

Development of Banjo Field Pea for Organic Agriculture

Steve Zwinger, Steve Schaubert, Frank Kutka, Blaine Schmaltz, and Byron Lannoye

A recent finding from the State of Organic Seed 2016 by the Organic Seed Alliance (OSA) illustrates that “more farmers believe organic seed is important to the integrity of organic food production and that varieties bred for organic production are important to the overall success of organic agriculture”

Organic agriculture poses unique challenges for the organic farmer with one of the challenges being the availability of certified organic seed or seed developed in certified organic fields. Recent surveys by OSA illustrate the use of certified organic seed by certified organic farmers tends to be low with percent usage varying by crop type. Results also demonstrate that farmers are attempting to source more organic seed, with more than 30% of farmers attempting to use more organic seed than they were three years ago. Although the use of organic seed is increasing, there are a number of reasons why organic farmers are not using organic seed including variety choice, insufficient quantities, lack of desirable traits, and price. Overall, the organic seed supply is not keeping up with the growth in organic sales with organic farmers still relying on conventionally-produced seed.

The USDA's National Organic Policy (NOP) requires the use of organic seed when commercially available. When the NOP began, the organic seed sector rarely existed and is continually growing to meet the demand of organic production. Currently there are few public and private breeding programs focusing on the development of organic seed. A basic principle in plant breeding is “breed and select in the environment of intended use,” and for organic agriculture that means selection and development in certified organic fields.

The CREC has a history of variety evaluation, development, and increase. The center has worked with other University and private plant breeding projects to aid in this mission. The CREC has partnered with industry in a number of ways to assist in variety development. One unique partnership has been in development of a local/regional pea seed industry. We have aided in varietal development from screening experimental cultivars to increasing foundation seed.

During the past four (2013-2016) growing seasons a new collaborative effort with field pea was formed focusing on varietal development in certified organic fields. The CREC partnered with industry, non-governmental organizations (NGOs), and certified seed growers to aid in the development of an organic pea variety.

Pulse USA (PUSA), a farmer/member-owned seed company that specializes in pulse crops, and Blaine's Best Seeds (BBS), a double certified (state and organic) seed grower, entered 10 to 13 experimental cultivars from private breeding programs into the CREC organic field pea variety trials. The trial evaluated their performance as a certified organic variety for an eventual exclusive release to organic farmers. Two NGOs were also involved in the project: the Northern Plains Sustainable Ag's Farm Breeding Club (FBC), whose members assist in the development of organic seed through research and education; and the Foundation for Agricultural and Rural Resources Management and Sustainability (FARRMS), a non-profit educational organization that provided partial funding for variety testing.

The ultimate goal of the project after the evaluation of experimental cultivars is complete will be to select the best line adapted to an organic environment then secure seed and rights to grow and sell seed. The seed grower will then grow the varieties in a certified field making organic pea seed available to meet the growing demands of organic agriculture.

After four years of testing peas in an organic environment, an experimental cultivar was chosen to be released as an exclusive variety for organic production. Banjo, formerly named PUSA0814, will be one of the first organically-developed field pea varieties that will be released by Pulse USA. Banjo is a yellow field pea with good agronomic traits that include high yield and tall plant height with very good stand ability. Banjo is a medium- to late-maturing variety with a medium seed size. Agronomic traits from selected varieties averaged from 2014-2016 are presented in Table 1. Complete data sets from the 2013-2016 organic variety trials are available in past CREC annual reports (volumes 54-57) or the CREC variety trial website.

Field Pea - Organic, 2014-2016	Carrington
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Variety/type	Days to Bloom	Days to PM	Plant Height	Plant Lodging	Seed Yield
			inch	0-9	bu/ac
Yellow type					
Banjo	54.0	87.9	31.0	2.1	49.7
Nette	53.0	84.2	25.6	2.6	50.3
DS Admiral	53.4	84.1	25.8	3.2	39.7
Agassiz	54.1	89.8	27.7	3.6	45.0
Green type					
CDC Striker	54.9	87.6	24.8	5.3	39.8
Cruiser	53.8	87.4	24.5	4.9	37.3

The 2013 and 2014 growing seasons were very favorable for the performance and evaluation of field pea as compared to the 2015 and 2016 growing seasons, which both experienced hail damage in the flat pod stage. Yields from these trials illustrate this well with 56.5 bu/ac trial average for 2013-2014 as compared to 33.3 bu/ac trial average for 2015-2016.