordate leaves are shorter than HA89. The broadly ovate, yellow ray flowers are narrower than HA89. The seed is oblong, longer but lighter than HA89. T0946HG has seed that are nearly solid black with grey strips on and between margins. Hypocotyl anthocyanin is absent.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T0954LM

- T0954LM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross LSW022QM/T0075LM. LSW022QM and T0075LM are both Pioneer proprietary lines. Selections were made for oil content, self fertility, shorter plant stature and yield, as assessed in hybrid combination. The pedigree method was used in the development of T0954LM. It is a bulk of F8 seed tracing back to a single F7 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- Hybrids utilizing T0954LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	te?): Medium
	Height (relatively short, medium or tall?):	Short
	Stem branching: Fully Branching with Central Head	d
	Leaf shape: Cordate	Leaf margins: Medium Serrate
	Leaf attitude: Ascending	Leaf surface: Smooth
	Leaf color: Green	•
	Ray flowers: Fusiform	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Weakly Present
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Brown	Seed middle pericarp color: White
	Stripe appearance: Absent	Seed shape: Oblong
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, T0954LM blooms 6 days later and matures 5 days later. It is about 47 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The fusiform, yellow ray flowers are shorter than RHA274. The seed is oblong and dark brown, longer and heavier than RHA274. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T0989HM

- 1. T0989HM is an oleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross T00A9HM/LSW022QM. T00A9HM and LSW022QM are all Pioneer proprietary line. Selections were made for oil content, self fertility, fatty acid content, shorter plant stature and yield, as assessed in hybrid combination. The pedigree method was used in the development of T0989HM is a bulk of F7 seed tracing back to a single F6 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing T0989HM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Short
	Stem branching: Fully Branching with Central Head	
	Leaf shape: Cordate	Leaf margins: Finely Serrate
	Leaf attitude: Horizontal	Leaf surface: Smooth
	Leaf color: Green	
	Ray flowers: Fusiform	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Lateral and Marginal Narrow Dark-grey Stripping	Seed shape: Broadly Ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, T0989HM blooms 3 days later and matures 5 days later. It is about 56 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The fusiform, yellow ray flowers are narrower than RHA274. The seed is black with grey stripes on and between the margins, and longer and lighter than RHA274. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T1074LM

- 1. T1074LM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross T0267LM/T0456LM. T0267LM and T0456LM are both Pioneer proprietary lines. Selections were made for oil content, shorter plant stature, earlier flowering and yield, as assessed in hybrid combination. The pedigree method was used in the development of T1074LM. It is a bulk of F8 seed tracing back to a single F7 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing T1074LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (rela	tively early, medium, or late?):		Medium	
٥.	•	naturity (relatively early, medium, or lat	te?):	Medium	
		ely short, medium or tall?):	,.	Medium	
	Stem branching				
	Leaf shape:	Cordate	Lea	f margins:	Medium Serrate
	Leaf attitude:	Descending	Lea	f surface:	Smooth
	Leaf color:	Dark Green	-		
	Ray flowers:	Broadly Ovate and Flat	Ray	flower cold	or: Yellow
	Disk flower col	or: Yellow	Stig	ma anthocy	vanin: Absent
	Pollen color:	Yellow	Pap	pi color:	Green
	Receptacle shap	e: Convex	Hea	d (neck) att	itude: Descending
	Seed outer perio	carp color: Medium Brown	See	d middle pe	ricarp color: White
	Stripe appearan	ce: Absent	See	d shape: _ I	Broadly Ovate
	Seed cross-sect	ion: Curved	-		

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, T1074LM blooms 9 days later and matures 9 days later. It is about 13 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The broadly ovate, yellow ray flowers are narrower than RHA274. The broadly ovate seed is medium brown, longer and lighter than RHA274. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T1078LM

- 1. T1078LM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross T0455LM/Pegasol//PHA232. T0455LM and PHA232 are both Pioneer proprietary lines. Pegasol is a hybrid from Dekalb that was purchased for use. Selections were made for oil content, self fertility, recessive branching, shorter plant stature, earlier flowering and yield, as assessed in hybrid combination. The pedigree method was used in the development of T1078LM. It is a bulk of F8 seed tracing back to a single F7 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing T1078LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or late	e?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Fully branching with central head	
	Leaf shape: Cordate	Leaf margins: Medium Serrate
	Leaf attitude: Ascending	Leaf surface: Smooth
	Leaf color: Green	
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Brown	Seed middle pericarp color: White
	Stripe appearance: Absent	Seed shape: Broadly Ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, T1078LM blooms 5 days later and matures 5 days later. It is about 29 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The narrowly ovate and flat, yellow ray flowers are narrower than RHA274. The broadly ovate seed is medium brown with no stripes, longer and lighter than RHA274. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T1097HM

- 1. T1097HM is an oleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross W9721QM/T02C6HM. W9721QM and T02C6HM are both Pioneer proprietary lines. Selections were made for earlier flowering, shorter plant stature, fatty acid & oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of T1097HM. It is a bulk of F7 seed tracing back to a single F6 selection.
- 2 Hybrids utilizing T1097HM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Late
	Physiological maturity (relatively early, medium, or lat	re?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Fully branched with central head	
	Leaf shape: Cordate with rounded apex	Leaf margins: Finely Serrate
	Leaf attitude: Ascending	Leaf surface: Smooth
	Leaf color: Green	
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Descending
	Seed outer pericarp color: Medium Brown	Seed middle pericarp color: White
	Stripe appearance: Absent	Seed shape: Broadly Ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, T1078LM blooms 12 days later and matures 12 days later. It is about 14 cm shorter than RHA274, and the cordate leaves are longer than RHA274. The broadly ovate and flat, yellow ray flowers are narrower than RHA274. The broadly ovate seed is medium brown with no stripes and lighter than RHA274. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



T9933LG

- 1. T9933LG is a linoleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross PHB246/ALBENA. PHB246 is a Pioneer proprietary line. ALBENA is a Bulgarian hybrid developed by the Toshevo Institute, purchased by Pioneer. Selections were made for earlier flowering, self fertility, shorter stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of T9933LG. It is a bulk of F9 seed tracing back to a single F8 selection. The sterile analog derives from the CMS PET1 cytoplasm following 6 generations of backcrossing. It is homozygous dominant for single heads.
- 2 Hybrids utilizing T9933LG are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or la	ite?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: None	
	Leaf shape: Cordate	Leaf margins: Finely Serrate
	Leaf attitude: Horizontal	Leaf surface: Slightly Crinkled
	Leaf color: Light Green	
	Ray flowers: Fusiform	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal Narrow Dark-Grey Stripes	Seed shape: Broadly Ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line HA89, T9933LG blooms 6 days later and matures 1 day later. It is about 12 cm shorter than HA89, and the broad triangular leaves are shorter than HA89. The fusiform, yellow ray flowers are narrower than HA89. The seed is broadly ovate, longer but lighter than HA89. T9933LG has seed that is black with grey stripes on the margins. Hypocotyl anthocyanin is present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



U09MJLM

- 1. U09MJLM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from the cross N06GELM/U06VAHM. N06GELM and U06VAHM are both Pioneer proprietary lines. Selections were made for oil content, shorter plant stature, earlier flowering and yield, as assessed in hybrid combination. The pedigree method was used in the development of U09MJLM. It is a bulk of F9 seed tracing back to a single F8 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing U09MJLM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

5 .	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Tall
	Stem branching: Fully Branched with Central Head	
	Leaf shape: Broad Triangular	Leaf margins: Coarsely Serrate
	Leaf attitude: Ascending	Leaf surface: Smooth
	Leaf color: Light Green	
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Weakly Present
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Lateral and Marginal Brown Stripes	Seed shape: Narrowly Ovate
	Seed cross-section: Flat	

State expected variants or other varietal traits that will assist in identification in the field:

Compared to the public line RHA274, U09MJLM blooms 6 days later and matures 4 days later. It is about 48 cm taller than RHA274, and the broad triangular leaves are longer than RHA274. The narrowly ovate and flat, yellow ray flowers are narrower than RHA274. The seed is narrowly ovate, longer and lighter than RHA274. U09MJLM has seed that are striped black, with brown stripes. Hypocotyl anthocyanin is weakly present.

- 4 This variety does not appear to exhibit qualitative resistance to any herbicides or to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



U1184IMLG

- 1. U1184IMLG is a linoleic oil type, imidazilinone resistant, maintainer line developed by Pioneer Hi-Bred International, that derives from the cross B0391LG/N0626LG//U0754LG. B0391LG, N0626LG & U0754LG are all Pioneer proprietary lines. Selections were made for imidazilinone resistance, oil content, shorter plant stature, earlier flowering and yield, as assessed in hybrid combination. The pedigree method was used in the development of U1184IMLG. It is a bulk of F6 seed tracing back to a single F5 selection. The sterile analog derives from the CMS PET1 cytoplasm following 4 generations of backcrossing. It is homozygous dominant for single heads.
- 2 Hybrids utilizing U1184IMLG are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: None	
	Leaf shape: Cordate	Leaf margins: Medium Serrate
	Leaf attitude: Descending	Leaf surface: Slightly crinkled
	Leaf color: Green	
	Ray flowers: Fusiforme	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped black	Seed middle pericarp color: White
	Stripe appearance: Marginal grey	Seed shape: Ovoid
	Seed cross-section: Flat	

State expected variants or other varietal traits that will assist in identification in the field:

U1184IMLG is a linoleic oil type, imidazilinone resistant, maintainer line. Compared to the public line HA89, U1184IMLG blooms 2 days earlier and matures 6 days later. It is about 9 cm shorter than HA89, and the cordate leaves are longer than HA89. The fusiforme yellow ray flowers are longer and wider than HA89. The ovoid seed is longer than HA89. U1184IMLG has seed that are nearly solid black with grey strips on margins. Hypocotyl anthocyanin is medium strength.

- 4 This variety is resistant to imidazolinone herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



U1188IMLG

- 1. **U1188IMLG** is a linoleic oil type, imidazilinone resistant, maintainer line developed by Pioneer Hi-Bred International that derives from the cross B0391LG/U0652HG/N0626LG. B0391LG, U0652HG & N0626LG are all Pioneer proprietary lines. Selections were made for imidazilinone resistance, oil content, shorter plant stature, earlier flowering and yield, as assessed in hybrid combination. The pedigree method was used in the development of U1188IMLG. It is a bulk of F6 seed tracing back to a single F5 selection. The sterile analog derives from the CMS PET1 cytoplasm following 4 generations of backcrossing. It is homozygous dominant for single heads.
- 2 Hybrids utilizing **U1188IMLG** are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Early
	Physiological maturity (relatively early, medium, or lat	e?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: None	
	Leaf shape: Cordate	Leaf margins: Coarsely Serrate
	Leaf attitude: Ascending	Leaf surface: Crinkled
	Leaf color: Dark Green	
	Ray flowers: Narrowly Ovate and Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal grey	Seed shape: Ovoid
	Seed cross-section: Flat	

State expected variants or other varietal traits that will assist in identification in the field:

U1188IMLG is a linoleic oil type, imidazilinone resistant, maintainer line. Compared to the public line HA89, U1188IMLG blooms 6 days earlier and matures 2 days later. It is about 8 cm shorter than HA89, and the cordate leaves are longer than HA89. The narrowly ovate, yellow ray flowers are longer and wider than HA89. The ovoid seed is longer than HA89. U1188IMLG has seed that are nearly solid black with grey strips on margins. Hypocotyl anthocyanin is medium strength.

- 4 This variety is resistant to imidazolinone herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



U11TAIMLM

- U11TAIMLM is a linoleic oil type, restorer line developed by Pioneer Hi-Bred International that derives from
 the cross U06SPLM/B0642LM//SANAY. U06SPLM and B0642LM are both Pioneer proprietary lines. Sanay
 is a Syngenta hybrid that was purchased and used to cross. Selections were made for imidazilinone resistance,
 oil content, shorter plant stature, earlier flowering and yield, as assessed in hybrid combination. The pedigree
 method was used in the development of U11TAIMLM. It is a bulk of F6 seed tracing back to a single F5
 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
- 2 Hybrids utilizing U11TAIMLM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	re?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Apical branching with Central Hea	nd
	Leaf shape: Cordate	Leaf margins: Medium Serrate
	Leaf attitude: Ascending	Leaf surface: Smooth
	Leaf color: Light Green	
	Ray flowers: Flat	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Descending
	Seed outer pericarp color: Striped Black	Seed middle pericarp color: White
	Stripe appearance: Marginal Grey Stripes	Seed shape: Narrowly Ovate
	Sand cross section: Flat	

State expected variants or other varietal traits that will assist in identification in the field:

U11TAIMLM is a linoleic type, imidazilinone resistant restorer line. Compared to the public line RHA274, U11TAIMLM blooms 1 day later and matures 2 days later. It is about 4 cm taller than RHA274, and the cordate leaves are about 5 cm longer than RHA274. The fusiforme, yellow ray flowers are longer and narrower than RHA274. The seed is narrowly ovate, longer and lighter than RHA274. U11TAIMLM has seed that are striped black, with grey, marginal stripes. Hypocotyl anthocyanin is absent.

- 4 This variety is resistant to imidazolinone herbicide. It does not appear to exhibit qualitative resistance to the common sunflower diseases and insect pests.
- 5. Pioneer Hi-Bred International will be responsible for the maintenance of all seed stocks. Foundation seed will be produced in open pollinated field increases in isolation as prescribed by the state where the seed is grown. A maximum of two generations beyond breeder seed will be allowed. Breeder seed will originate from cage isolations or, on occasion, from controlled bagging in nursery rows.
- 6. Certified seed is first expected to be available in 2013. Please do not publish certified seed production acreage.
- 7. Application for protection under the Plant Variety Protection Act will not be made.



SA1970R

- SA1970R is a Seeds 2000, Inc. tribenurone herbicide resistant, linoleic oilseed restorer derived from the cross SA219R/SA370R//SU4907. The pedigree method of selection was used for the development of SA1970R. It is a bulk of F6 plants tracing to a single F5 plant. Selection was for uniform plant type, self compatibility, and resistance to tribenurone methyl herbicide.
- 2 Hybrids utilizing SA1970R have been tested in major sunflower growing regions of North America and have been tested in North and South Dakota and will be marketed in those states. Hybrids with SA1970RR will be used both for human consumption and vegetable oil.

3.	Flowering (rela	tively early, medium, or late?):	Late	
	Physiological n	naturity (relatively early, medium, or la	ate?): Late	
	Height (relative	ely short, medium or tall?):	Tall	
	Stem branching	: Top branching		
	Leaf shape:	Cordate	Leaf margins: Medium serrate	
	Leaf attitude:	Horizontal	Leaf surface: Crinkled	
	Leaf color:	Green		
	Ray flowers:	Present	Ray flower color: Yellow	
	Disk flower col	or: Yellow	Stigma anthocyanin: Absent	
	Pollen color:	Yellow	Pappi color: Green	
	Receptacle shap	e: Convex	Head (neck) attitude: Horizontal	
	Seed outer peri-	carp color: Solid black	Seed middle pericarp color: White	
	Stripe appearan	ce: None	Seed shape: Broadly ovate	
	Seed cross-sect	ion: Curved		

SA1970R is a linoleic, tribenuron methyl herbicide resistant, oilseed restorer line developed by the pedigree method of selection. Compared to the public line RHA274, SA1970R is 5 days later to flower and reach physiological maturity and is 5 cm taller. Leaves of SA1970R are similar in number and color as leaves of RHA274 but are 2 cm longer. Heads of SA1970R are larger than RHA274. Seed of SA1970R is larger, heavier, and longer than seed of RHA274. Seed color of SA1970R is similar to that of RHA274.

- 4 SA1970R is resistant to tribenuron methyl herbicide.
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Hybrid certified seed produced with this line will first be offered for sale in 2013. Do not publish certified seed production acreage.
- 7. Application for PVP will not be made.



SA2624R

- SA2624R is a Seeds 2000, Inc. linoleic, imidazolinone herbicide resistant oilseed restorer line derived from the cross SA219R/SA616R//SA6166R. It is a bulk of F8 plants tracing to a single F7 plant. Selection was for uniform plant type, self compatibility, and resistance to imidazolinone. SA2624R is homozygous for dominant fertility restoration of CMS PET1 cytoplasm.
- 2 Hybrids utilizing SA2624R are adapted to major sunflower growing regions of North and South America and have been tested in North and South Dakota and Argentina and will be marketed in those states and countries. Hybrids utilizing SA2624R will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Late
	Physiological maturity (relatively early, medium, or lat	te?): Late
	Height (relatively short, medium or tall?):	Short
	Stem branching: Top branching	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Ascending	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: convex	Head (neck) attitude: Ascending
	Seed outer pericarp color: Solid black	Seed middle pericarp color: White
	Stripe appearance: None	Seed shape: Broadly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

SA2624R is a linoleic, imidazolinone herbicide resistant, oilseed restorer line developed by the pedigree method of selection. Compared to the public line RHA274, SA2624R is 5 days later to flower and reach physiological maturity, and is 30 cm shorter. Leaves of SA2624R are shorter in length and are similar in color and number as leaves of RHA274. Heads of SA2624R are larger and held in a more upright position than heads of RHA274. Seed of SA2624R. Seed of SA2624R is similar in color and size but shorter in length than seed of RHA274.

- 4 SA2624R is resistant to imidazolinone herbicide.
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags, or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Hybrid certified seed produced with this line will first be offered for sale in 2013. Please do not publish acreage.
- 7. Application for PVP will not be made.



SA426R

- 1. SA426R is a Seeds 2000, Inc. non-oilseed, imidazolinone resistant, downy mildew resistant restorer derived from the cross SA467R//SA430R/447R. The pedigree method of selection was used for the development of SA426R It is a bulk of F6 plants tracing to a single F5 plant. Selection was for uniform plant type, self compatibility, imidazolinone herbicide resistance, and race 734 downy mildew resistance.
- 2 Hybrids utilizing SA426R have been tested in major sunflower growing regions of North America and have been tested in North and South Dakota and will be marketed in those states. Hybrids with SA426R will be used primarily for human consumption.

۶.	Flowering (relatively early, medium, or late?):		Late	
	Physiological maturity (relatively early, medium, or lat	te?):	Late	
	Height (relatively short, medium or tall?):	•	Medium	
	Stem branching: Top branching	•		
	Leaf shape: Cordate	Leaf	margins:	Medium serrate
	Leaf attitude: Horizontal.	Leaf	surface:	Crinkled
	Leaf color: Green			
	Ray flowers: Present	Ray	flower colo	or: Yellow
	Disk flower color: Yellow	Stig	na anthocy	vanin: Absent
	Pollen color: Yellow	Papp	oi color:	Green
	Receptacle shape: Flat	Head	d (neck) att	itude: Ascending
	Seed outer pericarp color: Striped black	Seed	l middle pe	ricarp color: White
	Stripe appearance: Narrow white	Seed	shape: <u>I</u>	Broadly ovate
	Seed cross-section: Not curved			

State expected variants or other varietal traits that will assist in identification in the field:

SA426R is a non-oilseed, imidazolinone herbicide resistant, downy mildew resistant restorer developed by the pedigree method of selection. Compared to the public line RHA294, SA426R is two days later to flower and reach physiological maturity and similar in height. SA426 has a similar number of leaves, similar in color, but 2 cm longer than leaves of RHA294. Heads of SA426R are larger, flatter in shape and more upright than heads of RHA294. Seed of SA426R is larger, longer and heavier than seed of RHA294. Seed color of SA426R is similar to RHA294.

- 4 SA426R is resistant to imidazolinone herbicide and race 734 of downy mildew.
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Hybrid certified seed produced with this restorer line will first be offered for sale in 2013. Do not publish certified seed production acreage.
- 7. Application for PVP will not be made.



Association of Official Seed Certifying Agencies

SA434R

- 1. SA434R is a Seeds 2000 Inc. non-oilseed, imidazolinone resistant restorer derived from the cross 1831R/428R. 1831R is a proprietary, non-oilseed restorer. 428R is a proprietary, non-oilseed restorer resistant to imidazolinone herbicide. SA434R is homozygous for dominant fertility restoration of CMS PET 1 cytoplasm. The pedigree method of selection was used for the development of SA434R. It is a bulk of F6 plants derived from a single F5 plant. Selection was for uniform plant type, self-compatibility, and resistance to imidazolinone herbicide.
- 2 Hybrids utilizing SA434R are adapted to major sunflower growing regions of North America and have been tested in North and South Dakota and will be marketed in those states. Hybrids utilizing SA434R will be used primarily for human consumption.

3.	Flowering (relatively early, medium, or late?):	Relatively late
	Physiological maturity (relatively early, medium, or late	e?): Relatively late
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Present	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Slightly crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Ascending
	Seed outer pericarp color: Striped brown	Seed middle pericarp color: White
	Stripe appearance: Narrow white	Seed shape: Broadly ovate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field:

- 4 SA434R is resistant to imidazolinone herbicide
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags, or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown
- 6. Certified seed will first be offered for sale in 2103. Please do not publish acreage.
- 7. Application for PVP will not be made.



SA452R

- 1. SA452R is a Seeds 2000, Inc.non-oilseed, imidazolinone resistant restorer derived from the cross SA370R*2/SA334R//SA147R/IMI9607. The pedigree method was used for the development of SA452R. It is a bulk of F5 plants tracing to a single F4 plant. Selection was for uniform plant type, self compatibility, and imidazolinone herbicide resistance. SA452R is homozygous for dominant fertility restoration of CMS PET1 cytoplasm.
- 2 Hybrids utilizing SA452R are adapted to major sunflower growing regions of North America and have been tested in North and South Dakota and will be marketed in those states. Hybrids utilizing SA452R will be used primarily for human consumption

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	ate?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Top branching	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Crinkled
	Leaf color: Green	_
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Descending
	Seed outer pericarp color: White w/narrow black stri	ripe Seed middle pericarp color: White
	Stripe appearance: Narrow black	Seed shape: Ovoid elongate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field:

SA452R is a non-oilseed, imidazolinone resistant restorer line developed by the pedigree method of selection. Compared to the public line RHA294, SA452R is 2 days earlier to flower, 1 day earlier to reach physiological maturity, and similar in height. SA452R has leaves similar in color, size and leaf number as RHA294. Heads of SA452R are larger, flatter and more pendulous than heads of RHA294. Seed of SA452R is larger, longer, heavier and whiter in color than seed of RHA294.

- 4 SA452R is resistant to imidazolinone herbicide.
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags, or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Certified seed will first be offered for sale in 2012. Please do not publish acreage.
- 7. Application for PVP will not be made.



SA453

- 1. SA453 is a Seeds 2000, Inc. non-oilseed, imidazolinone herbicide resistant, downy mildew resistant (race 730) maintainer line developed by the pedigree method of selection from the cross SA9611//SA443/SA440B. It is a bulk of F6 plants tracing to a single F5 plant. Selection was for uniform plant type, self compatibility, imidazolinone herbicide resistance and resistance to race 730 of downy mildew. The male sterile component of SA453 has CMS PET1 cytoplasm derived from H. petiolaris (French).
- 2 Hybrids utilizing SA453 have been tested in major sunflower growing regions of North America and have been tested in North and South Dakota and will be marketed in those states. Hybrids with SA453 will be used primarily for human consumption.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or la	te?): Medium
	Height (relatively short, medium or tall?):	Short
	Stem branching: Absent	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Horizontal
	Seed outer pericarp color: Grey striped	Seed middle pericarp color: White
	Stripe appearance: Narrow white	Seed shape: Broadly ovate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field:

SA453 is a Seeds 2000, Inc. non-oilseed, imidazolinone herbicide resistant, downy mildew resistant (race 730) maintainer develop by the pedigree method of selection. Compared to the public line HA292, SA453 is two days earlier to flower and reach physiological maturity and 12 cm shorter. Leaves of SA453 are similar in number and color but are longer than leaves of HA292. Heads of SA453 are similar in size, shape and head attitude as heads of HA292. Seed of SA453 is shorter in length and smaller in size than seed of HA292. Seed of SA453 is greyer in color than seed of HA292.

- 4 SA453 is resistant to imidazolinone herbicide and race 730 of downy mildew.
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Hybrid certified seed produced with this line will first be offered for sale in 2013. Do not publish certified seed production acreage.
- 7. Application for PVP will not be made.



SA481R

- 1. SA481R is a Seeds 2000, Inc. non-oilseed, tribenuron methyl herbicide resistant, race 734 downy mildew resistant restorer line derived from the cross 477SU/447R. The pedigree method of selection was used for the development of SA481R. It is a bulk of F6 plants tracing to a single F5 plant. Selection was for uniform plant type, self compatibility, resistance to tribenuron methyl herbicide and resistance to race 734 of downy mildew.
- 2 Hybrids utilizing SA481R have been tested in major sunflower growing regions of North America and have been tested in North and South Dakota and will be marketed in those states. Hybrids with SA481R will be used primarily for human consumption.

3.	Flowering (relatively early, medium, or late?):	Late
	Physiological maturity (relatively early, medium, or lat	te?): Late
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Top branching	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Crinkled
	Leaf color: Green	•
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Horizontal
	Seed outer pericarp color: Striped black	Seed middle pericarp color: White
	Stripe appearance: Narrow white	Seed shape: Narrowly ovate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field:

SA481R is a non-oilseed, tribenuron methyl herbicide resistant, downy mildew resistant (race 734) restorer line developed by the pedigree method of selection. Compared to the public line RHA294, SA481R is two days later to flower and reach physiological maturity and is 5 cm taller. Leaves of SA481R are similar in color and number but are longer than leaves of RHA294. Heads of SA481R are larger and flatter in shape than heads of RHA294. Seed of SA481R is larger, longer, and heavier than seed of RHA294. Seed color of SA481R is similar to seed color of RHA294.

- 4 SA481R is resistant to tribenuron methyl herbicide and race 734 of downy mildew
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Hybrid certified seed produced with this line will first be offered for sale in 2013. Do not publish certified seed production acreage
- 7. Application for PVP will not be made.



SA468R

- 1. SA468R is a Seeds 2000, Inc. non-oilseed, imidazolinone resistant, high oleic (85.9%) restorer derived from the cross SA181R/467R-HO. SA 181R is proprietary restorer previously described to and approved by the NSVRB. 467R-HO is a proprietary, imidazolinone resistant, high oleic, non-oilseed restorer. SA468R is homozygous for dominant fertility restoration of CMS PET 1 cytoplasm. The pedigree method of selection was used for the development of SA468R. It is a bulk of F6 plants tracing to a single F5 plant. Selection was for uniform plant type, self-compatibility, imidazolinone herbicide resistance and high oleic fatty acid content.
- 2 Hybrids utilizing SA468R are adapted to major sunflower growing regions of North America and have been tested in North and South Dakota and will be marketed in those states. Hybrids utilizing SA468R will be used primarily for human consumption

3.	Flowering (relatively early, medium, or late?):	Relatively late
	Physiological maturity (relatively early, medium, or lat	e?): Relatively late
	Height (relatively short, medium or tall?):	Relatively tall
	Stem branching: Present	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Horizontal
	Seed outer pericarp color: Striped black	Seed middle pericarp color: White
	Stripe appearance: Narrow white	Seed shape: Broadly ovate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field: none claimed

- 4 SA468R is resistant to imidazolinone herbicide
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags, or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Certified seed will first be offered for sale in 2013. Please do not publish acreage.
- 7. Application for PVP will not be made



SA4391R

- 1. SA4391R is a Seeds 2000, Inc.high oleic (89.9%), imidazolinone herbicide resistant, oilseed restorer derived from the cross SA439R/RHA801CLHA+. SA439R is a proprietary restorer previously described to and approved by the NSVRB. RHA801CLHA+ is a proprietary restorer containing genes for CLHA+ imidazolinone herbicide resistance licensed for use by Seeds 2000 from BASF. SA4391R is homozygous for dominant fertility restoration of CMS PET 1 cytoplasm. The pedigree method of selection was used for the development of SA4391R. It is a bulk of F6 plants tracing to a single F5 plant. Selection was for uniform plant type, self-compatibility, high oleic fatty acid content, and resistance to imidazolinone herbicide
- 2 Hybrids utilizing SA4391R are adapted to major sunflower growing regions of North and South America and have been tested in North and South Dakota and Argentina and will be marketed in those states and countries. Hybrids utilizing SA4391R will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Relatively late
	Physiological maturity (relatively early, medium, or lat	e?): Relatively late
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Present	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Horizontal
	Seed outer pericarp color: Striped black	Seed middle pericarp color: White
	Stripe appearance: Narrow dark grey	Seed shape: Broadly ovate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field: none claimed

- 4 SA4391R is resistant to imidazolinone herbicide
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags, or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown
- 6. Certified seed will first be offered for sale in 2013. Please do not publish acreage.
- 7. Application for PVP will not be made



SA4861

- 1. SA4861 is a Seeds 2000, Inc. high oleic (88.1%), imidazolinone resistant, oilseed maintainer selected from the cross SA486B/HA89B-CLHA+. SA486 is a proprietary, high oleic maintainer previously described to and approved by the NSVRB. HA89B-CLHA+ is a proprietary oilseed maintainer with genes for CLHA + imidazolinone herbicide resistance licensed for use by Seeds 2000 from BASF. The pedigree method of selection was used for the development of SA4861. It is a bulk of F5 plants derived from a single F4 plant. Selection was for uniform plant type, self-compatibility, high oleic fatty acid content, and resistance to imidazolinone herbicide.
- 2 Hybrids utilizing SA4861 are adapted to major sunflower growing regions of North and South America and have been tested in North and South Dakota and Argentina and will be marketed in those states and countries. Hybrids utilizing SA4861 will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Relatively late
	Physiological maturity (relatively early, medium, or la	te?): Relatively late
	Height (relatively short, medium or tall?):	Relatively tall
	Stem branching: Absent	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Slightly crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Flat	Head (neck) attitude: Horizontal
	Seed outer pericarp color: Nearly solid black	Seed middle pericarp color: White
	Stripe appearance: Narrow dark grey	Seed shape: Narrowly ovate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field: none claimed

- 4 SA4861 is resistant to imidazolinone herbicide
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags, or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Certified seed will first be offered for sale in 2013. Please do not publish acreage.
- 7. Application for PVP will not be made.



SA6331R

- 1. SA6331R is a Seeds 2000, Inc. linoleic, imidazolinone herbicide resistant, Orobanche cumana resistant (race F) oilseed restorer derived from the cross 6356R/T3133R. The pedigree method of selection was used for the development of SA6331R. It is a bulk of F6 plants tracing to a single F5 plant.
- 2 Hybrids utilizing SA6331R are adapted to major sunflower growing regions of North America and Turkey and have been tested in North and South Dakota and the Trakya region of Turkey and will be marketed in those regions. Hybrids utilizing SA6331R will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Medium
	Physiological maturity (relatively early, medium, or lat	te?): Medium
	Height (relatively short, medium or tall?):	Medium
	Stem branching: Top branching	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Horizontal	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Ascending
	Seed outer pericarp color: Solid black	Seed middle pericarp color: White
	Stripe appearance: None	Seed shape: Narrowly ovate
	Seed cross-section: Not curved	

State expected variants or other varietal traits that will assist in identification in the field:

SA6331R is a linoleic, imidazolinone herbicide resistant, race F orobanche cumana resistant oilseed restorer line developed by the pedigree method of selection. Compared to the public line RHA274, SA6331R is 3 days later to flower and reach physiological maturity and similar in height. SA6331R has more leaves, and longer leaves than RHA274. Heads of SA6331R are larger and held in a more upright position than heads of RHA274. Seed of SA6331R is similar in length and color but heavier than seed of RHA274.

- 4 SA6331R is resistant to imidazolinone herbicide and race F of Orobanche cumana.
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Hybrid certified seed produced with this line will first be offered for sale in 2013. Please do not publish acreage.
- 7. Application for PVP will not be made.



SA7852R

- 1. SA7852R is a Seeds 2000, Inc. linoleic, imidazolinone herbicide resistant, race 734 downy mildew resistant restorer line developed by the pedigree method of selection from the cross SA578R/6356R. It is a bulk of F6 plants tracing to a single F5 plant. Selection was for uniform plant type, self compatibility, imidazolinone herbicide resistance, and race 734 downy mildew resistance. SA7852R is homozygous for dominant fertility restoration of CMS PET1 cytoplasm.
- 2 Hybrids utilizing SA7852R are adapted to major sunflower growing regions of North and South America and have been tested in North and South Dakota and Argentina and will be marketed in those states and countries. Hybrids utilizing SA7852R will be used primarily for vegetable oil.

3.	Flowering (relatively early, medium, or late?):	Late
	Physiological maturity (relatively early, medium, or lat	te?): Late
	Height (relatively short, medium or tall?):	Short
	Stem branching: Top branching	
	Leaf shape: Cordate	Leaf margins: Medium serrate
	Leaf attitude: Ascending	Leaf surface: Crinkled
	Leaf color: Green	
	Ray flowers: Present	Ray flower color: Yellow
	Disk flower color: Yellow	Stigma anthocyanin: Absent
	Pollen color: Yellow	Pappi color: Green
	Receptacle shape: Convex	Head (neck) attitude: Ascending
	Seed outer pericarp color: Solid black	Seed middle pericarp color: White
	Stripe appearance: None	Seed shape: Broadly ovate
	Seed cross-section: Curved	

State expected variants or other varietal traits that will assist in identification in the field:

SA7852R is a linoleic, imidazolinone herbicide resistant, race 734 downy mildew resistant restorer line developed by the pedigree method of selection. Compared to the public line RHA274, SA7852R is 8 days later to flower and reach physiological maturity and 25 cm shorter. Leaves of SA7852R are similar in size and color to leaves of RHA274. SA7852R has fewer leaves than RHA274. Heads of SA7852R are larger and are held in a more upright position than heads of RHA274. Seed of SA7852R is similar in color, but shorter in length than seed of RHA274.

- 4 SA7852R is resistant to imidazolinone herbicide and race 734 of downy mildew.
- 5. Breeder's seed will be maintained by Seeds 2000 in nursery rows under bags, or by open pollination in isolated fields. Up to two generations beyond breeder's seed will be allowed for production of foundation seed. Isolation and other requirements will be according to the seed certification regulations of the state where seed is grown.
- 6. Hybrid certified seed produced with this line will first be offered for sale in 2013. Please do not publish acreage.
- 7. Application for PVP will not be made.

