CULTIVAR DESCRIPTION

ACS-C12 summer turnip rape

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Falk, K. C. 2010. **ACS-C12 summer turnip rape**. Can. J. Plant Sci. **90**: 345–346. CS-C12 summer turnip rape (*Brassica rapa* L.) is a canola-quality, two-parent population-synthetic (Syn_1) cultivar adapted to the short-season growing areas of western Canada. On average, it yielded 17% more than the Western Canada Canola/Rapeseed Recommending Committee (WCC/RRC) checks over 3 yr of testing and has high seed oil content.

Key words: Turnip rape (summer), synthetic, cultivar description

Falk, K. C. 2010. **La navette ACS-C12**. Can. J. Plant Sci. **90**: 345–346. ACS-C12 est un cultivar de navette (*Brassica rapa* L.) de qualité canola issu d'une population biparentale synthétique (Syn_1). La variété est adaptée à la brève période végétative de l'Ouest canadien. En moyenne, ce cultivar a donné 17 % plus de graines que les variétés témoin du Western Canada Canola/Rapeseed Recommending Committee (WCC/RRC) au cours des trois années d'essai et se caractérise par une forte teneur en huile.

Mots clés: Colza, synthétique, description de cultiva

ACS-C12 summer turnip rape (*Brassica rapa* L.), a canola-quality population-synthetic (Syn_1), was developed at Agriculture and Agri-Food Canada, Beaverlodge Research Farm, AB. It was tested in the short-season growing zones of the WCC/RRC co-operative trials under the experimental designation ACS-C12 in 2006–2008. ACS-C12 was recommended for registration in 2009 after 3 yr of testing. ACS-C12 was issued registration no. 6619 on 2009 Jul. 15 by the Registrar, Variety Registration, Seed Section, Canadian Food Inspection Agency, Government of Canada, Ottawa, ON.

Breeding Methods and Pedigree

ACS-C12 is a two-parent population-synthetic. The Syn_0 is composed of equal proportions of the populations 93-6757 and TR1. 93-6757 was derived from a canola quality breeding population, 89-411, which was derived from a population closely related to cv. Tobin. 89-411 was developed by Dr. D.S. Hutcheson, formerly of Agriculture and Agri-Food Canada, Saskatoon Research Centre (AAFC-SRC). Following four cycles of recurrent selection for superior agronomic performance (vigour, uniformity and straw strength), high seed oil, yellow seed coat colour and low glucosinolate content, the population was selected twice for low erucic acid content using the half-seed technique (Downey and Harvey 1963). Following this, 89-411 went through two cycles of mass selection for improved resistance to white rust Race 7a [*Albugo candida* (Pers.) Kunze], which was carried out in a greenhouse. A minimum of 1000 plants were screened in each cycle. Breeder seed of 93-6757 was produced by bulking seed of 680 zero erucic acid, white rust resistant plants of the population 89-411. Following that, an additional cycle of mass selection (1000 plants) for improved resistance to white rust (Race 7a) was carried out in the greenhouse.

TR1 was derived from a composite of two populations, CompD and CompE. CompD was derived from crosses between Tobin and Echo while CompE from Tobin and Torch (Downey and Klassen 1974). F_2 seed from both populations was bulked and sown in isolation and 3247 single plants threshed individually and subsequently screened for yellow seed coat colour prior to seeding, overall agronomic performance, glucosinolate content, and seed oil and meal protein content. This work was initiated by Dr. D.S. Hutcheson, formerly a breeder at AAFC-SRC and carried out for five cycles of recurrent selection. At the end of each cycle, reserve seed was bulked and used to sow the next cycle of selection. Selections were largely based on agronomic performance and seed coat colour with less emphasis put on glucosinolate content and other quality parameters such as seed oil and erucic acid content. After five cycles of recurrent selection, an equal reserve seed bulk of 55 progeny were composited and sown in isolation and 2000 single plants threshed individually and screened for low glucosinolate content (TesTape method; McGregor and Downey 1975); 475 low glucosinolate progeny were field tested the following year. On the basis of good agronomics and quality, 50 progeny were selected, reserve seed bulked to form a composite for white rust screening (Race 7a). The population (7326 plants) was then screened for resistance to white rust; 1049 were selected, brush pollinated, seed equally bulked from

Table 1. Performance and quality of ACS-C12 in the Western Canada Canola/Rapeseed Recommending Committee private and public co-operative trials, 2006–2008

	Yield (kg ha^{-1}) by year[z]					
Cultivar	2006	2007	2008	Mean	Seed oil[y] (% whole seed)	Protein[y] (% whole seed)
ACS-C12	1852	1973	2322	2103	49.4	23.2
AC Parkland	1558	1461	1921	1680	47.8	23.6
AC Sunbeam	1603	1806	2126	1908	47.5	23.8
SED	110	112	112	67	0.3	0.2
Tests (*n*)	3	6	7	16	13	13

[z]2006 tests grown at Beaverlodge, Ft. Vermilion and Berwyn, AB; 2007 tests grown at Beaverlodge, Ft. Vermilion, Fairview and Hines Creek, AB, and Fort St. John and Dawson Creek, BC; 2008 tests were grown at Didsbury, Fairview, Ft. Vermilion, Westlock, and Penhold, AB, and Prince Albert and Glaslyn, SK.
[y]Data combined over 3 yr. Near-infrared reflectance according to AOCS standard procedure Am 1-92: Determination of oil, moisture and volatile matter, and protein by near-infrared reflectance using a Foss NIRSystems Model 6500 analyzer. Results are reported on a zero moisture basis.

each plant and subsequently screened for low erucic acid. In total, 297 half seeds were selected, intercrossed and bulked. The bulk was then re-analyzed to ensure that it was indeed low erucic, and the same bulk was screened again for resistance to white rust Race 7a. This was done because of the high frequency of resistant plants found in the initial white rust screening. Another screen of 1200 plants for resistance to white rust resulted in 668 selections. An equal bulk of these was subsequently grown in isolation and approximately 300 plants harvested individually. Two hundred and ninety-seven progeny were assessed in a replicated nursery and selections made on the basis of good agronomics and quality. Twenty-three progenies were selected, and reserve seed from each bulked and used to sow a composite crossing block. Approximately 927 single plants were harvested individually, TesTaped for low glucosinolate content and half-seeded to isolate low erucic acid plants. In total, 378 half-seeds were selected, intercrossed and subsequently bulked to form the breeder seed of TR1.

Performance

On average, ACS-C12 yielded 17% more than the mean of AC Parkland and AC Sunbeam over 3 yr of testing (Table 1). It also had 1.8% more seed oil than the checks, but was similar in protein content. ACS-C12 is slightly shorter than AC Parkland and has very good resistance to white rust.

Other Characteristics

Plant Characteristics

Maturity. 87 d, 1 d earlier than AC Parkland, 1d later than AC Sunbeam.
Height. 91 cm, slightly shorter than AC Parkland.
Lodging resistance. Fair, similar to AC Parkland and AC Sunbeam.

Seed Characteristics

Seed colour. Mixed yellow-brown, predominantly yellow.
Thousand-kernel weight. 2.5 g, similar to AC Parkland.
Saturated fatty acid content. 5.4%.
Erucic acid content. 0.3%.
Glucosinolate content. 12.3 μmol g^{-1} whole seed, on a 8.5% moisture basis.

Availability of Propagating Material

The parents of ASC-C12, 93-6757 and TR1, will be maintained by AAFC-SRC, 107 Science Place, Saskatoon, Saskatchewan, Saskatchewan, Canada S7N 0X2.

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