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Authors: Bing, Deng-Jin, Beauchesne, Don, Cuthbert, Richard, and Naeem, Hamid

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Cultivar description

AAC Aberdeen field pea

Deng-Jin Bing[a], **Don Beauchesne**[a], **Richard Cuthbert**[b], **and Hamid Naeem**[c]

[a]Agriculture and Agri-Food Canada, 6000 C&E Trail, Lacombe, AB T4L 1W1, Canada; [b]Semiarid Prairie Agricultural Research Centre, Agriculture and Agri-Food Canada, PO Box 1030, 1 Airport Road, Swift Current, SK S9H 3X2, Canada; [c]Research Farm—Indian Head, Agriculture and Agri-Food Canada, PO Box 760, 1 Government Road, Indian Head, SK S0G 2K0, Canada

Corresponding author: **Deng-Jin Bing** (email: Dengjin.bing@agr.gc.ca)

Abstract

AAC Aberdeen is a semi-leafless, yellow cotyledonary field pea (*Pisum sativum* L.) cultivar developed at Lacombe Research and Development Centre, Agriculture and Agri-Food Canada, Lacombe, AB, Canada. It has a maturity of 98 days, 1000-seed weight of 243 g, and a lodging score of 3.3 on the scale of 1–9. The seed crude protein content of AAC Aberdeen is 20.1%. AAC Aberdeen is resistant to powdery mildew (caused by *Erysiphe pisi* D.C.) and moderately susceptible to mycosphaerella blight (caused by *Mycosphaerella pinodes*) and *Fusarium* root rot (caused by *Fusarium avenaceum* (Fr.) Sacc.).

Key words: field pea, *Pisum sativum*, cultivar description, AAC Aberdeen

Introduction

Field pea (*Pisum sativum* L.) is the most widely grown pulse crop in Canada, and Canada has been leading the field pea production and export in the world since middle of 1990s (Pulse Canada 2021). Developing improved field pea varieties for Canadian pulse producers is the mandate of the field pea breeding program of Lacombe Research and Development Centre (LRDC), Agriculture and Agri-Food Canada (AAFC). In this article, we describe AAC Aberdeen, a yellow field pea variety registered on 14 April 2019 at the Variety Registration Office of Canadian Food Inspection Agency. The registration number of AAC Aberdeen was 8720.

Pedigree and breeding methods

AAC Aberdeen was developed from the cross Agassiz//Polstead/CDC715S-4. Agassiz was a yellow field pea variety developed at AAFC (Bing et al. 2006). Polstead, a registered yellow pea variety in Canada, was developed by Innoseeds B.V., Vlijmen, The Netherlands. CDC715S-4, derived from the cross 92-46Y-PMR-1Y/MP1566, was a yellow pea breeding line developed at the Crop Development Centre, University of Saskatchewan. The breeding method for AAC Aberdeen was pedigree selection in combination with a modified single-seed descent for generation advance.

The cross Agassiz//Polstead/CDC715S-4 was made in the greenhouse in the winter of 2006/2007 at AAFC LRDC. The F_1 generation was grown in the field in Lacombe, AB in the summer of 2007 and harvested in bulk. The F_2 generation was grown in the field in 2008 in Lacombe, AB. Two pods per plant were harvested from a total of 150 plants. The F_3 generation was grown in a winter nursery in Brawley, CA, USA from November 2008 to March 2009, and two to four pods per plant were harvested from a total of 133 individual plants. Two seeds from each of the harvested plant were planted into the F_4 nursery in Lacombe, AB in the summer of 2009. One pod was harvested from each plant from a total of 224 F_4 plants. The F_5 generation was grown in the winter nursery in Brawley, CA, USA in the 2009/2010 winter and a total of 81 individual plants were harvested. In the summer of 2010, the seeds of harvested plants from the F_5 generation were bulk-planted in the F_6 nursery in the field in Lacombe, AB, and 256 single plants were harvested. The harvested seeds from each plant were kept until 2012 and planted in 1 m^2 plot in the field in Lacombe, AB, and a total of 128 lines were selected on the basis of visual evaluation of maturity, pod canopy, and lodging resistance. The selected lines were evaluated in replicated preliminary yield tests in 2013 in Lacombe, AB. One of the lines, P0730-118, in the preliminary yield test-3 was the top yielder (4470 kg ha^{-1}) in the test and yielded 10% higher than the check variety Agassiz. Line P0730-118 was advanced to the multilocation yield test Net-1 in 2014 at six locations (Barrhead, DePauw, AAFC Lacombe, St. Albert, and Vegreville in Alberta and Melfort, SK). In the Net-1 test, P0730-118 was the top yielder (8059 kg ha^{-1}) and yielded 13% higher than Agassiz. It had a maturity of 102 days, a lodging score of 4.1 on the scale of 1–9, and 1000-seed weight (TSW) of 238 g. P0730-118 was selected as a candidate for Western Canada Field Pea Cooperative Variety Registration Test (Pea COOP Test). It was planted in two 1 m × 15 m strips in the field in Lacombe, AB in 2015 for seed multiplication and purification by roguing off-type plants. Line P0730-118 was entered into the 2016 Pea COOP Test and grown at 15 locations. The test locations were Sutherland, Saskatoon, Scott, Limerick, Swift Current, Melfort, Kamsack, and Indian Head in Saskatchewan; Brooks, Barrhead, Morinville, Vegreville, and

Table 1. Agronomic performance, seed quality, and disease resistance of AAC Aberdeen and the check cultivars in the 2016–2017 Field Pea Cooperative Registration Test.

	Yield (kg ha^{-1})	DTM (days)	Height (cm)	PHL[a]	TSW (g)	Shape[b]	SCB (%)	Protein (%)[c]	MB[d]	FRR[e]	PM[f]
CDC Amarillo (CK)	4175	97	89	3.2	225	2.5	12	21.2	5.1	6.1	0
AAC Lacombe (CK)	4104	96	87	3.5	259	2.5	14	20.4	5.0	5.5	0
AAC Aberdeen	4357	98	89	3.3	243	2.7	11	20.1	4.5	5.2	0
LSD ($p = 0.05$)	142	2	3	0.3	5	0.1	7	0.5	0.9	0.8	0
Location-year	23	23	19	22	24	18	17	17	6	1	1

Note: DTM, days to maturity; TSW, thousand-seed weight; SCB, seed coat breakage .
[a]Preharvest lodging score: 1 = upright; 9 = completely prostrate.
[b]Seed shape: 1 = round; 5 = cubed.
[c]Crude protein content of seeds (%) determined by the NIR method at 0% moisture basis using a FOSS near-infrared spectrophotometer model DS 2500.
[d]Mycosphaerella blight score: 0 = no disease; 9 = whole plant severely blighted.
[e]*Fusarium* root rot severity score: 1 = no disease; 7 = tap root completely decayed.
[f]Powdery mildew score: 0 = no disease; 9 = whole plant severely mildewed.

Lacombe in Alberta; Brandon, MB; and Fort St. John, BC. Line P0730-118 was the top yielder (4847 kg ha^{-1}) among the first-year Pea COOP Test entries. It was tested in 2017 Pea COOP Test and grown at the above locations. It was recommended for registration by the Prairie Recommending Committee for Pulse and Special Crops in 2018 on the basis of its performance in the 2016–2017 Pea COOP Tests. Line P0730-118 was registered as variety AAC Aberdeen at the Variety Registration Office of Canadian Food Inspection Agency on 14 April 2019.

Performance

AAC Aberdeen yielded 4357 kg ha^{-1} on the average over 23 location-years (Table 1), 4% higher than the check cultivar CDC Amarillo and 6% higher than AAC Lacombe. AAC Aberdeen had maturity of 98 days and a preharvest lodging score of 3.3 on a 1–9 scale, similar to the check cultivars.

Other characteristics

AAC Aberdeen was semi-leafless and has determinate growth. The plant height of AAC Aberdeen was 89 cm. It had white flowers, yellow cotyledons, and opaque seed coat. The seed size of AAC Aberdeen, represented with TSW, was 243 g, significantly larger than the seed size of CDC Amarillo, but significantly smaller than that of AAC Lacombe (Table 1). The seed shape of AAC Aberdeen was slightly less spherical than that of the check cultivars. AAC Aberdeen had a seed coat breakage of 11%, similar to the check cultivars. AAC Aberdeen had a seed crude protein content of 20.1%, similar to the check cultivar AAC Lacombe, but 1% lower than CDC Amarillo.

As part of the Pea COOP Tests, AAC Aberdeen was evaluated for its reactions to mycosphaerella blight (caused by *Mycosphaerella pinodes* (Berk. & Blox.) Vestergr.) in disease nurseries in Sutherland, Saskatoon, SK, Morden, MB, and Lethbridge, AB in 2016 and 2017 at a total of six location-years, to *Fusarium* root rot (predominantly caused by *Fusarium avenaceum* (Fr.) Sacc.) in Lethbridge, AB in 2017, and to powdery mildew in the disease nursery in Morden, MB in 2016. AAC Aberdeen was moderately susceptible to mycosphaerella blight but resistant to powdery mildew, similar to the check cultivars. It was also moderately susceptible to *Fusarium* root rot, but slightly less susceptible than CDC Amarillo (Table 1).

Maintenance and distribution of pedigreed seed

Breeder seed of AAC Aberdeen was derived from a single line in the F_9 generation, and is maintained at AAFC Research Farm, Indian Head, SK S0G 2K0, Canada. Exclusive rights for the production and sale of the pedigreed seed for commercialization have been awarded to Alliance Seeds Corp. (2400-333 Main Street, Winnipeg, MB R3C 4E2, Canada).

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Data availability

All data supporting the findings of this study are the property of the Government of Canada, which can be accessed under the data access policy of the Canadian Government.

Author information

Author ORCIDs

Deng-Jin Bing https://orcid.org/0000-0001-9698-5008

Competing interests

There is no competing interests for all authors.

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