

# FIELD PEA PLANTING

## In South Carolina, USA



### WHY ORGANIC FIELD PEAS?

U.S. certified organic agriculture production has increased since the introduction of the Organic Foods Production Act of 1990. The development and selection of nutritionally superior organic field pea cultivars will bring significant economic value (premium price for organic commodity) and agricultural sustainability benefits (N benefit) to organic growers as well as health and nutritional value (reduced obesity and malnutrition) to end users. Increased inclusion of pulse crops in organic cropping rotations will also provide significant ecological benefits, such as effective N and P fertilizer management, and allow better nutrient supply through improved agronomic practices. Agriculture has been the main driver of South Carolina's economy since the 1600s. Corn, cotton, soybean, peanut, and wheat are the major field crops grown in South Carolina due to their adaptability to a southern climate. Currently, SC is home to approximately 25,000 farms totaling 4.9 million acres in agricultural production. South Carolina growers are exploring options to incorporate organically grown, new specialty crops, including field pea (*Pisum sativum* L.), into their existing cropping systems.

### WHY DOES THE NUTRITIONAL VALUE OF FIELD PEA MATTER?

Field pea is an excellent source of prebiotic carbohydrates, protein, dietary fiber, vitamins, and minerals. Prebiotic carbohydrates are important components of healthy diets, supporting healthful hindgut microflora to combat obesity and overweight. Healthy human gut microbiota decreases host obesity, inflammatory bowel diseases, and colorectal cancers and also modulates immunological functions. Due to the dietary nature of these metabolic disorders, solutions will necessarily have a focus on diet. *A cup of pulses a day provides 13-15 g of prebiotic carbohydrates and a range of micronutrients.* Pulses, *especially field pea or "poor man's meat,"* are low in fat (1g/100g) and provide significant quantities of dietary protein (20-25 g/100 g) and a range of micronutrients. For example, a 50g serving provides 3.7-4.5mg of iron, 2.2-2.7mg of zinc, and 22-34 µg of selenium and is very low in phytic acid (2.5-4.4 mg/g), which decreases the bioavailability of minerals. With increasing societal nutritional demands for organically grown grains, biofortification brings organic plant breeding and nutritional sciences together to work on the persistent problems of human nutrition.





## FIELD PEA PLANTING MATERIALS

25 elite field pea cultivars currently in production and 19 advanced breeding lines from the USDA-ARS pulse breeding program were planted at two on-farm locations in SC. The commercial field pea cultivar 'Hampton' was used as a blanket cultivar to assess N benefit to a subsequent sorghum crop.

## ELITE CULTIVARS

- Hampton, DS Admiral, Delta, AAC Comfort, AAC Carver, AC Agassiz, AC Earlystar, CDC Amarillo, CDC Inca, CDC Saffron, CDC Spectrum, Jetset, Nette 2010, SW Midas, Korando, Durwood, Mystique, SW Arcadia, LG Koda, Matrix, CDC Striker, Banjo, Fiddle, Flute.

## ADVANCED BREEDING LINES

- PS14100079, PS08101022, PS1410B0003, PS16100085, PS01100925, PS08101004, PS16100127, PS16100096, PS12100047, PS16100086, PS1410B0073, PS05100735, PS03101445, PS1410B0065, PS1410B0006, PS1514B0002, PS08100582, PS16100003, PS16100038.

Seeds for all of the above were obtained from the Washington State Crop Improvement Association (Pullman, WA), Pulse USA (Bismarck, ND), Meridian Seeds (Mapleton, ND), and the USDA-ARS Pulse Crop Breeding Program (Pullman, WA). For genetic selections, 299 accessions from the USDA-ARS Pea Single Plant Plus Collection (PSPPC) were planted at the Clemson University Student Organic Farm and Pee Dee Research and Education Center, Florence, SC.



## FIELD PREPARATION

- ALL field locations are USDA Certified Organic fields.
- Fields were conventionally tilled using a disc harrow prior to planting.
- All fields were smoothly levelled before planting.
- Border plots were planted first to eliminate the “edge” effect.
- Each field plot was marked (barcoded) using weather-proof field tags.
- Soil samples were taken from each location at 0-6" depth prior to planting.
- No irrigation was provided.



## TWO ON-FARM LOCATIONS:

- WP Rawl and Sons (Pelion, SC; sandy loam soils) - <https://www.rawl.net/>
- Carolina Bay Farms (Hopkins, SC; sandy loam soils) - <http://www.carolinabayfarms.com/>

## TWO RESEARCH FARM LOCATIONS:

- Calhoun Field Laboratory (Clemson, SC; clay loam soils) - <https://www.clemson.edu/cafls/research/organicfarm/>
- Pee Dee Research and Education Center (Florence, SC; clay loam soils) - <https://www.clemson.edu/cafls/research/peedee/>



## PLOT SIZE AND SEEDING RATES:

- Using a cone plot planter, cultivars were sown in 1.4×6 m plots (8.4 m<sup>2</sup>) (4.6×19.7 ft; 90.4 ft<sup>2</sup>) containing 7 rows spaced 20 cm (7.9 in) apart, with a seeding depth of 5-7 cm (~2-3 in).
- A conventional grain drill was used for “Hampton” with a row spacing of 15.2 cm (6 in) and a seeding depth of 5-7 cm (~2-3 in).
- The PSPPC accessions were sown in 1.2 m (4 ft.) plots containing two rows spaced 38 cm (15 in) apart, with a seeding depth of 5-7 cm (~2-3 in).
- USDA certified organic inoculant was purchased from Peaceful Valley Farm Supply, Inc.
- The inoculant rate was 1.4 g per lb. of seed (2.5 oz. per 50 lbs. of seed).
- Elite Cultivars and Advanced Breeding Lines seeding rates were 90 seeds/m<sup>2</sup>.
- Hampton was planted at a rate of 120 lbs. per acre.

## PLANTING DATES

### *Elite Cultivars & Advanced Breeding Lines:*

- WP Rawl & Sons – January 29, 2019
- Carolina Bay Farms – January 31, 2019
- Calhoun Field Laboratory – February 4, 2019

### *Commercial Cultivar (Hampton):*

- WP Rawl & Sons – January 29, 2019
- Carolina Bay Farms – February 1, 2019
- Calhoun Field Laboratory – February 5, 2019

### *Pea Single Plant Plus Collection (PSPPC):*

- Pee Dee Research and Education Center – February 6, 2019
- Calhoun Field Laboratory – February 7, 2019



## AUTHORS

- Tristan Lawrence: Field Research, Pulse Quality and Nutrition (Nutrigenomics), Department of Plant & Environmental Sciences, 270 Poole Agricultural Center, Clemson University, SC 29634-0310; [tjlawre@g.clemson.edu](mailto:tjlawre@g.clemson.edu).
- Dr. Rebecca McGee: Pulse Breeder, Research Geneticist (Plants), Johnson Hall, USDA, Washington State University, Pullman, WA; [rebecca.mcgee@ars.usda.gov](mailto:rebecca.mcgee@ars.usda.gov).
- Dr. Dil Thavarajah: Associate Professor, Pulse Quality and Nutrition (Nutrigenomics), Department of Plant & Environmental Sciences, 270 Poole Agricultural Center, Clemson University, SC 29634-0310; [dthavar@clemson.edu](mailto:dthavar@clemson.edu).

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- Clemson researchers optimizing pulse and cereal crops for organic production in SC: <http://newsstand.clemson.edu/mediarelations/clemson-researchers-optimizing-pulse-and-cereal-crops-for-organic-production-in-s-c/>
- South Carolina Department of Agriculture: <https://agriculture.sc.gov/>