THE PRODUCTIVE POTENTIAL OF AUTUMN AND SPRING RAPE - COMPARISON

Florica MORAR [1]

[1] **„PETRU MAIOR" University from Tg-Mureş**

Abstract

The research carried out under S.C.D.C.B. Tg. Mures rape cultivation annua biennis was aimed at finding the most suitable varieties and hybrids of rapeseed for Transylvania, the most appropriate seeding densities and an optimal formula of NPK fertilization.

Accordingly, during the three years of research, the productive potential of the two types of rapeseed cultivars of autumn and spring, was observed that the first crop year, deemed rape favorable year, the most productive kind of spring (heros) provides a production seed that gets closer to the best kind of autumn (Valesca). In the next crop year, the difference between the two varieties was 1413 kg ha for autumn variety. In the 2006-2007 crop year, less favorable climate than the other two preceding years, the highest rape seed production in autumn of 2210 kg / ha was obtained in variant Vectra x 300 x N90P90K90 bg/m^2 and the rape of Spring production was highest in the variant bg/m^2 Amica x 300 x N90P90K90.

It notes that during less favorable climate, spring rape carried higher production and lower than the fall in favorable years.

Keywords: rape, fertilization, sowing density, potentially productive, growing.

The role, functions and economic importance of crop yield of rape, in the intensified process of agriculture, as the ever-increasing requirements of the national economy from products of this culture, led, in recent years to a considerable increase in cultivated areas, and an increase in efforts to enhance efficiency and increase economic efficiency of production achieved.

Obtaining biodiesel from vegetable oils is an opportunity for our country, growing sunflower, soybean and rape over wide areas. Andries Piebalgs, EU Energy Commissioner, in an interview for the magazine told Biodiesel Magazine that: "Romania has a large potential for energy crops and plants have learned with great satisfaction that grows increasingly more rape raw material for biodiesel. Is an alternative fuel that can be an effective solution for the future".

If sunflower and soybean have been more extensive research, there is little research on rape and in Transylvania there are even fewer. This prompted us to conduct research within SCDCB Tg. Mureş culture rape (Brassica napus oleifera), to pursue productive potential of rapeseed cultivation.

Research conducted shows that the spring forms (Ozer, H. and others, 1999, Turkey), production is correlated with plant height, number of branches, the silicve per plant, seed number silicvă, MMB (Ozer, H . etc., 1999, Turkey).

Hasheni, A. and others, 1998, Australia through their research showed that both seed production and quality are affected by stress fluid rape, but other researchers (Maataoni, A. and others, 2003, Morocco) consider that rape is more resistant to hydric stress than other cultivated or wild species.

Spring rape has an evolutionary cycle shorter than a period of emergence-flowering phase (compared with winter rape) but retains its period of flowering - maturity under favorable conditions and thus often takes higher production than cultivars autumn.

Winter rape consume more nitrogen than the spring, especially since the nitrogen concentration in soil is higher by 4-5 leaf stage, then the duration of flowering. For consumption is increasing spring rape during seed formation. P consumption of spring rape is lower in the first part of vegetation, but that of potassium acquires a special importance at this stage (Sidlauskas, G., and others, 2003, Lithuania).

Given the high mineral consumption (both in winter rape and spring on the role of nutrients in quality training to rape, and relatively limited opportunities for organic fertilization), mineral fertilization is considered by most experts link technology decisive rape culture. Studies on models have also shown that it is the first position among factors which depend on production,

quality and inexpensive to rape. (Läniste, P., and others, 2004).

MATERIAL AND METHOD

At SCDCB Tg. Mures, Mures County there has been conducted research on the behavior of rapeseed cultivation for autumn and spring at the application of differential doses of fertilizers N, P and K, and densities of planting more practice in order Tracking the factors mentioned influence on production and its quality

The research was organized in 2004-2007, and investigated factors were:

◊ factor A - with four graduations fertilization (N0P0K0; N60P0K0; N60P60K0; N90P90K90),

◊ factor B-cultivation of rape, three graduations:

- for winter rape : Valesca, Kardinal, Digger (in 2004-2006, the hybrid Vectra 2006-2007),
- for the rape of Spring: Bolero heros and Amica,

◊ factor C-density, three graduations: bg/m^2 100, 200 bg/m^2 300 bg/m^2.

The type of experience research adopted was "Experience polifactorială" 3x3x4 type, method of settlement are "randomized block method.

A parcel size was 10 square meters. Technology was applied to classical.

Experiences were placed on a luvosol stagnogleizat, humus 1.9%, 16.3 mg P2O5/100 g soil, 19.9 mg K2O/100 g soil and pH 6.5.

Research carried out under S.C.D.C.B. Tg. Mures rape cultivation annua biennis and was aimed at finding the most suitable varieties and hybrids of rapeseed for Transylvania, the most appropriate seeding densities and an optimal formula of NPK fertilization.

An important objective of the research was to spring to sow oilseed rape where the autumn has been compromised in some cases.

RESULTS AND DISCUSSIONS

Analyzing the results, we found (Table 1) that the 2004-2005 rape seed crop production in autumn ranged from 3150 kg / ha in variant bg/m^2 x 200 x Valesca N90P90K90, and 992 kg / ha in varianta100 bg / m^2 x N0P0K0 x Digger and the spring rape, production ranged between 2700 kg / ha in variant bg/m^2 x 300 x N90P90K90 heros and 700 kg / ha in variant 100 bg/m^2 x N0P0K0 x Bolero.

Between the best and the worst option there was a difference in autumn rape 2158kg/ha and 2000 kg / ha in spring rape.

Between varieties Valesca (autumn) and Bolero (spring) the recorded production differences were between 1663 kg / ha and 223 kg / ha, and between autumn Digger variety, and spring heros variety, the differences, were both positive and negative. In variants fertilized and sown N90P90K90 N60P60K0 and 300 bg/m^2, the spring variety heros, has made a bigger production than the autumn variety Digger, with 677 kg / ha, respectively 850 kg / ha. This shows more clearly the need to more accurately determine what kind of rape to be grown, taking into consideration climatic factors.

In the 2005-2006 crop years (Table 1) there were tested the autumn varieties rapeseeds Valesca, Digger and Kardinal, with spring varieties Bolero heros and Amica. In this crop year, the autumn varieties had yields from 3260 kg / ha for variety x N90P90K90 bg/m^2 Valesca x 200 and 961 kg / ha in variant Digger x 200 x N0P0K0 bg/m^2 and spring rape between 1847 kg / ha in variant heros x 300 bg / m^2 x N90P90K90 and 971 kg / ha in variant Bolero x 100 x N0P0K0 bg/m^2.

Spring Variety Bolero at all densities and doses of fertilization and heros at the density of 100 and 200 bg. / m^2 realized less than average yields and varieties Valesca Digger while variety Amica achieved higher production than the variety Kardinal, Autumn.

In the 2006-2007 crop year (Table 2) seed yields were lower due to less favorable weather conditions (dry year). Productions varied in autumn rape between 2210 kg / ha in variant 300 bg/m^2 x N90P90K90, Digger variety but this year has been replaced with hybrid Vectra (which showed greater resistance to cold) and 518 kg / ha in variant bg/m^2 x 100 x Kardinal N0P0K0.

Spring rapeseed yields ranged from 1820 kg / ha in variant bg/m^2 x 300 x Amica N90P90K90 and 872 kg / ha in variant 100 bg/m^2 x N0P0K0 x Bolero. Amica variety achieved higher production than Kardinal.

Averaged over the three years (2004-2007) (*table 2*) there were plus and minus differences between the two varieties.

In autumn rape, the average yield varied between 2789 kg / ha in variant bg/m^2 x 200 x Valesca N90P90K90 and 833 kg / ha in variant bg/m^2 x 100 x Kardinal N0P0K0 and spring rape, between 1945 kg / ha 300 version bg/m^2 x N90P90K90 x heros and 848 kg / ha in variant 100 bg/m^2 x N0P0K0 x Bolero.

The heros variety recorded production increases over the winter variety Digger and less variety to Valesca Bolero.

This shows that the spring varieties of the heros and amica, are more productive than autumn varieties Kardinal and Digger.

Table 1

Production differences between winter rape and spring rape

B.g/m^2	NPK	Crop year 2004-2005				Diff. from autumn crop	Crop year 2005-2006				Diff. from autumn crop
		Autumn cultivar	Kg/ha	Spring cultivar	Kg/ha		Autumn cultivar	Kg/ha	Spring cultivar	Kg/ha	
100	$N_0P_0K_0$	VALESCA	1477	BOLERO	700	-777	VALESCA	1471	BOLERO	971	-500
	$N_{60}P_0K_0$		2427		1210	-1217		2560		1400	-1160
	$N_{60}P_{60}K_0$		2643		1490	-1153		2540		1404	-1136
	$N_{90}P_{90}K_{90}$		2969		1580	-1389		3137		1431	-1706
200	$N_0P_0K_0$		1708		900	-808		1675		1090	-585
	$N_{60}P_0K_0$		2620		1500	-1120		2653		1419	-1234
	$N_{60}P_{60}K_0$		2983		1320	-1663		2979		1498	-1481
	$N_{90}P_{90}K_{90}$		3150		1970	-1180		3260		1618	-1642
300	$N_0P_0K_0$		1553		1330	-223		1519		1257	-262
	$N_{60}P_0K_0$		2488		1840	-648		2496		1504	-992
	$N_{60}P_{60}K_0$		2820		1880	-940		2750		1485	-1265
	$N_{90}P_{90}K_{90}$		3002		2470	-532		3016		1581	-1435
100	$N_0P_0K_0$	DIGGER	992	HEROS	760	-232	DIGGER	1448	HEROS	1338	-110
	$N_{60}P_0K_0$		1243		1000	-243		1605		1584	-21
	$N_{60}P_{60}K_0$		1400		1360	-40		1780		1600	-180
	$N_{90}P_{90}K_{90}$		1540		2090	+550		2975		1590	-1385
200	$N_0P_0K_0$		1050		1030	-20		969		1350	+381
	$N_{60}P_0K_0$		1333		1400	+67		1779		1630	-149
	$N_{60}P_{60}K_0$		1567		1380	-187		1764		1708	-56
	$N_{90}P_{90}K_{90}$		1590		1760	+170		1810		1776	-34
300	$N_0P_0K_0$		1150		950	-200		1040		1334	+294
	$N_{60}P_0K_0$		1443		1870	+427		1242		1626	+384
	$N_{60}P_{60}K_0$		1763		2440	+677		1327		1618	+291
	$N_{90}P_{90}K_{90}$		1850		2700	+850		1666		1847	+181
100	$N_0P_0K_0$	KARDINAL	1010	-	-	-	KARDINAL	971	AMICA	1333	+362
	$N_{60}P_0K_0$		1253		-	-		1109		1542	+433
	$N_{60}P_{60}K_0$		1447		-	-		1356		1633	+277
	$N_{90}P_{90}K_{90}$		1730		-	-		1488		1828	+340
200	$N_0P_0K_0$		1066		-	-		1036		1314	+278
	$N_{60}P_0K_0$		1780		-	-		1176		1523	+347
	$N_{60}P_{60}K_0$		1963		-	-		1764		1808	+44
	$N_{90}P_{90}K_{90}$		2003		-	-		1544		1808	+264
300	$N_0P_0K_0$		1126		-	-		1076		1361	+285
	$N_{60}P_0K_0$		1406		-	-		1325		1376	+51
	$N_{60}P_{60}K_0$		1627		-	-		1427		1528	+101
	$N_{90}P_{90}K_{90}$		1848		-	-		1549		1585	+36

CONCLUSIONS

Comparing the two types of autumn and spring rape reach important conclusions:

◊ In the favourable year for rape (2004-2005), the biggest seed production obtained for autumn rape, variant Valesca x 200 b.g./m^2 x $N_{90}P_{90}K_{90}$, was of 3150 kg/ha, with 450 kg/ha bigger than the maximal production obtained for the spring rape at variant Heros x 300 b.g./m^2 x $N_{90}P_{90}K_{90}$ (2700 kg/ha). We noticed that the most productive spring cultivar realizes a seed production close to the production of the best autumn cultivar in this year:

◊ In 2005-2006, the biggest seed production for autumn rape was obtained for the variant Valesca x 200 b.g./m^2 x $N_{90}P_{90}K_{90}$, of 3260 kg/ha, compared to only 1847 kg/ha for variant Heros (spring cultivar) x 300 b.g./m^2 x $N_{90}P_{90}K_{90}$, the difference being of 1413 kg/ha. This year was more favourable to winter rape, compared to the spring rape;

◊ In 2006-2007, less favourable than the previous two, regarding the climate conditions, the biggest seed production for autumn rape, of 2210 kg/ha, was obtained for variant Vectra x 300 b.g./m^2 x $N_{90}P_{90}K_{90}$, and for the spring rape, the biggest seed production was realized for variant Amica x 300 b.g./m^2 x $N_{90}P_{90}K_{90}$, of 1820 kg/ha seeds, the difference between them being of only 390 kg/ha. We observed that in the less favourable years, spring rape realizes bigger productions and autumn rape smaller ones than in the favourable years.

Table 2

Production differences between winter rape and spring rape

B.g/m^2	NPK	Crop year 2006-2007				Diff. from autumn crop	Average 2004-2007				Diff. from winter rape	
		Autumn cultivar	Kg/ha	Spring cultivar	Kg/ha		Autumn cultivar	Kg/ha	Spring cultivar	Kg/ha	Kg/ha	%
100	$N_0P_0K_0$	VALESCA	883	BOLERO	872	-11	VALESCA	1277	BOLERO	848	-429	66,4
	$N_{60}P_0K_0$		1495		1103	-392		2161		1238	-923	57,2
	$N_{60}P_{60}K_0$		1524		1134	-390		2236		1343	-893	60,0
	$N_{90}P_{90}K_{90}$		1912		1411	-501		2673		1474	-1199	55,0
200	$N_0P_0K_0$		1005		927	-78		1463		972	-491	66,4
	$N_{60}P_0K_0$		1592		1018	-574		2288		1312	-976	57,3
	$N_{60}P_{60}K_0$		1786		1127	-659		2582		1315	-1267	50,9
	$N_{90}P_{90}K_{90}$		1956		1200	-756		2789		1596	-1193	57,2
300	$N_0P_0K_0$		911		1027	+116		1328		1205	-123	90,7
	$N_{60}P_0K_0$		1537		1161	-376		2174		1502	-672	69,0
	$N_{60}P_{60}K_0$		1664		1217	-447		2411		1527	-884	63,3
	$N_{90}P_{90}K_{90}$		1809		1352	-457		2609		1801	-808	69,0
100	$N_0P_0K_0$	VECTRA	928	HEROS	1026	+98	DIGGER (VECTRA*)	966	HEROS	1041	+75	107,7
	$N_{60}P_0K_0$		1465		1211	-254		1238		1265	+27	102,1
	$N_{60}P_{60}K_0$		1768		1281	-487		1449		1414	-35	97,5
	$N_{90}P_{90}K_{90}$		1906		1354	-552		1631		1678	+47	102,8
200	$N_0P_0K_0$		866		994	+128		962		1125	+163	116,9
	$N_{60}P_0K_0$		1345		1213	-132		1252		1415	+163	113,0
	$N_{60}P_{60}K_0$		1558		1356	-202		1439		1481	+42	102,9
	$N_{90}P_{90}K_{90}$		1856		1417	-439		1664		1651	+13	99,2
300	$N_0P_0K_0$		893		1072	+179		1027		1119	+92	108,9
	$N_{60}P_0K_0$		1565		1186	-379		1417		1561	+144	110,1
	$N_{60}P_{60}K_0$		1887		1211	-676		1659		1756	+97	105,8
	$N_{90}P_{90}K_{90}$		2210		1289	-921		1909		1945	+36	101,8
100	$N_0P_0K_0$	KARDINAL	518	AMICA	962	+444	KARDINAL	833	AMICA	1147	+314	137,6
	$N_{60}P_0K_0$		875		1336	+461		1079		1439	+360	133,3
	$N_{60}P_{60}K_0$		990		1420	+430		1264		1526	+262	120,7
	$N_{90}P_{90}K_{90}$		1094		1651	+557		1437		1739	+302	121,0
200	$N_0P_0K_0$		578		1034	+456		894		1174	+280	131,3
	$N_{60}P_0K_0$		946		1192	+246		1502		1357	-145	90,3
	$N_{60}P_{60}K_0$		1067		1313	+246		1598		1560	-38	97,6
	$N_{90}P_{90}K_{90}$		1219		1348	+129		1677		1578	-99	94,0
300	$N_0P_0K_0$		581		1067	+486		928		1214	+286	130,8
	$N_{60}P_0K_0$		821		1324	+503		1126		1350	+224	119,8
	$N_{60}P_{60}K_0$		940		1562	+616		1335		1545	+210	115,7
	$N_{90}P_{90}K_{90}$		973		1820	+847		1457		1702	+245	116,8

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