Dry matter accumulation and harvest index in varieties of canola, mustard and turnip crops under appropriate and late planting dates

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Abstract: In order to determine the accumulation of dry matter and harvest index, experiment with different varieties of canola, mustard and turnip crops was done in Gonbad city. Mustard crop genotypes, including genotypes G-98, Bared 1, two genotypes turnip Rainbow and candle and four Canola hyolla 401, valves, RGS003 and Select 4 (a cross between canola and mustard crops), respectively. Experiment in a randomized complete block design in three replications during 2009-2010 and in two different planting dates (the second half of November and December) were performed. The results showed significant differences between genotypes shoot dry matter accumulation at the beginning of grain filling, shoot dry matter accumulation at the time of their maturity and harvest index. Delaying planting these traits also showed a decreasing trend from it. On the first sowing dry matter content in the grain filling, shoot dry matter at the time of maturity and harvest index equal to 10740, 12376 kg per hectare and 20.3%, respectively. In the second planting date, respectively, the average of these traits in 9053, 10188 kg per hectare and 21.6%, respectively. The effect of genotype was significant on all traits. Harvest index Hyola401 with an average of 25.9 percent of the maximum amount and genotype candle with an average of 4.17 percent was the lowest amount.
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1. Introduction.

The need to import most of edible oil consumption in the country and the continuation of this trend, the need to assess the potential and comprehensive planning for cultivation of oilseeds has emphasized more than ever. We also factor in promoting self-sufficiency in the production of edible oil is needed for the country to become a national determination. Oilseed crops after the second are the world's food supply. In addition to these products rich in fatty acids, proteins with one another. Among oilseeds, oilseed rape (Brassica napus L.) with other Brassica species, as one of the most important oil crop in the world are raised.

Winter rapeseed in the early stages of the cold winter and the selection of the optimum planting date can plant in a rosette strong help to produce maximum yield and maximum resistance to adverse environmental factors (Ahmadi and Javidfar, 1998). In general, shoot dry matter production rate of rape in the first, but after the high canopy closure and then aging the leaves during grain filling it (Walton et al, 1999). Dry matter yield potential depends not only produce, but also to the efficient transfer of dry matter accumulation is dependent on seeds (Ehdaei and Viinz, 2001). Rice, Kumar and colleagues (2006) showed that in terms of dry matter accumulation and transfer it to the seed, there is a difference between locations and different years. He said that in places the plant in flowering stage and then be faced with drought, dry matter production was not increased during flowering to maturity.

Materials and methods.

To evaluate changes in dry matter and harvest index canola varieties, mustard and turnip crop experiment in a randomized complete block design in three replications during 2009-2010, in Agricultural Research Station of Gonbad stations affiliated to Golestan Research Center of Agriculture and Natural Resources came into force. Agricultural Research Station dome on the divided Mediterranean climate with warm and semi-dry coupons. Its height of 45 meters above sea level and its geographical coordinates are 55° 12' east longitude and 37° 16' minutes north latitude. Mustard crop genotypes,

including genotypes G-98, Bared 1, two genotypes turnip Rainbow and candle and four Canola hyolla 401, valves, RGS003 and Select 4 (a cross between canola and mustard crops), respectively. In two separate planting date (the second half of the second half of November and December) were performed. Before running the tests, in the land which for this purpose is considered to be soil samples from a depth of 30 cm from the surface of the soil to determine nutrient in the soil preparation and the Laboratory of Soil and Water Research Center for Agriculture Research Golestan Province natural resources was submitted on the basis of the results, the required amount of fertilizers was determined. To ensure access to the plant of interest (one million plants per hectare by planting 5 × 20 cm), at planting more than enough seed and then plant establishment, at the time of thinning (step 2 to 4 leaf stage) are the plants in each row. Each plot or experimental treatments consisted of 5 planting line with a length of 5 m. Distance between treatments a meter (5 Planting line) and the distance between repetitions 3 meters were considered. Air dry matter by measuring the dry matter of 10 plants randomly shoot at the beginning of grain filling and maturity were determined. Plant that was on the ground floor after 48 hours and put them in the oven at 72 °C, the total weight of dry matter, shoot them as order and then turned kg per hectare. Harvest index divided into above-ground dry matter yield was calculated at physiological maturity. At the end of the SAS statistical software for simple and compound analysis of variance was used. The mean data on LSD least significant difference test was evaluated.

Results and discussion.

The amount of dry matter accumulation in the grain filling traits in canola is in the performance. It is reported that the dependence of grain yield in dry matter production in flowering time increased late planting dates and it is also more swing early planting dates (Habkoot, 1997). In this experiment, shoot dry matter in the grain filling delay in planting at the level of one percent and five percent were in genotype. So that the comparison showed that the average of the first sowing date with an average of 10740 kg per ha and second sowing date with an average of 9053 kg ha dry matter in the least amount of grain filling, respectively. Reduced dry matter production with delay in planting canola in other studies conducted in the dome area is also shown. Faraji (2008) showed that temperatures at the end of the growing season in late planting dates, significantly decreased shoot dry matter, harvest index and thus reduce the yield will be reduced. In their study Hyola401 better yield than RGS003 was only due to higher harvest index and two varieties of dry matter accumulation in shoots than seeds were not significantly different.

Genotypes showed that genotype select 4 (fourth-generation confluence of mustard and rapeseed crops) with an average of 10540 kg per hectare and genotype with an average of 9263 kg ha^{-1} is turnip in order from highest to lowest and had this trait. The average dry matter at the time of physiological maturity in the first planting date 12376 kg per hectare and on the second crop 10188 kilograms per hectare. Genotypes studied in this experiment both in terms of the quality differences were significant. The highest amount of dry matter (11735 kg) of genotype G -98 and lowest (10557 kg ha) belonged to the candle.

Effect of planting date harvest index was statistically significant. Second and first planting date had the highest and lowest harvest index. It seems the delay in planting to produce enough leaf area, short stem and drop branching and thereby reduce the production of juice processed in the pod, resulting in reduced dry matter accumulation, grain yield and reduction in harvest index. Late planting a huge impact on the division of dry matter in the reservoirs of plant and reduces economic efficiency of assimilate into the grain. Higher plant yield that can be achieved with a higher dry matter. Significant effect of genotypes showed that different genotypes of the different characters, so that the genotype hyolla 401 index picked up 25.8 percent and 17.4 percent in genotype candle.

The results of this study showed that canola plants' ability to implement critical stages of growth such as flowering period and filling with non-stress conditions during the growing season can cause the plant to flee from drought and heat stress at the end of the growing season resulting in increased biomass and grain yield. In this study, delayed planting of canola in January led to critical periods such as flowering and grain filling high temperatures at the end of the growing season, resulting in dry matter and harvest index decreased.

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