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Research Article

INVESTIGATION SOME IMPORTANT AGRONOMIC TRAITS OF INTERNAL AND EXTERNAL RAPESEED CULTIVARS THROUGH DECOMPOSING MAIN COMPONENTS

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ABSTRACT
To grouping rapeseed internal and external cultivars and based on experimental traits in 2010 in research field of agriculture and natural resource, the experiments were conducted in Ardabil province in Mogan (Pars Abad). In this research, traits such as begin of flowering, days to maturity, 50% flowering, days to the end of flowering, number of pods per plant, number of seeds per pod and weight of 100 seeds were measured. In composing to components, 3 components with high Eigen values were selected and 75.9% of first analysis of data was included. Based on analysis results to components, the coefficients of common factors in many traits are high. These results showed that the selected numbers of factors is appropriate and selected factors can justify the changes of traits, Eigen values of main first, second, third and fourth components were higher than 1 and they were respectively 2.622, 1.912, 1.30 and 0.9917 and they were in total 75.9% of all variances of variables. The results showed that in formation of first component, traits of flowering length period, the number of pods per plant and height of pod had the highest positive factor, in other word, selection based these tall cultivars, with the period of flowering and number of pods per plant in top plant will be selected.

Keywords: *Rapeseed, Internal and External Cultivars, Grain Yield, Decomposition to Components*

INTRODUCTION
Rapeseed (*Brassica napus*) is the most important source of vegetable oil in Europe and third oil plant in the world after soya and oil palm (Fao, 2007).
New seed varieties typically contain 40-45% oil which is the raw material for most products such as industrial and hydraulic oils, detergents and soap and bio-degradable plastic. After extracting remained meal oil which contains 44-88% protein with high quality, it is used for livestock feeding.
In addition to nutritional and industrial applications, rapeseed has a drug application. The powder of rapeseed is used for cancer treatment and its oil is used with salt for massage therapy and skin strengthening (Freidt *et al.,* 2007). Grain yield is a complex characteristic which is influenced by a number of physiological and morphological processes and environmental conditions, genetic structure of plant and their interaction effect influences on crop plants (Monneveux and Belhassen, 1996).
According to Bouchereau *et al.,* (1996), in rapeseed, the performance and drought tolerance is controlled through separated gene places. So modification for drought tolerance includes identification and transferring control genes.
Physiological traits are involved in drought tolerance and so they can increase performance and creating appropriate crop cultivars, indirectly.
Controlling genes of performance components may have severe effect or it can be a result of plio therapy of different genes, so, when selection is done on each of the performance components in a special population, its negative or positive reactions can be seen on other components (Kjear and Jensen, 1996).
Decomposition to components is one of the effective statistical methods to reducing a number of correlated variables to a few numbers of main assumed factors (Moghadam *et al.*, 2009).
Decomposition to components is used effectively to understand the relation and structure of performance components and morphological traits of crop plants (Tosi *et al.*, 2005). The purpose of this study is to find the relation of different traits with grain yield in order to take advantage in their selection and presentation.

MATERIALS AND METHODS

This experiment was conducted during two crop years of 2009 and 2010 on the twenty-fifth of May in the form of fully randomized blocks in three replications with 20 varieties of rapeseed. The experiment was conducted in research farm of natural resource and agricultural researches of Ardabil province in Mogan (Pars abad). The names of studied cultivars are in table 1.

Table 1: The names of rapeseed cultivars in this study

Cultivar's name	Number	Cultivar's name	Number	Cultivar's name	Number	Cultivar's name	Number
Hyola420	16	Ogla	11	Sw5001	6	Sangol	1
Syn-3	17	19-h	12	Cracker5001	7	Goliath	2
Option 500	18	Hyola401(external)	13	Eagle	8	Heros	3
Hyola60	19	Hyola401(Safi Abad)	14	Wild Cat	9	Comet	4
Hyola308	20	Hyola401(Barazjan)	15	Swhotshot	10	Amica	5

The average of annual temperature of Pars Abad station during statistical period of 2001-2010 was 15.3 ° C. On average, July and August months with 27.04 ° C were the warmest month and January with 4 ° C was the coldest month in this study period. The maximum recorded temperature was 41 ° C in July and the minimum was -16.5 ° C in January. During past 10 years, in this station the maximum absolute temperature of the month was in august about 40 ° C and monthly minimum temperature was in January with -13 ° C. the average rainfall in the autumn is 82.73 and winter 51.24 and spring 102 and summer is 32.850 mm. the highest rainfall according to the statistic of Pars Abad is from April to the end of June. According to 10 years average rainfall statistic, the average rainfall of ParsAbad is reported as 269.1. Spring has 38.02% of rainfall and summer has about 12.02% and autumn has about 30.7% and winter has about 19.01% and spring has the highest rainfall and summer has the lowest rainfall. Also, from the perspective of monthly rainfall, May with 45.9 mm has the highest rainfall and August with 4.1 average mm has the lowest rainfall.

The product of studied field in the previous year was grain. And land preparation operations include spring plowing, spring disc, leveling and fertilization was done in two stages as top dressing and in the first stage, before flowering, 50 kg per hectare was added to soil and in second stage, before the start of grain filling, 50 kg per hectare was added to the soil. Each plot consisted of 3 rows with a length of 4 meters and distance of 60 cm and it was sown between plants with a distance of 5 to 8 cm. the first irrigation after planting was conducted with low weight and one day after planting. Next irrigations were conducted based on irrigation period and based on weather conditions. Irrigation intervals were about 10 days, so plants at any stages were not under water stress, after planting, combating weeds was done by hand.

During the growing season, the phonological characteristics such as date of germination, flowering date and date of pod were recorded. In full maturity stage and by considering border, randomly from each plot, 10 plants were selected and were cut from the soil surface. Agronomic characteristics related to Yield were: days to flowering, days to end of flowering, length of flowering, days to maturity, plant height, number of pods per plant in plant, numbers of seeds per pod, weight 1000 seeds and grain yield were evaluated. In this study, for decomposition to components, SPSS-22 software was used.

RESULTS AND DISCUSSION

The purpose of decomposition to main components is to reduce the data volume. In decomposition to main components, the relation between numbers of variables is stated by using some independent components and the role of each trait is identified. In addition, decomposition to main components is used for genotypes grouping and in fact it is a supplement of cluster analysis (Moghadam, 1993). Decomposition to main components was assessed with 20 average cultivar in this study, and obtained parameters of decomposition to main components include Eigen values for each of the main components,

Eigenvalues, the amount of relative variance and cumulative variance for obtained components and values of each of the main components of each studied genotype in table 2.

Table 2: Eigen values and vectors, relative and cumulative variances

Traits	1	2	3	4
Grain yield	**0.136**	**-0.178**	-0.489	0.713
days to flowering	**-0.492**	0.171	-0.3	0.073
days to maturity	**-0.479**	0.351	0.012	0.037
length of flowering	**0.283**	0.493	-0.236	0.226
days to end of flowering	**-0.59**	0.014	-0.028	0.041
plant height	0.185	**0.419**	0.366	0.238
number of pods per plant	0.182	**0.468**	-0.117	-0.39
numbers of seeds per pod	-0.002	**0.398**	-0.273	0.014
weight 1000 seeds	**0.117**	-0.14	**-0.62**	**-0.473**
Special amount	**2.622**	**1.912**	**1.3**	**0.9917**
Relative variance	**0.291**	**0.213**	**0.144**	**0.11**
Cumulative variance	**0.291**	**0.504**	**0.648**	**0.759**

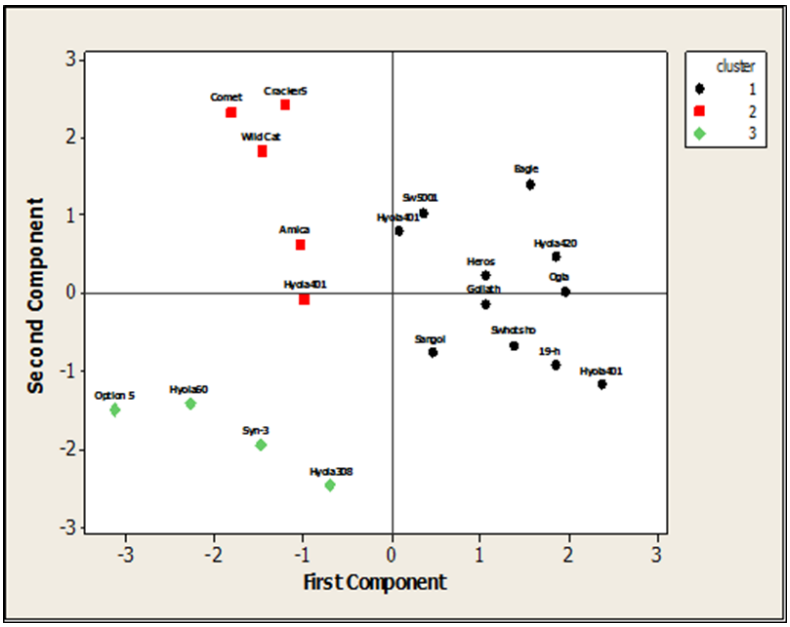

Figure 1: Distribution of investigated genotypes based on second and first component and decomposition to main components and obtained grouping from clustering analysis were evaluated on traits

The Eigen values of first, second, third and fourth main component were higher than 1 and respectively, they were 2.622, 1.912, 1.30 and 0.9917 and in total they justified 75.9% of all variance of variables. The results have showed that in creating first component, the length of flowering period, the number of pods in plant and height of plant had the highest positive coefficient; in other words, selection based on this component will select tall cultivars with high flowering period and high pods in plant. Selection based on second component selected cultivars with higher pods per plant, long flowering period and tall and Serotinous plants and number of seeds in large pods and genotype grouping based on these two variables is given in figure 1. Eigen values and vectors and relative and cumulative variance based on other traits are given in table 2. Comparing the obtained results of cluster analysis with scatter plot of genotypes based on first and second components indicate the concordance of these two (figures 1 and 2).

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