Ministério da Agricultura, Pecuária e Abastecimento

Boletim de Pesquisa e Desenvolvimento online 52

ISSN 1677-8901

December, 2007

Performance of canola genotypes in Tarariras, Uruguay, 2006

Gilberto Omar Tomm[1], Maria Alejandra Elizarzú[2], Gerardo Nicolas Arias Duran y Veiga[3]

Picture: Maria Alejandra Elizarzú

Passo Fundo, RS
2007

Introduction

Agriculture of Uruguay can benefit from crop rotation with alternative winter crops such as canola, plant belonguing to the Cruciferae family, for reducing quantitative and qualitative losses in the production of wheat and other grass crops caused by diseases and insect pests as well as benefiting from reduction of input costs associated with their control as observed elsewhere (Tomm, 2005; Tomm et al., 2005; Tomm, 2006). Aiming at making available to farmers of Uruguay the benefits from new canola genotypes that performed well in other South American countries, such as Paraguay and Brazil, led to the beginning of a number of activities to reach this objective. Activities started with training of technical personnel (Fig. 1), and the beginning of experiments to evaluate the performance of genotypes under the growing conditions of Uruguay. These investments along with other efforts likely will lead to the expansion of commercial canola production in Uruguay. The experiment reported here aimed at assessing the comparative adaptation of hybrids in commercial use in Brazil and Paraguay, and newly developed genotypes, to the growing conditions of Uruguay.

[1] Agronomist, Ph.D., Researcher at Embrapa Trigo E-mail: tomm@cnpt.embrapa.br
[2] Agronomist, Greising y Elizarzú S.R.L., www.geseed.com. Calle Libertad 1856. Tarariras, Colonia – Uruguay, CP 70002. E-mail: asimson@adinet.com.uy
[3] Agronomist, Ph.D., Researcher, formerly at Embrapa Trigo. E-mail: gerardoarias6@hotmail.com

Picture: Gerardo Nicolas Arias Duran y Veiga

Fig. 1. Training on canola best management practices held on May 8th, 2006. Passo Funod/RS, Brazil.

Picture: Maria Alejandra Elizarzú

Fig. 2. General view of the experiment on July 24th, 2006. Tarariras, Uruguay.

Picture: Maria Alejandra Elizarzú

Fig. 3. General view of the experiment on September 9th, 2006. Tarariras, Uruguay.

Material and methods

This experiment was carried under conventional tillage, having natural grasses as previous use of the land, in an area that belongs to Greising y Elizarzú SRL and is located at Tarariras, Uruguay, Latitude 34º11'S, Longitude 57º31'13'' W, altitude of 100.8 m above sea level, in soil classified as Brunosol Subeutrico Haplico, with fertility parameters before seeding the experiment, recommended and applied fertilizer rates as detailed in Table 1. Mechanic seeding of the experiment was done on June 7, 2006 and emergence was observed on June 21. Plots had 4 rows of plants, with row spacing of 0.34 m and 5 m length, making an area of 6.8 m^2.

At seeding 264 kg/ha of the formula 0 – 20/22 - 0 + 12 S (20% of soluble P and 22% of total P) plus 238 kg/ha of the formula 15-15-15 were applied by hand and incorporated before seeding. Top dressed nitrogen at rates of 164 kg of urea/ha, was applied at 24 days after emergence.

Table 1. Soil fertility parameters before seeding the experiment, recommended and applied fertilizer rates.

	pH	N	P	K	S
Results of soil analysis	6.8	4.2μN/g	6μN/g	0.78 meq/100g	7.2μS/g
Recommended rates (kg/ha)		120.00	48.00	36.00	30.00
Applied rates (kg/ha)		111.14	93.78	36.00	31.68

Presence of adults and larvae forms of *Plutella* spp were observed on September 8. On September 29, an application of the insecticide “Match” (Lufenuron 4.4%, 50 g/L) at a rate of 150 cc/ha and volume of 200 L/ha was made.

Grain yield was estimated based on the harvest of the two central rows of plants with 4 m length (2.72 m^2). Harvest was done by hand and plants were threshed on a plot threshing machine. Calculations were made to correct grain yield to 10 % moisture content.

Phenological observations were made based on criteria adopted in Canada and Australia[1], as follows. Emergence date: day at which 50% of the seedlings of the plot emerged. Beginning of flowering: day at which 50% of the plants present at least one flower. End of flowering: day when there are no more flowers, except on off type plants. Plant height: average plant height up to the upper extreme of the branches with pods. Maturation date: day at which 50% of the seeds have their colour turning to dark on the pods situated on the central part of the raceme of the plants. Plant lodging and plant height were rated respectively on October 16 and October 23.

Results

The earliest maturing genotypes received 455 mm and the latest maturing genotypes had 525 mm of rain from seeding to harvest. A precipitation of 73 mm two days after seeding provided abundant moisture for the germination and emergence. However, during the following three months, rainfall was bellow average in the area (Table 2).

Table 2. Precipitation at Tarariras in the period of time immediately before and during the experiment in the year 2006.

Period of ten days	June	July	August	September	October	November
1º	92	20	22	20	62	32
2º	13	6	8	0	20	20
3º	140	20	9	14	66	3
Total	245	46	39	34	148	55
Average	95	83	85	91	106	109

Source: Greising y Elizarzú SRL (Average of the last eleven years).

[1] Communication by e-mail by dr. Greg Buzza, canola breeder of Advanta Canada Inc., to Gilberto Omar Tomm, on 16 April 2003.

Plant cycle ranged from 128 days for H4815, harvested on 27 October, to 144 days for Hyola 60, harvested on 9 November (Table 3). Initial plant population ranged from 21 to 53 plants/m^2, averaged 39 plantas/m^2 (C.V.=18%) and did not present significant correlation with grain yield. Plant stand of Hyola 60 averaged only 5 plants/m^2 due to seeds with low vigour and therefore no results on grain yield and thousand kernel weight are available (Table 3).

Grain yield of genotypes did not present statistical differences although the absolute values ranged from 2,736 kg/ha to 3,588 kg/ha and averaged 3,225 kg/ha. None of the estimated parameters presented significant correlation with grain yield.

The number of days from plant emergence to the beginning of flowering varied among genotypes and ranged from 61 days, for H4815, to 84 days for Hyola 60. Duration of the flowering period ranged from 19 to 38 days. Plant height ranged from 110 to 154 cm. I4401 and Hyola 61 presented no plant lodging (rate 9.0) but the scores abtained ranged up to intermediate rates (4.4). Thousand kernel weight ranged from 3.30 to 3.97 g and averaged 3.60 g.

Freezing temperatures were observed by INIA/GRAS at the meteorological station located about 10 km of the experimental site in the following periods, with correspondent minimum air temperatures at the ground level as follows: 19/7(-0.8ºC); 30/7(-4.0ºC), 31/7(-6.7ºC), 1/8(-7.4ºC), 2/8(-7.0ºC), 3/8(-5.4ºC); 10/8(-2.6ºC), 11/8(-1.6ºC), 12/8(-0.2ºC); 15/8(-2.5ºC); 18/8(-3.6ºC); 20/8(-0.2ºC), 21/8(-8.4ºC), 22/8(-0.8ºC); 28/8(-3.3ºC), 29/8(-2.3ºC), 30/8(0ºC); 1/9(0ºC), 2/9(0ºC); 4/9(-1.6ºC), 5/9(-5.1ºC), 6/9(-4.5ºC); 21/9(-0.4ºC); and 24/9(-1.9ºC). No visible frost damage was observed or grain yield reduction was attributed to frost although temperatures of zero or below zero degrees Celsius were measured at ground level on these 24 days.

Earlier seeding at lower latitudes, in Southern and Central Brazil, have allowed yield performance, the length of the flowering period, and the total cycle to be more differentiated among genotypes than in this experiment (Tomm et al., 2004 a; Tomm et al., 2004 b).

No symptoms of the disease incited by the fungi (*Leptosphaeria maculans*/*Phoma lingam*) or *Sclerotinia* spp were observed.

Table 3. Performance of canola genotypes in Tarariras, Uruguay, emerged on June 21, 2006.

Genotype	Emergence to beginning of flowering (days)	Duration of flowering (days)	Emergence to maturation (days)	Plant height (cm)	Plant lodging 1=lodged 9=standing	Thousand kernel weigth (g)	Grain yield (kg/ha)
H4481	68 DEF	33 AB	133 FG	129 BCDE	7.8 ABC	3.77 ABC	3.085
H4592	70 DE	29 AB	138 BCD	131 BCD	7.8 ABC	3.30 E	2.736
H4722	71 D	32 AB	135 DEF	126 CDE	8.5 AB	3.30 E	3.088
H4815	61 I	38 A	128 H	110 E	4.4 D	3.67 BCD	3.045
H4816	67 EFG	28 AB	133 FG	125 CDE	7.5 ABC	3.50 DE	3.377
H4915	78 BC	29 AB	139 BCD	148 AB	8.5 AB	3.65 BCD	2.736
H4917	75 C	29 AB	137 CDE	131 BCD	5.3 CD	3.61 CD	3.074
I4401	79 B	29 AB	141 AB	154 A	9.0 A	3.69 BCD	3.414
I4403	78 BC	19 B	139 ABC	139 ABC	8.8 A	3.97 A	3.079
I4404	77 BC	33 AB	137 CDE	143 ABC	7.9 ABC	3.88 AB	3.572
Y3000	64 HI	36 AB	130 GH	124 CDE	5.8 CD	3.66 BCD	3.550
Hyola 43	66 FGH	35 AB	129 H	130 BCD	6.9 ABCD	3.66 BCD	3.026
Hyola 60	84 A	27 AB	144 A	140 ABC	8.8 A	N.A.	N.A.
Hyola 61	77 BC	30 AB	139 BC	134 BCDE	9.0 A	3.56 CD	3.230
Hyola 75	79 B	30 AB	140 BC	138 ABCD	8.5 AB	3.61 CD	3.466
Hyola 401	65 GH	35 AB	129 H	119 DE	6.0 BCD	3.94 A	3.588
Hyola 432	70 DE	34 AB	134 EF	140 ABC	8.8 A	3.65 BCD	3.409
Média	71	31	135	132	7.5	3.6	3.225
CV (%)	1	23	1	5	14.3	2.5	14
Pr>F	<0.01	0.10	<0.01	<0.01	<0.01	<0.01	0.19
Correlação com o rendimento de grãos							
r^2	>0.01	>0.01	>0.01	>0.01	(-)0.05	0.06	--
Pr>F	0.90	0.76	0.97	0.84	0.56	0.06	--

Means in each column, followed by the same letter, do not differ among themselves, by Tukey test, at the level of 5% of error probability.
N.A. – not available.

Conclusion

Although bellow zero degree Celsius temperatures were reported during the experiment, soil and climatic conditions resulted in grain yield of 3,225 kg/ha as average for all canola genotypes, a high yield compared to any spring canola genotypes grown in Southern Brazil.

Continuation of such evaluations in different seeding times, and locations, is recommended as seeding earlier than in this study will possibly allow plant growth and development under more favourable environmental conditions for differentiating cultivars on yield potential, the length of the flowering period, and the total cycle among the same genotypes in Uruguay.

Literature references

TOMM, G. O.; GARRAFA, M.; BENETTI, V.; WOLBOLT, A. A.; FIGER, E. **Efeito de épocas de semeadura sobre o desempenho de genótipos de canola em Três de**

Maio, RS. Passo Fundo: Embrapa Trigo, 2004a. 11 p. html. (Embrapa Trigo. Circular Técnica, 17). Disponível em: <http://www.cnpt.embrapa.br/biblio/ci/p_ci17.htm>.

TOMM, G. O.; SOARES, A. L. S.; MELLO, M. A. B. de; DEPINÉ, D. E.; FIGER, E. **Desempenho de genótipos de canola em Goiás, em 2004**. Passo Fundo: Embrapa Trigo, 2004b. 11 p. html. (Embrapa Trigo. Comunicado Técnico Online, 118). Disponível em: <http://www.cnpt.embrapa.br/biblio/co/p_co118.htm>.

TOMM, G. O. **Situação em 2005 e perspectivas da cultura de canola no Brasil e em países vizinhos**. Passo Fundo: Embrapa Trigo, 2005. 21 p. html. (Embrapa Trigo. Boletim de Pesquisa e Desenvolvimento Online, 26). Disponível em: <http://www.cnpt.embrapa.br/biblio/bp/p_bp26.htm>.

TOMM, G. O.; ÖSTERLEIN, N.; FIGER, E. Advantages of growing canola preceeding wheat and related new developments in South America. In: INTERNATIONAL WHEAT CONFERENCE, 7. 2005, Mar del Plata, Argentina. poster.

TOMM, G. O. Canola: alternativa de renda e benefícios para os cultivos seguintes. **Revista Plantio Direto**, v. 15, n. 94, p. 4-8, jul./ago. 2006. Disponível em: <http://www.cnpt.embrapa.br/culturas/canola/canola-rev_plantio_direto2006.pdf>.

Embrapa Trigo

Boletim de Pesquisa e Desenvolvimento Online, 52

Embrapa Trigo
Caixa Postal, 451, CEP 99001-970
Passo Fundo, RS
Fone: (54) 3316 5800
Fax: (54) 3316 5802
E-mail: sac@cnpt.embrapa.br

Service

Comitê de Publicações
Presidente: **Leandro Vargas**
Ana Lídia V. Bonato, José A. Portella, Leila M. Costamilan, Márcia S. Chaves, Maria Imaculada P. M. Lima, Paulo Roberto V. da S. Pereira, Rita Maria A. de Moraes

Referências bibliográficas: Maria Regina Martins
Editoração eletrônica: Márcia Barrocas Moreira Pimentel

TOMM, G. O.; ELIZARZÚ, M. A.; ÁRIAS, G. **Performance of canola genotypes in Tarariras, Uruguay, 2006**. Passo Fundo: Embrapa Trigo, 2007. 14 p. html (Embrapa Trigo. Boletim de Pesquisa e Desenvolvimento Online, 52). Available at: <http://www.cnpt.embrapa.br/biblio/bp/p_bp52.htm>.