



Oat variety sowing guide 2015

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The oat variety descriptions in this publication serve as a guide to select oat varieties for specific end uses with disease resistance, agronomic traits, and yield potential suited to diverse south eastern Australian farming systems.

How to use the oat variety sowing guide

Varieties adapted to low, medium, and high rainfall regions and categorised by grain and hay end-use are shown in Table 1. Select the group of varieties suited to your rainfall region and end use. Consult Tables 2 to 7 to refine the list to one or two varieties. Consult Tables 2 and 3 for hay and grain production comparisons, Table 4 for agronomic features, Table 5 for disease resistance, Table 6 for grain quality and Table 7 for hay quality. Certain varieties are preferred for particular end-uses, so check with hay processors and millers prior to variety selection.

Is cereal cyst or stem nematode a production constraint?

Cereal cyst nematode (CCN) and stem nematode (SN) are major soil-borne diseases limiting the yield of oats in certain areas of southern Australia. Due to the significant effect of CCN and SN on varietal performance, soil testing is recommended to assess if either of these nematodes will be a significant problem. The PreDicta™ B Root Disease Testing Service (RDTS) provides a diagnostic service to assess the levels of both nematodes prior to sowing. This is available through your local accredited agronomist or contact Alan Mackay

(SARDI Plant and Soil Health ph. 8303 9375) for your local accredited agronomist.

Varieties contained in Table 1 provide options for different end uses. Table 5 should then be used in conjunction with this table to determine if the variety of choice has both resistance and tolerance to CCN if it is a problem or resistance and tolerance to SN if it is a problem. Varieties grown where CCN or SN is present should be resistant to the particular nematode which is a problem so that multiplication of the nematode is



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limited. The variety should also be tolerant so that it yields well in the presence of the nematode. Yield penalties of up to 80% can occur if an intolerant variety is sown in a paddock where CCN or SN is a problem.

There are 10 varieties resistant to CCN listed in Table 5 and eight of these are also tolerant: Wombat, Tammar, Mulgara, Tungoo, Kangaroo, Wintaroo, Wallaroo and Potoroo are all varieties with both CCN resistance and tolerance. The remaining two resistant varieties, Yallara and Brusher

Table 1. Oat varieties listed according to annual rainfall. Use Tables 2, 3, 4, 5, 6 and 7 to further refine your choice within each category.

End use	Annual Rainfall (mm)		
	<375	375-500	>500
Milling grain	Mitika	Mitika	Mitika
	Yallara	Yallara	Yallara
	Wombat	Wombat	Wombat
	Bannister	Possum	Possum
		Bannister	Bannister
	Williams	Williams	
Feed grain-sheep, cattle	Mitika	Mitika	Mitika
	Yallara	Yallara	Yallara
	Wintaroo	Wintaroo	Wintaroo
	Mulgara	Mulgara	Mulgara
	Wombat	Wombat	Wombat
	Echidna	Echidna	Echidna
	Wallaroo		
Feed grain - pigs, poultry	-	Numbat	Numbat
Oat hay	Brusher	Wintaroo	Forester
	Mulgara	Mulgara	Tammar
	Wintaroo	Tammar	Tungoo
	Wallaroo	Tungoo	Glider
		Kangaroo	Kangaroo
		Brusher	Brusher
			Mulgara
			Wintaroo
Hay and legume mixes	Brusher	Wintaroo	Forester
	Mulgara	Tammar	Tammar
	Wintaroo	Tungoo	Tungoo
	Yallara	Kangaroo	Glider
	Wallaroo	Brusher	Kangaroo
	Potoroo		



are intolerant of CCN. There are eight varieties tolerant to stem nematode. These are Wombat, Tammar, Mulgara, Tungoo, Wintaroo, Glider, Quoll and Echidna. All of these are rated as resistant or moderately resistant to SN except Echidna which is rated as moderately susceptible. Bannister, Kangaroo, Potoroo and Wallaroo are intermediate in their reaction to SN. In cold wet seasonal conditions these varieties may suffer more yield loss than in warmer, drier winter conditions.

Is leaf disease a production constraint?

Resistance to leaf diseases is important in most environments. However, even though varieties are listed as resistant to stem and leaf rust, changes in rust pathotypes can occur. Recently a stem rust pathotype moved into the southern region of South Australia from northern NSW causing all stem rust resistance to be ineffective in the presence of this pathotype. Table 5 indicates a range of resistance reactions for stem rust depending on whether the new pathotype of stem rust is present or not. Monitoring of disease levels is essential and application of fungicide may still be required depending on seasonal conditions.

Table 1 should be used to determine the variety options available for a particular end use. Next, Table 5 should be used to further refine your choice. For example, if a variety for oat hay is required in a high rainfall environment, Forester, Tammar, Tungoo, Glider and Kangaroo are suitable (Table 1). Table 3 indicates that Kangaroo is the highest yielding for hay in this environment. However, using Table 5 Forester, Tammar, Tungoo, and Glider have better resistance to both stem and leaf rust.

These varieties also vary in their level of resistance to septoria, barley yellow dwarf virus (BYDV), bacterial blight and red leather leaf which may be also be important. Table 4 should then be used to determine if the variety selected matures at the time required.

Is milling quality required?

The probability of a variety meeting the classification criteria for milling grade is an important consideration when selecting a variety for milling end-use. This is greatly influenced by seasonal conditions. Premium milling varieties

Table 2. Seven year (2007-2013) average grain yield (t/ha) of oat varieties tested in grain trials.

	Region						Overall
	Lower EP	Upper EP	Yorke Peninsula	Mid North	South East	Murray Mallee	
Semi-dwarf (husked)							
Bannister	4.2	2.0	4.9	3.5	4.3	1.6	3.6
Mitika	3.9	1.9	4.6	3.3	4.0	1.4	3.4
Possum	3.9	1.9	4.6	3.2	3.9	1.4	3.4
Potoroo	3.9	1.9	4.9	3.2	4.0	1.6	3.4
Wombat	3.8	1.9	4.7	3.2	4.0	1.5	3.4
Semi-dwarf (naked)							
Numbat	2.9	1.2	3.4	1.9	2.5	0.5	2.1
Tall (husked)							
Williams	4.4	1.9	4.5	3.5	4.4	1.4	3.6
Yallara	3.2	1.7	3.9	3.0	3.6	1.4	3.0
No. trials	7	8	7	27	20	5	74

Table 3. Nine year (2005-2013) average hay and grain production of oat varieties tested in hay trials.

	Hay yield (t/ha)			Grain yield (t/ha)		
	Rainfall zone			Rainfall zone		
	<375mm	375-500 mm	>500mm	<375mm	375-500 mm	>500mm
Tall (husked) - early to mid season maturity						
Brusher	6.6	9.0	12.9	1.7	2.7	2.9
Mulgara	6.7	8.9	13.1	1.8	2.8	3.0
Wallaroo	6.7	8.9	12.4	1.7	2.7	2.8
Wintaroo	7.3	9.1	13.6	1.9	2.8	3.0
Yallara	6.8	9.0	12.5	2.0	3.0	3.3
Tall (husked) - mid late to very late maturity						
Forester	na	7.4	13.7	1.2	1.8	1.8
Glider	na	8.2	12.8	1.4	2.1	2.2
Kangaroo	na	8.7	13.3	1.8	2.6	2.9
Tammar	na	8.6	13.6	1.8	2.6	3.1
Tungoo	na	8.6	13.7	1.5	2.5	2.7
No. trials	9	25	7	10	23	12

such as Yallara, Mitika, Possum, Wombat, Euro and Mortlock, will reach the classification criteria for milling grade more often than other varieties such as Echidna (Table 6).

Although some varieties are not considered milling class, they may reach milling grade criteria, but would not be accepted for milling. It is imperative that you check with your miller about the quality standards and varieties that are accepted for milling before you sow a grain crop.

To select a variety for milling grain in medium to high rainfall zones you have the choice of Mitika, Yallara, Wombat, Possum, Bannister and Williams (Table 1).

Table 2 shows the relative yield and Table 6 the relative grain quality for each of these varieties. Using this information, choose a variety that suits your end use based on whether yield or quality is a priority. Table 4 should also be used

to determine if the variety selected matures at the time required and Table 5 should be used to determine if the variety selected has the desired disease resistance. For example, if CCN is a problem you have a choice of Wombat or Dunnart.

If export hay quality is required

Hay quality is essential to meet export hay standards and is greatly influenced by seasonal and nutritional conditions. However, some varieties are more likely to produce hay of a higher quality than others.

It is imperative that you check with your hay processor about the quality standards required to make export grade quality hay before you sow a hay crop. Use Table 7 to refine your choice after first ensuring that the criteria in Tables 1, 4 and 5 are met for your situation.

Oats for grazing

This guide contains no guidelines for

oats suited to grazing plus feed grain production and repeated grazing from early sowing. A more comprehensive guide for grazing varieties is contained in the Winter Crop Variety Sowing Guide produced annually by NSW DPI. Please contact the National Oat Breeding or New Variety Agronomy Groups for information on how to obtain a copy of this publication.

Notes on recently released varieties

Fact sheets or pamphlets describing all varieties released by the SA based National Oat Breeding Program are available from Primary Industries and Resources (PIRSA), the South Australian Research and Development Institute (SARDI), New Variety Agronomy Group, the relevant commercial partner for the variety or the SARDI website (www.sardi.sa.gov.au). The herbicide tolerance of different oat varieties as well as yield and quality information for grain varieties is available on the NVT website www.nvtonline.com.au

Milling varieties

Williams^ϕ is a tall milling variety commercialised by Heritage and released in Western Australia in 2013. Williams, formerly known as the breeding line WA2332, is a high yielding early to midseason variety with similar maturity compared to Yallara. It is three to seven days later maturing than Mitika. Williams is 15 cm taller than Mitika, 5 cm taller than Bannister, and 15 cm shorter than Yallara.

Although classified as MS for septoria, Williams has the highest level of septoria resistance compared to all other current oat varieties. It is resistant to leaf rust and depending on the stem rust pathotype present can range from moderately resistant to susceptible. Williams is resistant to bacterial blight and moderately resistant to moderately susceptible for BYDV. It is susceptible and intolerant to CCN.

Williams has similar grain yield to Bannister with slightly inferior grain quality. Screenings are similar to Wombat and can be high, especially in the low rainfall regions. Williams has high B-glucan levels.

Williams averages slightly lower hay yield compared to other hay varieties. Hay quality is similar to Wintaroo with slightly lower water soluble carbohydrates

and slightly higher crude protein.

Bannister^ϕ is a dwarf milling variety with high grain yield released for Western Australia in 2012. Bannister is suited to eastern Australia as well as Western Australia. It is adapted to low, medium, and high rainfall zones of Southern Australia. It is 13 cm taller than Mitika and heads about 3 to 4 days later than Mitika. Seednet is the commercial partner. Bannister is resistant to leaf rust and moderately resistant to bacterial blight. It is susceptible and intolerant to CCN. Bannister has slightly lower hectolitre weight and slightly higher screenings compared to Mitika. It is similar to Mitika for groat percent.

Wombat^ϕ is a dwarf milling variety commercialised by Seednet. It is similar in height to Possum and slightly taller than Mitika. It is a midseason variety flowering about six days later than Mitika.

Wombat is the first dwarf milling variety with CCN resistance and tolerance. It is also moderately tolerant and moderately resistant to stem nematode. It has improved BYDV resistance compared to other dwarf varieties and improved

bacterial blight resistance compared to other dwarf varieties except Mitika.

Wombat has high hectolitre weight and low screenings compared to the feed variety Potoroo, which was the first dwarf variety with CCN resistance and tolerance. It also has high groat percent, slightly higher than Mitika. Wombat can have slightly higher screenings than Mitika, Yallara and Possum depending on seasonal conditions. Wombat will develop leaf reddening symptoms similar to Mitika and Possum post flowering. This does not affect grain yield or quality.

Mitika^ϕ is an early maturing dwarf milling oat developed by SARDI and now commercialised by Heritage Seeds. It is resistant to leaf rust and moderately resistant to stem rust and bacterial blight. However, Mitika is susceptible to CCN, BYDV, septoria and red leather leaf and intolerant to CCN and stem nematode. Mitika is a milling quality oat with high hectolitre and grain weight, low screenings percent and moderately high groat percent. It is also a high feed value oat with low hull lignin and high grain digestibility. Mitika averages higher levels of Beta-glucan than Possum, Yallara and

Table 4. Agronomic features of varieties.						
Variety	Early vigour	Plant height	Heading	Maturity	Shattering resistance	Standing ability
Semi-dwarf (husked)						
Bannister	G	D	EM	EM	R	R
Echidna	G	D	EM	EM	R	R
Mitika	G	D	E	E	R	R
Possum	G	D	EM	EM	R	R
Potoroo	G	TD	E	E	MR	MR
Wombat	G	D	M	M	R	R
Semi-dwarf (naked)						
Numbat	MG	D	EM	EM	MR	R
Tall (husked)						
Brusher	MG	T	E	EM	MS	MR
Forester	VG	MT	VL	VL	R	R
Glider	P	MT	L	L	MS	MR
Kangaroo	MG	MT	ML	ML	MS	R
Mulgara	MG	T	EM	EM	MR	MR
Tammar	M	MT	LM	LM	MS	R
Tungoo	MP	MT	ML	ML	MS	MS
Wallaroo	G	MT	E	E	MS	MS
Williams	G	ST	EM	EM	R	R
Wintaroo	M	T	M	EM	MS	MR-MS
Yallara	VG	MT	EM	EM	MR	R
Value for trait: Early vigour: VG=very good, G=good, MG = moderately good, M=moderate, P=poor, MP = moderately poor						
Plant height: D = dwarf, TD = tall dwarf, T = tall, ST = short tall, MT = moderate tall						
Heading and maturity: E = early, EM = early mid, M= mid season, ML = mid late season, LM = late mid season, L= late, VL=very late						
Shattering and standing ability: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible,						



Euro. It is recommended for all rainfall zones where CCN or stem nematode is not a problem.

Yallara^ϕ is a medium-tall milling oat variety developed by SARDI and commercialised by Seednet. Yallara is a backcross line using Euro as the recurrent parent and a North Dakota line as the source of rust resistance. It is moderately resistant to stem rust and resistant to leaf rust. Long term yield of this variety is a 2% improvement compared to Euro. However, yield increases of between 40 and 100% have been recorded for varieties with stem rust resistance similar to Yallara in years where stem rust is yield limiting. Yallara is slightly taller than Euro and 2 days earlier to head. It has premium oat quality and averages higher hectolitre weight and groat percent and lower screenings percent than Euro, Mitika, Possum and Wombat. Yallara is an improvement compared to Euro for bacterial blight resistance. Like Euro, Yallara is resistant to CCN but intolerant, moderately susceptible to septoria and red leather leaf and intolerant to stem nematode. Yallara is recommended to replace Euro in all areas but particularly where stem and leaf rust can be yield limiting. In addition, Yallara has bright grain and high grain digestibility making it suitable for the horse racing industry. Based on herbicide tolerance trials conducted by the SARDI New Variety Agronomy Group, Yallara is particularly sensitive to applications of Banvel-M[®]. For more information about the herbicide tolerance of Yallara go to www.nvtonline.com.au.

Hay varieties

Forester^ϕ is a very late hay variety adapted to high rainfall and irrigated cropping regions. It is seven to 10 days later than Glider, three days later than Riel, two days later than Targa, and three weeks later than Wintaroo. Forester has excellent early vigour and is an improvement compared to Glider. It has excellent lodging and shattering resistance.

Forester has an excellent foliar disease resistance spectrum. It is moderately susceptible to CCN. It has good hay colour, but like all late hay varieties may not resist hot dry winds as well as earlier varieties. Forester has excellent hay

Table 5. Disease resistance of oat varieties - field reactions.

Colour key: Green is a good choice, yellow use caution and red either do not use or develop a management package if this disease is yield limiting in your environment

Variety	Rust		Barley yellow dwarf virus ²	CCN		Stem nematode		Septoria	Bacterial blight	Red leather leaf
	stem ¹	leaf		resistance	tolerance	resistance	tolerance			
Semi-dwarf (husked)										
Bannister	MR-S	R	MS	VS	I	-	MI	-	MR-S	MS
Echidna	S	S	MS	S	I	MS	MT	S	S	MS
Mitika	MR-S	R	S	VS	I	S	I	S	MR	S
Possum	MS-S	MS	S	VS	I	S	I	MS	S	MS-S
Potoroo	S	S	MS	R	T	S	MI	S	VS	S-VS
Wombat	MS-S	MS	MR	R	MT	MR	MT	MS	MS	MS
Semi-dwarf (naked)										
Numbat	MR-S	R	S	S	I	S	I	MR	S	MS
Tall (husked)										
Brusher	MS-S	MR-MS	MS	R	MI	MS	I	MS	MR-MS	MR-MS
Forester	R-S	MR-MS	MR-S	MS	MI	S	I	MR	MS-S	R-MR
Glider	MR-S	R	S-MR	MS	I	R	T	R	R	R
Kangaroo	MS-S	MS	MR-S	R	MT	MS	MI	MR-MS	MR-MS	MS
Mulgara	MS-S	MR	MS	R	MT	R	MT	MS	MR	MS
Tammar	MR-S	MR	MS	MR	MT	R	MT	MR	MR	R-MS
Tungoo	MS-S	MR	MR-MS	R	MT	R	MT	MR	MR	R
Wallaroo	S	S	MS	R	MT	MS	MI	S	S	MS
Williams	MR-S	R	MR-MS	S	I	-	I	MS	MR	MS
Wintaroo	S	MS	MR-MS	R	MT	MR	MT	MR-MS	MR	MS
Yallara	MR-S	R	MS	R	I	S	I	MS	MR-MS	MS

¹Disease reactions to stem rust will vary with pathotype, ²Disease reactions to BYDV may vary with the strain of the virus **Key to symbols used:** VS = very susceptible, S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant, VI = very intolerant, I = intolerant, MI = moderately intolerant, MT = moderately tolerant, T = tolerant, VT = very tolerant.

quality and is an improvement compared to Glider, Tammar, Targa, and Vasse, but similar to Riel.

Seed of Forester is available from AGF Seeds.

Tammar^ϕ is a new late tall hay oat variety later in cutting time than Kangaroo and Tungoo but not as late as Glider. It is available to growers through AEXCO Pty Ltd.

Tammar has excellent hay colour and resists brown leaf at hay cutting. Hay yields are slightly lower than Wintaroo and similar to Tungoo and Kangaroo. Grain yield is better than Kangaroo, Tungoo, Glider and Riel.

Hay quality is better than Kangaroo and similar to Tungoo and Wintaroo. Hay digestibility and ADF are better than Tungoo and Wintaroo. Tammar is moderately resistant and moderately tolerant to CCN and resistant and moderately tolerant to SN. Tammar has an excellent foliar disease resistance

profile and is an improvement compared to Tungoo for stem rust resistance. Tammar is similar in height to Kangaroo, Tungoo and Wintaroo and has better lodging resistance than Tungoo, Wintaroo, Glider and Riel.

Tammar has better early vigour than Tungoo and Glider. Tammar has grain quality similar to Tungoo and Kangaroo with slightly smaller grain weight and slightly more screenings. It has improved grain quality compared to Glider, Riel and Vasse.

Tammar is recommended for medium and high rainfall zones and gives a slightly later option for cutting time than Tungoo and Kangaroo.

Mulgara^ϕ is a tall mid season hay oat similar in heading time and height to Wintaroo. It is available to growers through AEXCO Pty Ltd.

Mulgara is an improvement compared to Wintaroo for resistance to stem rust and bacterial blight. It is also an

improvement compared to Wintaroo for lodging and shattering resistance and early vigour. Hay yield is an improvement compared to Brusher but is slightly lower than Wintaroo. Hay quality is similar to Wintaroo.

Mulgara has excellent hay colour and resists brown leaf at hay cutting. Grain yield and quality is similar to Wintaroo with lower screenings, higher protein and groat percent. Mulgara has high grain hull lignin.

Mulgara is recommended to replace Wintaroo in areas with stem nematode due to its higher level of resistance. In tests conducted over six years, Mulgara averaged 70 nematodes per plant compared to Wintaroo's 1065.

It is also recommended to replace Wintaroo where improved lodging resistance, stem rust, or bacterial blight resistance is required.

The seed size of Mulgara is larger than other hay varieties and similar to Swan. Care should be taken to sow this variety at the correct seed density.

Tungoo[®] is a medium tall mid to late season hay variety similar in heading date to Kangaroo. Seed of this line is available to growers through AEXCO Pty Ltd.

Tungoo has an excellent disease resistance profile and resists leaf browning from hot dry winds. It combines resistance and moderate tolerance to CCN and SN.

Levels of stem nematode resistance are similar to Glider and an improvement compared to Wintaroo.

Tested over six years, Tungoo averaged 24 nematodes per plant compared to Wintaroo's 1065.

Tungoo is also resistant to leaf rust and red leather leaf, moderately resistant to BYDV, septoria, and bacterial blight and moderately susceptible to stem rust.

Hay yield is similar to Kangaroo but grain yield and quality is similar to Glider. Hay digestibility is similar to Wintaroo (better than Kangaroo), although it tends to be higher in NDF and lower in WSC than Wintaroo but an improvement compared to Kangaroo. Early vigour is an improvement compared to Glider, but not as good as Kangaroo. It has moderately low hull lignin.

Brusher[®] is an early-mid season tall oat developed by SARDI and commercialised by AEXCO Pty Ltd in 2003. It is two to four days earlier to head than Wintaroo

Table 6. Grain quality comparisons.

Variety	Hectolitre Weight (kg/hl)	Screenings <2mm	1000 Grain weight (g)	Kernel (%)	Probability of reaching milling grade	Protein (%)	Oil(fat) (%)	Hull lignin content
Semi-dwarf (husked)								
Bannister	MH	ML	MH	MH	H	M	M	H
Echidna	M	MH	M	ML	L	M	M	MH
Mitika	H	L	H	MH	H	MH	M	L
Possum	MH	L	MH	MH	H	MH	M	H
Potoroo	L	MH	M	ML	-	M	MH	H
Wombat	H	M	MH	H	H	MH	M	H
Semi-dwarf (naked)								
Numbat	VH	H	L	-	-	H	VH	-
Tall (husked)								
Brusher	M	M	MH	M	-	MH	M	L
Forester	L	M	L	L	-	M	M	H
Glider	L	M	M	ML	-	MH	ML	L
Kangaroo	M	ML	MH	ML	-	M	M	H
Mulgara	M	M	MH	MH	-	MH	M	H
Tammar	L	H	L	ML	-	MH	M	SEG
Tungoo	L	H	L	ML	-	MH	M	L
Wallaroo	M	M	M	MH	-	M	MH	L
Williams	MH	M	M	M	MH	M	M	MH
Wintaroo	M	M	MH	MH	-	M	M	L
Yallara	H	L	H	H	VH	MH	L	H

Value for trait: L = low, ML = moderately low, M = medium, MH = moderately high, H = high, VH = very high, - not applicable

Table 7. Hay quality comparisons.

Variety	Digestible dry matter (%dm)	Crude protein (%dm basis)	Neutral detergent fibre (%dm basis)	Water soluble carbohydrate (%dm basis)	Stem diameter
Tall (husked)					
Brusher	MH	M	M	MH	M
Forester	MH	M	ML	MH	MH
Glider	M	M	M	M	M
Kangaroo	ML	MH	MH	ML	ML
Mulgara	M	M	M	M	M
Tammar	M	MH	M	M	ML
Tungoo	M	MH	M-MH	M	M
Wallaroo	M	M	M	M	L
Wintaroo	M	M	M	M	M
Yallara	MH	M	ML	H	ML

Value for trait: L = low, ML = moderately low, M = medium, MH = moderately high, H = high.

and this suits it well to low rainfall areas. Although Brusher has inferior hay yield when compared to Wintaroo it is recommended to replace this variety where improved resistance to stem and leaf rust or improved hay quality is desired.

Grain yield and grain quality is similar to Wintaroo, Wallaroo and Kangaroo with higher grain protein.

Brusher is moderately susceptible to stem rust, BYDV, septoria, red leather leaf and bacterial blight. It is resistant to leaf rust, resistant but moderately intolerant of cereal cyst nematode and intolerant of

stem nematode.

When there is a high CCN population in a paddock with favourable seasonal conditions, Brusher will have significantly lower hay yield than tolerant varieties. Brusher is moderately low in grain lignin.

Notes on interstate varieties

Many of the varieties released interstate are evaluated in a limited number of trials in southern Australia. More information is available from the SARDI National Oat Breeding Program and should be sought before attempting to grow these varieties. ■