

# Irrigation effects on the production of different Pea varieties

## Project duration

2018

## Objectives

To find out how irrigation affects phenology and yield of different pea varieties.

## Collaborators

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## Results

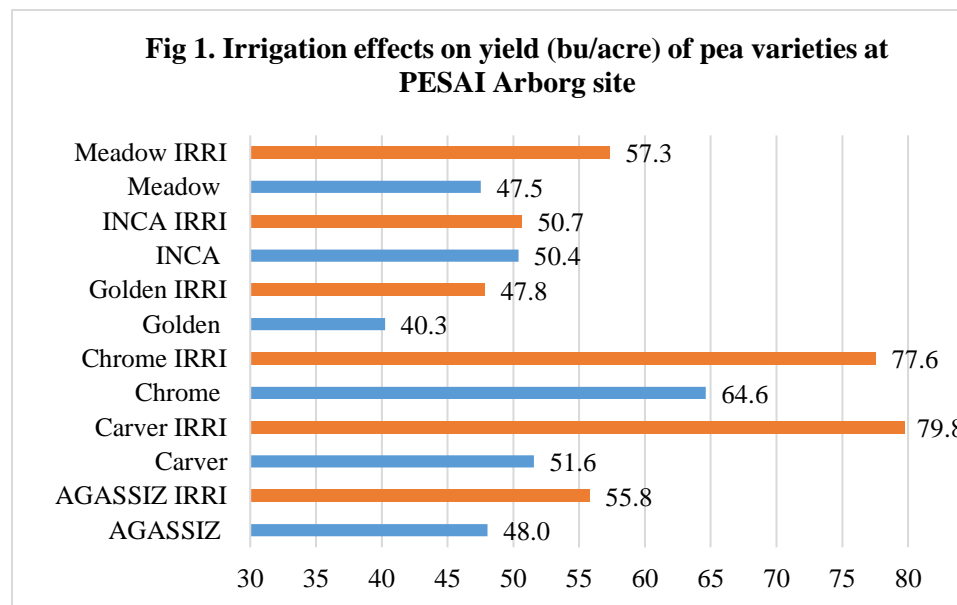
Irrigation on the plots started when the peas were almost two weeks old. Although irrigation showed chlorosis in some varieties during early phase of growth, but it did not cause adverse effect on yield. Irrigated plots had significantly higher yield than non-irrigated pea plots (Table 1). Overall, pea varieties were taller and they matured two days earlier when grown with irrigation. Irrigation did not result in increased lodging in pea plots.

Table 1. Effect of irrigation on various growth parameters and yield of peas at Arborg site.

Treatment*	Plant stand (plants/ft <sup>2</sup> )	Days to Maturity	Plant height (inches)	Lodging**	Yield (bu/acre)
Irrigated Peas	8.7	83.3	27.3	1.6	61.5
Non-irrigated Peas	9.6	85.3	22.9	1.5	50.4
Significant Difference	No	Yes	Yes	No	Yes
P value	0.187	0.005	<0.0001	0.144	<0.0001
CV (%)	20.1	2.37		14.2	12.9

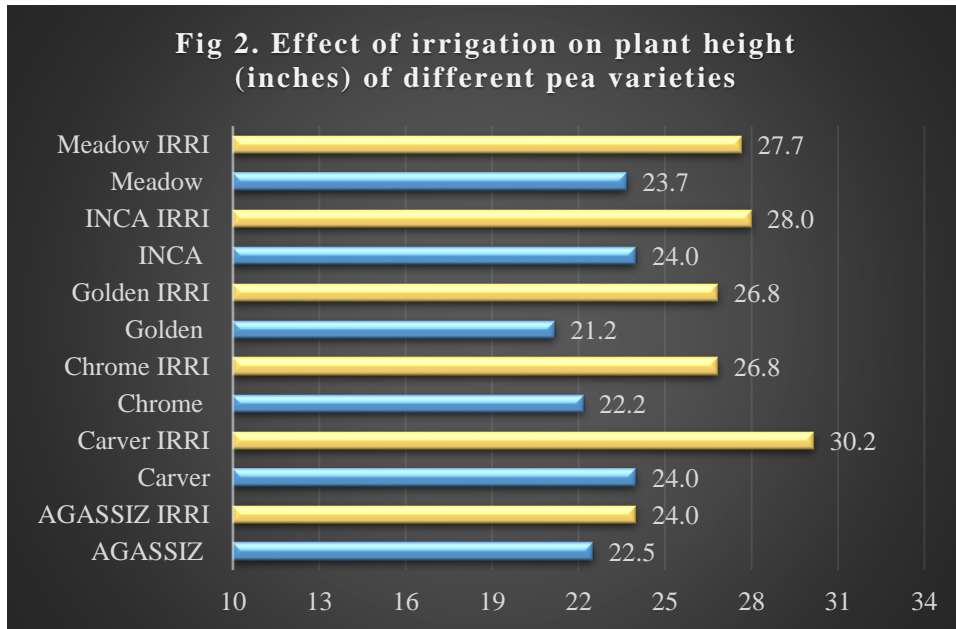
\*Mean of all six pea varieties tested.

\*\*Lodging scale: 1-5; 1 = upright, 5 = flat



Irrigation-variety interaction was not significant for yield (Figure 1). Most pea varieties had higher yield when grown with irrigation. Pea variety Carver had the maximum yield benefit (35% more yield) with irrigation, whereas irrigation did not have any effect on yield of pea variety Inca.

Pea varieties differed in yield irrespective of whether they were grown under irrigated or non-irrigated field conditions. Both Carver and Chrome had significantly higher yield than all other pea varieties, when evaluated with irrigation. Chrome had the maximum yield in non-irrigated trial.



Irrigation – variety interactions were significant for plant height and all pea varieties had higher plant height when grown with irrigation (Figure 2).

### Project Findings

The summer during 2018 was exceptionally drier at Arborg site. Pea varieties tested in these trials actively grew between June 1 – Aug 30 and Arborg got only 72 % of the normal rainfall during this period. On the other hand, this site received more heat than usual (Growing degree-days – 109% of the normal). Irrigation actually benefitted peas in terms of yield rather than causing any stress in such a dry and hot environment. A total of 14.5 inches of irrigation were applied over seven weeks and the maximum irrigation given per week was three inches. Deficit soil moisture and probably high evapotranspiration resulted in high water demand of the crop and irrigation applied at regular intervals helped in meeting this demand.

Pea varieties varied in their response to irrigation. Inca was the only variety, which did not show any response to irrigation applied. To create excess moisture conditions in a drier year, a more comprehensive irrigation plan is needed in future evaluations. Probably flooding peas continuously for few days will be a more realistic approach in a drier year.

### Background/References/Additional Resources

Peas perform well in relatively dry soil conditions and are susceptible to diseases under excess moisture conditions. Under optimum soil moisture conditions, peas will use 12-15 inches of water (McKenzie and Woods, 2011). Cannell and Jackson (1981) reported that peas waterlogged for continuous five days at 4-5 leaf and pod-filling stage suffered most yield loss. However, when peas were grown under excess moisture for two days, they did not suffer any yield loss.

If soil is deficit in moisture, peas can be successfully grown under irrigation. Early maturing, short-vined varieties are best suited to this type of production. Yields can be much higher than dry land production. Pezeshkpour et al. (2008) reported that supplemental irrigation has increased the seed yield and the biological yield of peas.

In the current study, we evaluated six commonly grown pea varieties under irrigated and non-irrigated conditions to see their response.

McKenzie R and S Woods (2011) Crop water use and requirements. Government of Alberta, Agri-facts.

Cannell, RQ and Jackson MB (1981) Alleviating aeration stresses in modifying the root environment to reduce crop stress. GF Arkin and HM Taylor (Eds.) ASAE Monograph, Pp 141-192.

Pezeshkpour P, Mousavi SK, Shahabu SH, Kalhor M, Khouregami A (2008) Effects of supplemental irrigation and crop density on dryland pea (*Pisum sativum* L.) production in Hamadan province. Iranian J. Agric., 39(2): 389-397.

## **Materials & Methods**

*Experimental Design* – Randomised block design with three replications

*Treatments* – Six pea varieties – Meadow, Inca, Carver, Agassiz, Golden, Chrome were evaluated under irrigated and non-irrigated conditions. A total of 14.5 inches of irrigation were applied to irrigated plots between June 14-July 27 in addition to natural rainfall.

*Plot size* – 5.75m<sup>2</sup>

*Data collected* – plant stand, plant height, lodging, days to maturity, yield

### ***Agronomic info***

*Stubble, soil type* – Fallow, heavy clay

*Fertilizer applied* – Soil nutrient levels (lbs/acre): N – 246, P – 36, K – 740

P – 20lbs/acre was applied at seeding.

*Pesticides applied* – Basagran Forte @ 0.9L/acre on June 18

*Seeding/harvesting date* – May 23 / Sep 4