

**A REPORT OF THE
NATIONAL SUNFLOWER VARIETY REVIEW BOARD**



ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

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ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES
(April 2013)

The Association of Official Seed Certifying Agencies (AOSCA) National Sunflower Variety Review Board (NSFVRB), reviewed the following varieties on April 18, 2013, 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,

Gonzalo Rojas, Chairman
National Sunflower Variety Review Board

2013 AOSCA SUNFLOWER NVRB

TABLE OF CONTENTS

Applicant	Page	Variety Name
Mycogen Seeds	1	NS1982R
Mycogen Seeds	2	OI3157R
Mycogen Seeds	3	OI3248B
Mycogen Seeds	4	OI3250B
Mycogen Seeds	5	OPD947R
Mycogen Seeds	6	ZN3321R
Pioneer Hi-Bred International	7	J0213LG
Pioneer Hi-Bred International	8	J9960LM
Pioneer Hi-Bred International	9	PH5044R
Pioneer Hi-Bred International	10	PH5057R
Pioneer Hi-Bred International	11	T0860LM
Pioneer Hi-Bred International	12	T0982HM
Pioneer Hi-Bred International	13	T1068LM
Pioneer Hi-Bred International	14	T1075LM
Pioneer Hi-Bred International	15	T1094HM
Pioneer Hi-Bred International	16	T1173LM
Pioneer Hi-Bred International	17	T1187HM
Pioneer Hi-Bred International	18	U09RFSULM
Pioneer Hi-Bred International	19	U1156HG
Pioneer Hi-Bred International	20	U1157LG
Pioneer Hi-Bred International	21	U1255SULG
Seeds 2000, Inc.	22	K12HE33
Seeds 2000, Inc.	23	K12HE34
Seeds 2000, Inc.	24	K12HM28
Seeds 2000, Inc.	25	K12HM36
Seeds 2000, Inc.	26	K12HM37
Seeds 2000, Inc.	27	K12HM62R
Seeds 2000, Inc.	28	K12HM69R
Seeds 2000, Inc.	29	K12LE60R
Seeds 2000, Inc.	30	K12LM61R
Seeds 2000, Inc.	31	K12LM71R
Seeds 2000, Inc.	32	K12LM72R
Seeds 2000, Inc.	33	K12LM73R
Seeds 2000, Inc.	34	K12SE39
Seeds 2000, Inc.	35	K12SM08
Seeds 2000, Inc.	36	K12SM38

NS1982R

1. NS1982R is a high oleic oilseed restorer derived from pedigree H285R*2/487R-1-8-1//H757B/LS10670B-B-17-3-23-5. All parent components are proprietary Mycogen Seeds lines used for development and selection of NS1982R having oleic acid content greater than 92%. NS1982R is derived from a bulk of a F9 family tracing to a single F8 plant homozygous for high oleic, low saturate levels, fertility restoration, and recessive branching. NS1982R has the male sterile inducing cytoplasm from PET1 [*H. petiolaris* (French)] and gene conferring fertility restoration.
2. Hybrids utilizing NS1982R 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-Late
 Physiological maturity (relatively early, medium, or late?): Medium-Late
 Height (relatively short, medium or tall?): Medium-Tall
 Stem Branching: Fully Branched
 Leaf Shape: Cordate Leaf Margins: Medium Serrate
 Leaf Attitude: Descending Leaf Surface: Slightly Crinkled
 Leaf Color: Green Ray Flower Color: Yellow
 Ray Flowers: Present Stigma Anthocyanin: Present Weak
 Disk Flower Color: Yellow Pappi Color: Rust
 Pollen Color: Yellow Head (neck) Attitude: Descending
 Receptacle Shape: Convex Seed Middle Pericarp Color: White
 Seed Outer Pericarp Color: Nearly Solid Black Seed Shape: Narrowly Ovate
 Stripe Appearance: Narrow Dark-Gray Striping Seed Cross-section: Curved

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

The leaf petioles exhibit a brown streak along its center for at least half its length. Petioles are more curved than average giving the leaves more obvious descending appearance. Although head is descending, the stem bend occurs 4-5 cm below the head giving the plant a more upright appearance. Seed size is larger than average for an oilseed branching R-line.

4. NS1982R 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 2014 season. Please do not publish certified acreage.
7. It is not anticipated that a PVP application will be made on this variety.



OI3157R

1. OI3157R is a high oleic restorer derived from the backcross pedigree OND947R*3//OIN163R/ONE563R. The recurrent and donor parents OND947R, OIN163R, and ONE563R are Mycogen Seeds proprietary high oleic restorers. OI3157R has the gene(s) conferring imidazolinone herbicide resistance acquired from the USDA in public releases in 1998. OI3157R is derived from a bulk of a BC2F6 family tracing to a single BC2F5 plant homozygous for high oleic, imidazolinone resistance, and downy mildew resistance. OI3157R has the male sterile inducing cytoplasm from PET1 [*H. petiolaris* (French)] and gene conferring fertility restoration.

2. Hybrids utilizing OI3157R 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 late?): Early
 Height (relatively short, medium or tall?): Short
 Stem Branching: Fully Branched
 Leaf Shape: Cordate Leaf Margins: Medium Serrate
 Leaf Attitude: Descending Leaf Surface: Slightly Crinkled
 Leaf Color: Green Ray Flower Color: Yellow
 Ray Flowers: Present Stigma Anthocyanin: Absent
 Disk Flower Color: Yellow Pappi Color: Rust
 Pollen Color: Yellow Head (neck) Attitude: Horizontal
 Receptacle Shape: Convex Seed Middle Pericarp Color: White
 Seed Outer Pericarp Color: Nearly Solid Black Seed Shape: Narrowly Ovate
 Stripe Appearance: Narrow Dark-Gray Striping Seed Cross-section: Curved

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

Leaf petioles are relatively short in length giving the plant a narrow canopy.

4. OI3157R is resistant to the metalaxyl resistant downy mildew races of North America (races 730, 733, and 770). OI3157R is resistant to imidazolinone 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 2015 season. Please do not publish certified acreage.

7. It is not anticipated that a PVP application will be made on this variety.



OI3248B

1. OI3248B is a high oleic B-line derived from the backcross pedigree ON8590B*4/OIE728014B. The recurrent and donor parents, ON8590B and OIE728014B respectively, are Mycogen Seeds proprietary high oleic B-lines. OIE728014B has the gene(s) conferring imidazolinone herbicide resistance acquired from the USDA in public releases in 1998. OI3248B is derived from a bulk of a BC3F6 family tracing to a single BC3F5 plant homozygous for high oleic fatty acid and imidazolinone herbicide resistance. The male-sterile A-line component of OI3248B, named OI3248A, uses the Cms PET 1 [*H. petiolaris* (French)] cytoplasm.
2. Hybrids utilizing OI3248B 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?):	<u>Early</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Early</u>	
Height (relatively short, medium or tall?):	<u>Short</u>	
Stem Branching:	<u>No Branching</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Descending</u>	Leaf Surface: <u>Slightly Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Dark Gray</u>	Seed Shape: <u>Broadly Ovate</u>
Stripe Appearance:		Seed Cross-section: <u>Curved</u>
Narrow Light-Gray Striping		

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

In some environments, up to 20% of plants may express basal branching.

4. OI3248R is resistant to imidazolinone 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 2015 season. Please do not publish certified acreage.
7. It is not anticipated that a PVP application will be made on this variety.



OI3250B

1. OI3250B is a high oleic B-line derived from the backcross pedigree ON8590B*2/OIE728014B. The recurrent and donor parents, ON8590B and OIE728014B respectively, are Mycogen Seeds proprietary high oleic B-lines. OIE728014B has the gene(s) conferring imidazolinone herbicide resistance acquired from the USDA IMISUN public releases in 1998. OI3250B is derived from a bulk of a BC1F6 family tracing to a single BC1F5 plant homozygous for high oleic fatty acid and imidazolinone herbicide resistance. OI3250B will be used to make the female OI3248A/OI3250B for increased vigor and seed production yields for hybrid seed production. The male-sterile A-line component of OI3250B, named OI3250A, uses the Cms PET 1 [*H. petiolaris* (French)] cytoplasm.

2. Hybrids utilizing OI3250B 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 late?): Early
 Height (relatively short, medium or tall?): Short
 Stem Branching: No Branching
 Leaf Shape: Cordate Leaf Margins: Medium Serrate
 Leaf Attitude: Descending Leaf Surface: Slightly Crinkled
 Leaf Color: Green Ray Flower Color: Yellow
 Ray Flowers: Present Stigma Anthocyanin: Absent
 Disk Flower Color: Yellow Pappi Color: Green
 Pollen Color: Yellow Head (neck) Attitude: Horizontal
 Receptacle Shape: Convex Seed Middle Pericarp Color: White
 Seed Outer Pericarp Color: Nearly Solid Black Seed Shape: Broadly Ovate
 Stripe Appearance: Seed Cross-section: Curved
 Narrow Dark-Gray Striping

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

In some environments, up to 20% of plants may express basal branching.

4. OI3250R is resistant to imidazolinone 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 2015 season. Please do not publish certified acreage.

7. It is not anticipated that a PVP application will be made on this variety.



OPD947R

1. OPD947R is a high oleic restorer derived from the backcross pedigree OND947R*4/BTI-1R. The recurrent parent OPD947R is a Mycogen Seeds proprietary high oleic restorer. BTI-1R is an imidazolinone herbicide resistant donor inbred with the CLHAplus imi gene developed by Nidera and BASF, and licensed to the seed industry in 2008. OPD947R is derived from a bulk of a BC3F6 family tracing to a single BC3F5 plant homozygous for high oleic, CLHAplus, and recessive branching. OPD947R has the male sterile inducing cytoplasm from PET1 [*H. petiolaris* (French)] and gene conferring fertility restoration.
2. Hybrids utilizing OPD947R 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?):	<u>Medium-Late</u>
Physiological maturity (relatively early, medium, or late?):	<u>Medium-Late</u>
Height (relatively short, medium or tall?):	<u>Short</u>
Stem Branching:	<u>Fully Branched</u>
Leaf Shape:	<u>Cordate</u>
Leaf Attitude:	<u>Descending</u>
Leaf Color:	<u>Green</u>
Ray Flowers:	<u>Present</u>
Disk Flower Color:	<u>Yellow</u>
Pollen Color:	<u>Yellow</u>
Receptacle Shape:	<u>Convex</u>
Seed Outer Pericarp Color:	<u>Nearly Solid Black</u>
Stripe Appearance:	<u>Narrow Dark-Gray Striping</u>
	<u>Leaf Margins: Medium Serrate</u>
	<u>Leaf Surface: Slightly Crinkled</u>
	<u>Ray Flower Color: Yellow</u>
	<u>Stigma Anthocyanin: Absent</u>
	<u>Pappi Color: Rust</u>
	<u>Head (neck) Attitude: Horizontal</u>
	<u>Seed Middle Pericarp Color: White</u>
	<u>Seed Shape: Narrowly Ovate</u>
	<u>Seed Cross-section: Curved</u>

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

OPD947R is a noticeably short height fully branched R-line but is not considered dwarf in stature. Leaf petioles are relatively short in length giving the plant a narrow canopy.

4. OPD947R is resistant to the metalaxyl resistant downy mildew races of North America (races 730, 733, and 770). OPD947R is resistant to imidazolinone 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 2015 season. Please do not publish certified acreage.
7. It is not anticipated that a PVP application will be made on this variety.



ZN3321R

1. ZN3321R 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 ZN3321R having oleic acid content greater than 92%. ZN3321R is derived from a bulk of a BC2F7 family tracing to a single BC2F6 plant homozygous for high oleic and low saturate levels. ZN3321R has the male sterile inducing cytoplasm from PET1 [H. petiolaris (French)] and gene conferring fertility restoration.
2. Hybrids utilizing ZN3321R 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Short</u>	
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Finely Serrate</u>
Leaf Attitude:	<u>Descending</u>	Leaf Surface: <u>Slightly Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Present Weak</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Rust</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Nearly Solid Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Narrow Dark-Gray Striping</u>	Seed Cross-section: <u>Curved</u>

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

ZN3321R is a short height fully branched R-line with a high number of leaves of approximately 30 per plant. Petioles are more curved than average giving the leaves a more obvious descending appearance. Anthocyanin is weakly expressed in stigmas and pappi. Although head is descending, the stem bend occurs 4-5 cm below the head giving the plant a more upright appearance.

4. ZN3321R 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 2015 season. Please do not publish certified acreage.
7. It is not anticipated that a PVP application will be made on this variety.



J0213LG

1. J0213LG is a linoleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross FXT020LG/INRASDB. FXT020LG is a Pioneer proprietary line. SDB is a line developed by INRA in France. Selections were made for earlier flowering, short plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of J0213LG. 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 J0213LG are adapted to the growing regions of the Northern Plains of the U.S. and Northern Europe.

3. Flowering (relatively early, medium, or late?):		<u>Medium</u>
Physiological maturity (relatively early, medium, or late?):		<u>Medium</u>
Height (relatively short, medium or tall?):		<u>Short</u>
Stem Branching:	<u>None, with occasional basal branch</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Coarsely Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Weak Blistering</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Vertical</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Striped Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Marginal and Lateral Narrow Dark-Grey Striping</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is weak.

4. No claims are made for reactions to specific insects, diseases or herbicides.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



J9960LM

1. J9960LM is a linoleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross VK60M/TRU024LM. Both VK60M and TRU024LM are Pioneer proprietary lines. Selections were made for earlier flowering, short plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of J9960LM. It 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 J9960LM are adapted to the growing regions of the Northern Plains of the U.S. and Northern Europe.

3. Flowering (relatively early, medium, or late?):	<u>Early</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Early</u>	
Height (relatively short, medium or tall?):	<u>Short</u>	
Stem Branching:	<u>Top-branching</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serration</u>
Leaf Attitude:	<u>Ascending</u>	Leaf Surface: <u>Weak Blister</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Erect</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Solid Black</u>	Seed Shape: <u>Oblong</u>
Stripe Appearance:	<u>None</u>	Seed Cross-section: <u>Flat</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is medium strength.

4. No claims are made for reactions to specific insects, diseases or herbicides.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



PH5044R

1. PH5044R is an Express resistant, linoleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the backcross H02507LM*5/B0644LM . Both H02507LM and B0644LM are Pioneer proprietary lines. Selections were made for Express resistance and recurrent parent traits. The backcross method was used in the development of PH5044R. 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 PH5035R 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Coarse Serration</u>
Leaf Attitude:	<u>Ascending</u>	Leaf Surface: <u>Weak Blister</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Solid Dark Brown</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is medium strength.

4. The line is resistant to Tribenuron-methyl.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



PH5057R

1. PH5057R is a tribenuron-methyl resistant, oleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the backcross T0592HM*6/HR19171054. T0592HM and HR19171054 are both Pioneer proprietary lines. Selections were made a tribenuron-methyl resistance and recurrent parent traits. The pedigree method was used in the development of PH5057R. It is a bulk of BC5F6 seed tracing back to a single BC5F5 selection. It is homozygous for dominant fertility restoration of the CMS PET 1 cytoplasm.
2. Hybrids utilizing PH5057R 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Medium</u>	
Stem Branching:	<u>Top Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrations</u>
Leaf Attitude:	<u>Descending</u>	Leaf Surface: <u>Weak Blister</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Fusiform</u>	Stigma Anthocyanin: <u>Weak Presence</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Striped Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Marginal and Lateral Narrow Dark-Grey Striping</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is weak.

4. The line is resistant to Tribenuron-methyl.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



T0860LM

1. T0860LM is a linoleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross INRPST5RR/S9867LM. S9867LM is a Pioneer proprietary line. PST5RR is a line that comes from INRA in France. Selections were made for earlier flowering, short plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of T0860LM. 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 T0860LM 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?):	Medium	
Height (relatively short, medium or tall?):	Short	
Stem Branching:	Fully Branched	
Leaf Shape:	Cordate	Leaf Margins: <u>Fine Serrations</u>
Leaf Attitude:	Horizontal	Leaf Surface: <u>Smooth</u>
Leaf Color:	Green	Ray Flower Color: <u>Orange-Yellow</u>
Ray Flowers:	Fusiform and Undulating	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	Yellow	Pappi Color: <u>Green</u>
Pollen Color:	Yellow	Head (neck) Attitude: <u>Slightly Descending</u>
Receptacle Shape:	Convex	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	Striped Dark brown	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	Marginal and Lateral Narrow Light Brown Striping	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is medium strength.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



T0982HM

1. T0982HM is an oleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross PHA305/PR810M//Aurasol. PHA305 and PR810M are Pioneer proprietary lines. Aurasol is a hybrid from Monsanto that was purchased for crossing. Selections were made for earlier flowering, short plant stature, oil & fatty acid content and yield, as assessed in hybrid combination. The pedigree method was used in the development of T0982HM. 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 T0982HM 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?):	<u>Medium</u>
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>
Height (relatively short, medium or tall?):	<u>Medium</u>
Stem Branching:	<u>Fully Branched</u>
Leaf Shape:	<u>Cordate</u>
Leaf Attitude:	<u>Ascending</u>
Leaf Color:	<u>Light Green</u>
Ray Flowers:	<u>Fusiform and Longitudinally Recurved</u>
Disk Flower Color:	<u>Yellow</u>
Pollen Color:	<u>Yellow</u>
Receptacle Shape:	<u>Flat</u>
Seed Outer Pericarp Color:	<u>Striped Black</u>
Stripe Appearance:	<u>Marginal and Lateral Narrow Dark grey Striping</u>
Leaf Margins:	<u>Medium Serration</u>
Leaf Surface:	<u>Smooth</u>
Ray Flower Color:	<u>Yellow</u>
Stigma Anthocyanin:	<u>Strong Intensity</u>
Pappi Color:	<u>Green</u>
Head (neck) Attitude:	<u>Erect</u>
Seed Middle Pericarp Color:	<u>White</u>
Seed Shape:	<u>Narrowly Ovate</u>
Seed Cross-section:	<u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is medium strength. The leaf apex is triangular compared to normal acuminate types.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



T1068LM

1. T1068LM is a linoleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross T0267LM/B0531LM. T0267LM and B0531LM 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 T1068LM. 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 T1068LM are adapted to the growing regions of the Northern Plains of the U.S. and Central, Eastern, and Western Europe.

Flowering (relatively early, medium, or late?):		<u>Medium</u>
Physiological maturity (relatively early, medium, or late?):		<u>Medium</u>
Height (relatively short, medium or tall?):		<u>Medium</u>
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Coarse Serration</u>
Leaf Attitude:	<u>Descending</u>	Leaf Surface: <u>Weak Blister</u>
Leaf Color:	<u>Dark Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Striped Light Brown</u>	Seed Shape: <u>Oblong</u>
Stripe Appearance:	<u>Marginal and Lateral Darker Brown Striping</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is absent.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



T1075LM

1. T1075LM is a linoleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross T0267LM/RHA419//T0075LM. T0267LM and T0075LM are both Pioneer proprietary lines. RHA419 is a restorer line developed by the USDA in Fargo, ND. 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 T1075LM. 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 T1075LM 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Medium</u>	
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serration</u>
Leaf Attitude:	<u>Ascending</u>	Leaf Surface: <u>Weak Blister</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Solid Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is absent.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



T1094HM

1. T1094HM is an oleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross W9721QM/LG4540. W9721QM is a Pioneer proprietary line. LG4540 is a high oleic hybrid from Limagrain, seed of the hybrid was purchased for use in crossing. Selections were made for earlier flowering, shorter plant stature, oil & fatty acid content and yield, as assessed in hybrid combination. The pedigree method was used in the development of T1094HM. It 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 T1094HM 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Medium</u>	
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Fine Serration</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Smooth</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Medium Strength</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Concave</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Solid Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is weak.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



T1173LM

1. T1173LM is a linoleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross U01P6/T0456LM. U01P6 and T0456LM 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 T1173LM. It 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 T1173LM 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Medium</u>	
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serration</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Weak Blister</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Solid Black</u>	Seed Shape: <u>Oblong</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is medium strength.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



T1187HM

1. T1187HM is an oleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross T00B3/B0345HM. T00B3 and B0345HM are both Pioneer proprietary lines. Selections were made for earlier flowering, shorter plant stature, oil & fatty acid content and yield, as assessed in hybrid combination. The pedigree method was used in the development of T1187HM. It 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 T1187HM 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Medium</u>	
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serration</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Weak Blister</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Strong Intensity</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Erect</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Solid Black</u>	Seed Shape: <u>Oblong</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is weak.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



U09RFSULM

1. U09RFSULM is a tribenuron-methyl, resistant, linoleic oil type restorer line developed by Pioneer Hi-Bred International that derives from the cross U06TNLM/B0524LM. U06TNLM and B0524LM are both Pioneer proprietary lines. Selections were made for tribenuron-methyl resistance, earlier flowering, stress tolerance, shorter plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of U09RFSULM. It 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 U09RFSULM 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?):	Medium		
Height (relatively short, medium or tall?):	Medium		
Stem Branching:	Fully Branched		
Leaf Shape:	Cordate	Leaf Margins:	Medium Serrations
Leaf Attitude:	Horizontal	Leaf Surface:	Weak Blister
Leaf Color:	Green	Ray Flower Color:	Yellow
Ray Flowers:	Flat	Stigma Anthocyanin:	Absent
Disk Flower Color:	Yellow	Pappi Color:	Green
Pollen Color:	Yellow	Head (neck) Attitude:	Descending
Receptacle Shape:	Convex	Seed Middle Pericarp Color:	White
Seed Outer Pericarp Color:	Striped Black	Seed Shape:	Narrowly Ovate
Stripe Appearance:	Marginal and Lateral Narrow Dark- Grey Stripping	Seed Cross-section:	Curved

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is weak.

4. The line is resistant to Tribenuron-methyl.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



U1156HG

1. U1156HG is an oleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross U0652HG/U0752HG. U0652HG and U0752HG are both Pioneer proprietary lines. Selections were made for earlier flowering, stress tolerance, short plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of U1156HG. 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 U1156HG 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?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Medium</u>	
Stem Branching:	<u>None</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Descending</u>	Leaf Surface: <u>Medium Blistering</u>
Leaf Color:	<u>Dark green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Solid Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>None</u>	Seed Cross-section: <u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is medium.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



U1157LG

1. U1157LG is a linoleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross U0673LG/N0626LG. U0673LG and N0626LG are both Pioneer proprietary lines. Selections were made for earlier flowering, stress tolerance, short plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of U1157LG. It is a bulk of F7 seed tracing back to a single F6 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 U1157LG 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?):	<u>Medium</u>
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>
Height (relatively short, medium or tall?):	<u>Medium</u>
Stem Branching:	<u>None</u>
Leaf Shape:	<u>Cordate</u>
Leaf Attitude:	<u>Ascending</u>
Leaf Color:	<u>Dark Green</u>
Ray Flowers:	<u>Flat</u>
Disk Flower Color:	<u>Yellow</u>
Pollen Color:	<u>Yellow</u>
Receptacle Shape:	<u>Convex</u>
Seed Outer Pericarp Color:	<u>Striped Black</u>
Stripe Appearance:	<u>Marginal and Lateral Narrow Dark-Grey Stripping</u>
Leaf Margins:	<u>Medium Serrate</u>
Leaf Surface:	<u>Weak Blister</u>
Ray Flower Color:	<u>Yellow</u>
Stigma Anthocyanin:	<u>Absent</u>
Pappi Color:	<u>Green</u>
Head (neck) Attitude:	<u>Descending</u>
Seed Middle Pericarp Color:	<u>White</u>
Seed Shape:	<u>Narrowly Ovate</u>
Seed Cross-section:	<u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is weak.

4. None.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



U1255SULG

1. U1255SULG is a tribenuron-methyl resistant, linoleic oil type maintainer line developed by Pioneer Hi-Bred International that derives from the cross N0626LG/U0956SULG. N0626LG and U0956SULG are both Pioneer proprietary lines. Selections were made for resistance to tribenuron-methyl, earlier flowering, stress tolerance, short plant stature, oil content and yield, as assessed in hybrid combination. The pedigree method was used in the development of U1255SULG. It is a bulk of F7 seed tracing back to a single F6 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 U1255SULG 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?):			<u>Early</u>
Physiological maturity (relatively early, medium, or late?):			<u>Early</u>
Height (relatively short, medium or tall?):			<u>Medium</u>
Stem Branching:	<u>None</u>		
Leaf Shape:	<u>Cordate</u>	Leaf Margins:	<u>Medium Serrate</u>
Leaf Attitude:	<u>Descending</u>	Leaf Surface:	<u>Weak Blister</u>
Leaf Color:	<u>Green</u>	Ray Flower Color:	<u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin:	<u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color:	<u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude:	<u>Erect</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color:	<u>White</u>
Seed Outer Pericarp Color:	<u>Solid Black</u>	Seed Shape:	<u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section:	<u>Curved</u>

State expected variants or other varietal traits that will assist in identification in the field: Hypocotyl anthocyanin is weak.

4. The line is resistant to Tribenuron-methyl.
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 2014. Please do not publish certified seed production acreage.
7. Application for protection under the Plant Variety Protection Act will not be made.



K12HE33

1. K12HE33 is a proprietary Seeds 2000 oilseed sunflower maintainer line with resistance to tribenuron methyl herbicide and high oleic acid content developed by the pedigree method from the cross SA470/PSU 7. Selection was for uniform plant type, self-compatibility, high oleic acid content and resistance to tribenuron methyl herbicide.
2. Hybrids using K12HE33 are adapted to major sunflower growing regions of the U.S. and will be used primarily for vegetable oil. Hybrids using K12HE33 have been tested in North and South Dakota and Minnesota.

3. Flowering (relatively early, medium, or late?):		<u>Medium</u>
Physiological maturity (relatively early, medium, or late?):		<u>Medium</u>
Height (relatively short, medium or tall?):		<u>Tall</u>
Stem Branching:	<u>Absent</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12HE33 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. Certified seed will be made available in 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12HE34

1. K12HE34 is a proprietary Seeds 2000, high oleic, tribenuron methyl herbicide resistant, downy mildew (*Plasmopara halstedii*) resistant maintainer line developed and selected by the pedigree method from the cross SA470/SA4754. Selection was for uniform plant type, self-compatibility, high oleic acid content, and resistance to tribenuron methyl herbicide.
2. Hybrids using K12HE34 are adapted to major sunflower growing regions of the U.S. and will be used primarily for vegetable oil. Hybrids using K12HE34 have been tested in North and South Dakota and Minnesota.

3. Flowering (relatively early, medium, or late?):	<u>Late</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Late</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Absent</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Broadly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12HE34 is resistant to tribenuron methyl herbicide and is resistant to 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. Certified seed will first be offered for sale in 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12HM28

1. K12HM28 is a Seeds 2000, Inc. proprietary, high oleic, imidazolinone tolerant sunflower inbred maintainer line derived from the cross SA586/SA970-2112A. The pedigree method of selection was used for the development of this line. SA586 and SA970 have previously been described to and approved by the NSVRB. Selection was for uniform plant type, self-compatibility, high oleic acid content (88.9%), and tolerance to imidazolinone herbicide.
2. Hybrids utilizing K12HM28A are adapted to major sunflower regions of the USA and will be used primarily for vegetable oil. They have been tested in all regions of North and South Dakota where sunflower is commonly grown.

3. Flowering (relatively early, medium, or late?):	<u>Late</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Late</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>None</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray FlowerColor: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Broadly Ovate</u>
Stripe Appearance:	<u>None</u>	Seed Cross-section: <u>Curved</u>

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

4. K12HM28 is imidazolinone herbicide tolerant.
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 be made available in 2014, do not publish certified acreage.
7. Application for PVP will not be made.



K12HM36

1. K12HM36 is a Seeds 2000, Inc. proprietary imidazolinone herbicide resistant, high oleic (87.8%), downy mildew (*Plasmopara halstedii*) resistant maintainer selected by the pedigree method from the cross SA944//SA6835/SA878. Selection was for uniform plant type, self-compatibility, imidazolinone herbicide resistance, high oleic fatty acid content, and resistance to downy mildew.
2. Hybrids utilizing K12HM36 are adapted to major sunflower growing regions of the USA and have been tested in North and South Dakota. Hybrids utilizing K12HM36 will be used primarily for vegetable oil.

3. Flowering (relatively early, medium, or late?):	<u>Late</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Late</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Absent</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Slightly Crinkled</u>
Leaf Color:	<u>Green</u>	Ray FlowerColor: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Ovoid Elongate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12HM36 is resistant to imidazolinone herbicide and is resistant to 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. Certified seed will first be offered for sale in 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12HM37

1. K12HM37 is a proprietary Seeds 2000, Inc. imidazolinone herbicide resistant, high oleic, downy mildew (*Plasmopara halstedii*) resistant oilseed maintainer selected by the pedigree method from the cross SA966/HA335. . Selection was for uniform plant type, self-compatibility, imidazolinone herbicide resistance, high oleic fatty acid content, and resistance to downy mildew.
2. Hybrids utilizing K12HM37 are adapted to major sunflower growing regions of the upper Midwest of the USA and will be used primarily for vegetable oil. Hybrids utilizing K12HM73 have been tested in North and South Dakota.

3. Flowering (relatively early, medium, or late?):	<u>Medium</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Medium</u>	
Height (relatively short, medium or tall?):	<u>Medium</u>	
Stem Branching:	<u>Absent</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray FlowerColor: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Ascending</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Broadly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12HM37 is resistant to imidazolinone herbicide and is resistant to 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. Certified seed will first be offered for sale in 2014. Do not publish acreage.
7. PVP will not be applied for.



K12HM62R

1. K12HM62R is a Seeds 2000 proprietary high oleic oilseed restorer, resistant to tribenuron methyl herbicide and resistant to downy mildew (*Plasmopara halstedii*), and was developed by the pedigree method of selection from the cross SU4907/TX16-1551R Selection was for uniform plant type, self-compatibility, resistance to tribenuron methyl herbicide and resistance to downy mildew.
2. Hybrids utilizing K12HM62R are adapted to major sunflower growing regions of the upper Midwest of the USA and will be used primarily for vegetable oil. Hybrids utilizing K12HM62R have been tested in North and South Dakota.

3. Flowering (relatively early, medium, or late?):	<u>Early</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Early</u>	
Height (relatively short, medium or tall?):	<u>Short</u>	
Stem Branching:	<u>Fully Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Serrate</u>
Leaf Attitude:	<u>Ascending</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray FlowerColor: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Erect</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12HM62R is resistant to tribenuron methyl herbicide and is resistant to 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. Certified seed will be made available in 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12HM69R

1. K12HM69R is a proprietary Seeds 2000 sunflower, high oleic (89.7%) oilseed restorer line with resistance to imidazolinone herbicide. K12HM69R was developed by the pedigree method of selection from the cross SA578/SA439-112R SA578R and SA439R are proprietary Seeds 2000 restorers previously described to and approved by the National Sunflower Variety Review Board. Selection was for uniform plant type, self-compatibility, and resistance to imidazolinone herbicide.
2. Hybrids using K12HM69R are adapted to major sunflower growing regions of the U.S. and will be used primarily for vegetable oil. Hybrids using K12HM69R have been tested in North and South Dakota and Minnesota.

3. Flowering (relatively early, medium, or late?):	<u>Late</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Late</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Top Branching</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Broadly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12HM69R 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 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12LE60R

1. K12LE60R is a Seeds 2000 proprietary linoleic oilseed restorer, resistant to tribenuron methyl herbicide and resistant to downy mildew (*Plasmopara halstedii*), and was developed by the pedigree method of selection from the cross SU4907/TX16-1135R. . Selection was for uniform plant type, self- compatibility, resistance to tribenuron methyl herbicide, and resistance to downy mildew.
2. Hybrids using K12LE60R are adapted to major sunflower growing regions of the U.S. and will be used primarily for vegetable oil. Hybrids using K12HM69R have been tested in North and South Dakota and Minnesota.

3. Flowering (relatively early, medium, or late?):	<u>Early</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Early</u>	
Height (relatively short, medium or tall?):	<u>Short</u>	
Stem Branching:	<u>Present</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Slightly Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Vertical</u>
Receptacle Shape:	<u>Flat</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Ovoid Elongate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12LE60R is resistant to imidazolinone herbicide and resistant to 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. Certified seed will first be offered for sale in 2014.
7. Application for PVP will not be made.



K12LM61R

1. K12LM61R is a proprietary Seeds 2000, Inc. linoleic oilseed restorer line with resistance to *Orobanche cumana* derived from the cross 6356R/TR311 by the pedigree method of selection. Selection was for uniform plant type, self-compatibility, and resistance to broomrape (*Orobanche Cumana*).
2. Hybrids utilizing K12LM61R are adapted to the Trakya region of Turkey and to the upper Midwest of the USA and have been tested in Tekirdag, Turkey and surrounding areas, and in North and South Dakota. Hybrids utilizing K12LM61R will be used primarily for vegetable oil.
3. Flowering (relatively early, medium, or late?): Medium
 Physiological maturity (relatively early, medium, or late?): 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 Flower Color: Yellow
 Ray Flowers: Flat Stigma Anthocyanin: Absent
 Disk Flower Color: Yellow Pappi Color: Green
 Pollen Color: Yellow Head (neck) Attitude: Horizontal
 Receptacle Shape: Convex Seed Middle Pericarp Color: White
 Seed Outer Pericarp Color: Black Seed Shape: Narrowly Ovate
 Stripe Appearance: Absent Seed Cross-section: Curved

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

4. K12LM61R is resistant to imidazolinone herbicide and is resistant to race F of broomrape (*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. Certified seed will first be offered for sale in 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12LM71R

1. K12LM71R is a Seeds 2000 proprietary oilseed restorer line with resistance to imidazolinone herbicide and resistance to downy mildew (*Plasmopara halstedii*) developed from the cross RHA468/RHA464 by the pedigree method of selection. Selection was for uniform plant type, self-compatibility, resistance to imidazolinone herbicide and resistance to downy mildew.
2. Hybrids using K12LM71R are adapted to major sunflower growing regions of the U.S. and will be used primarily for vegetable oil. Hybrids using K12LM71R have been tested in North and South Dakota and Minnesota.

3. Flowering (relatively early, medium, or late?):	<u>Late</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Late</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Present</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12LM71R is resistant to imidazolinone herbicide and is resistant to 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. Certified seed will first be offered for sale in 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12LM72R

1. K12LM72R is a Seeds 2000 proprietary oilseed restorer line with resistance to imidazolinone herbicide and resistance to downy mildew (*Plasmopara halstedii*) developed from the cross RHA468/RHA464 by the pedigree method of selection. Selection was for uniform plant type, self-compatibility, resistance to imidazolinone herbicide and resistance to downy mildew.
2. Hybrids utilizing K12LM72R are adapted to the major sunflower growing regions of the USA and will be used primarily for vegetable oil. Hybrids utilizing K12LM72R have been tested in North and South Dakota.

3. Flowering (relatively early, medium, or late?):	<u>Late</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Late</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Top Branching</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Descending</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>Absent</u>	Seed Cross-section: <u>Curved</u>

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

4. K12LM72R is resistant to imidazolinone herbicide and is resistant to 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. Certified seed will first be offered for sale in 2014. Do not publish acreage.
7. Application for PVP will not be made.



K12LM73R

1. K12LM73R is a proprietary Seeds 2000 sunflower, linoleic oilseed restorer line with resistance to imidazolinone herbicide. K12LM73R was developed by the pedigree method of selection from the cross SA578/SA439-13363R. SA578R and SA439R are proprietary Seeds 2000 restorers previously described to and approved by the National Sunflower Variety Review Board, Selection was for uniform plant type, self-compatibility, and resistance to imidazolinone herbicide.
2. : Hybrids using K12LM73R are adapted to major sunflower growing regions of the U.S. and will be used primarily for vegetable oil. Hybrids using K12LM73R have been tested in North and South Dakota and Minnesota.

3. Flowering (relatively early, medium, or late?):	<u>Late</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Late</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Top Branched</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower color: <u>Yellow</u>
Ray Flowers:	<u>Present</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Black</u>	Seed Shape: <u>Narrowly Ovate</u>
Stripe Appearance:	<u>None</u>	Seed Cross-section: <u>Not Curved</u>

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

4. K12LM73R is tolerant 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 2014. Do not publish acreage.
7. Application will not be made for PVP.



K12SE39

1. K12SE39 is a Seeds 2000, Inc. proprietary, non-oil seed, tribenuron methyl herbicide tolerant, sunflower inbred maintainer line developed by the pedigree method of selection from the cross SA360/494SU. It is a bulk of F6 plants derived from a single F5 plant. Selection was for uniform plant type, self compatibility, and tribenuron methyl herbicide resistance. The male sterile component of K12SE39 has CMS PET1 cytoplasm derived from H. petiolaris (French)
2. Hybrids utilizing K12SE39 have been tested in major sunflower growing regions of North America and have been tested in North and South Dakota where sunflower is commonly grown. Hybrids with K12SE39 will be used primarily for human consumption.

3. Flowering (relatively early, medium, or late?):	<u>Relatively Early</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Relatively Early</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Absent</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Stripe Dark brown</u>	Seed Shape: <u>Broadly Ovate</u>
Stripe Appearance:	<u>Narrow White</u>	Seed Cross-section: <u>Curved</u>

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

K12SE39 is a Seeds2000, Inc. non-oilseed, tribenuron methyl herbicide tolerant, maintainer line developed by the pedigree method of selection. Compared to the public line HA292, K12SE39 is three days earlier to flower and seventeen days earlier to reach physiological maturity and 28 cm taller. Leaves of K12SE39 are similar in number and color but longer than the leaves of HA292. Heads of K12SE39 are similar in size, shape and head attitude as heads of HA292. Seed of K12SE39 is striped and lighter in color than seed of HA292.

4. K12SE39 is tolerant to the tribenuron methyl herbicide.
5. Breeder's seed will be maintained by Seeds 2000, Inc. 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 in 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 2014. Do not publish certified seed production acreage.
7. Application for PVP will not be made.



K12SM08

1. K12SM08 is a Seeds 2000, Inc. proprietary, non-oil seed, imidazolinone herbicide tolerant, downy mildew resistant (race730), sunflower inbred maintainer line developed by the pedigree method of selection from the cross SA9611//SA443/SA440B. It is a bulk of F6 plants derived from 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 K12SM08 has CMS PET1 cytoplasm derived from H. petiolaris (French).
2. Hybrids utilizing K12SM08 have been tested in major sunflower growing regions of North America and have been tested in North and South Dakota where sunflower is commonly grown. Hybrids with K12SM08 will be used primarily for human consumption.

3. Flowering (relatively early, medium, or late?):	<u>Relatively Early</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Relatively Early</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Absent</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Dark Brown</u>	Seed Shape: <u>Oblong</u>
Stripe Appearance:	<u>Narrow White</u>	Seed Cross-section: <u>Curved</u>

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

K12SM08 is a Seeds2000, Inc. non-oilseed, imidazolinone herbicide tolerant, downy mildew resistant (race 730), and maintainer line developed by the pedigree method of selection. Compared to the public line HA292, K12SM08 is one day earlier to flower and to reach physiological maturity and 28 cm taller. Leaves of K12SM08 are similar in number and color but longer than the leaves of HA292. Heads of K12SM08 are similar in size, shape and head attitude as heads of HA292. Seed of K12SM08 is darker in color than seed of HA292.

4. K12SM08 is tolerant to the imidazolinone herbicide, and resistant to the race 730 of downy mildew.
5. Breeder's seed will be maintained by Seeds 2000, Inc. 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 in 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 2014. Do not publish certified seed production acreage.
7. Application for PVP will not be made.



K12SM38

1. K12SM38 is a Seeds 2000, Inc. proprietary, non-oil seed, imidazolinone herbicide tolerant, sunflower inbred maintainer line developed by the pedigree method of selection from the cross 4268B/4140B. It is a bulk of F6 plants derived from a single F5 plant. Selection was for uniform plant type, self compatibility, and imidazolinone herbicide resistance. The male sterile component of K12SM38 has CMS PET1 cytoplasm derived from H. petiolaris (French).
2. Hybrids utilizing K12SM38 have been tested in major sunflower growing regions of North America and have been tested in North and South Dakota where sunflower is commonly grown. Hybrids with K12SM38 will be used primarily for human consumption.

3. Flowering (relatively early, medium, or late?):	<u>Relatively Earlier</u>	
Physiological maturity (relatively early, medium, or late?):	<u>Relatively Earlier</u>	
Height (relatively short, medium or tall?):	<u>Tall</u>	
Stem Branching:	<u>Absent</u>	
Leaf Shape:	<u>Cordate</u>	Leaf Margins: <u>Medium Serrate</u>
Leaf Attitude:	<u>Horizontal</u>	Leaf Surface: <u>Crinkled</u>
Leaf Color:	<u>Green</u>	Ray Flower Color: <u>Yellow</u>
Ray Flowers:	<u>Flat</u>	Stigma Anthocyanin: <u>Absent</u>
Disk Flower Color:	<u>Yellow</u>	Pappi Color: <u>Green</u>
Pollen Color:	<u>Yellow</u>	Head (neck) Attitude: <u>Horizontal</u>
Receptacle Shape:	<u>Convex</u>	Seed Middle Pericarp Color: <u>White</u>
Seed Outer Pericarp Color:	<u>Clear</u>	Seed Shape: <u>Broadly Ovate</u>
Stripe Appearance:	<u>Narrow Dark-Gray</u>	Seed Cross-section: <u>Curved</u>

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

K12SM38 is a Seeds2000, Inc. non-oilseed, imidazolinone herbicide tolerant, maintainer line developed by the pedigree method of selection. Compared to the public line HA292, K12SM38 is one day earlier to flower and 3 days earlier to reach physiological maturity and 30 cm taller. Leaves of K12SM38 are similar in number and color but longer than the leaves of HA292. Heads of K12SM38 are similar in size, shape and head attitude as heads of HA292. Seed of K12SM38 is striped and lighter in color than seed of HA292.

4. K12SM38 is tolerant to the imidazolinone herbicide.
5. Breeder's seed will be maintained by Seeds 2000, Inc. 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 in 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 2014. Do not publish certified seed production acreage.
7. Application for PVP will not be made.

