RESEARCH OF ADAPTABILITY TO WINTER OILSEED RAPE GENOTYPES UNDER ALLUVIAL SOILS INSULA MARE A BRÃILEI

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Abstract

High and stable yields of rape can be obtained under the alluvial soils of the Insula Mare a Brãilei a only by using hybrid varieties with high yield and production, to use on favorable environmental conditions and agricultural technology in this area of great economic importance.
During 2004-2010 were studied over 215 genotypes of winter rapeseed yield of studying the elements of productivity of plant resistance to different stressors, their adaptability to the specific conditions of the Insula Mare a Brãilei.
Optimization of rapeseed varieties ensure a sufficient diversity of cultivated assortment in terms of the vegetation period, resistance to pests, and winter hardiness of morpho-physiological features that enable more efficient use of both soil and climate conditions of the Insula Mare a Brãilei, and decrease genetic vulnerability of this crop.
(10-15 rânduri, cu referire expresă la rezultatele cercetărilor).

Key words: winter rape, optimization varieties, adaptability

Growing diversity and continuous renewing the range of varieties and hybrids of rape makes determining the most appropriate structure for each complex genotypes agriculture to become increasingly important, yet most complex. (CETION, 2010; Canada Concil of Canada, Buzdugan, 2006; Rîşnoveanu, 2010).

Zoning rape varieties and hybrids should result in a best possible match between the specific biological particulars of each genotype and potential of different climatic zones and agricultural micro where this plant is grown. (Asseng, S., et al 2003, Clayton, G., et al, 2000; Diaconu, P., et al. 2004).

High and constant production of rape can only be achieved through the use of varieties and hybrids with high production capacity, to use on favorable environmental conditions and optimum cultivation technologies, specific to each agricultural area in part (Rîşnoveanu, 2010; Buzdugan 2006).

Whereas it is now a great influx of varieties and hybrids, we found necessary to organize comparative cultures, with a large number of varieties and hybrids to enable growers to focus on the choice of genotype to cultivate.

MATERIAL AND METHOD

The investigations were carried out during 2004-2010, under the alluvial soils of the Insula Mare a Brãilei, well stocked in nutrients under irrigation.

In these periods were tested a total of 215 varieties and hybrids of different architectures proveninţe and productive and biologically different. Due to the large number of genotypes in this paper we stopped at random in only 29 genotypes.

The results presented below are partial results of some larger and complex research on the adaptability and performance of this productive and not just agricultural crops in the area of the Insula Mare a Brãilei .

These genotypes were followed a series of elements of winter rape productive structure: production per unit area density at harvest, seed weight per plant, number silicve the plant, seed number per plant, grain weight. of a thousand.

The results were interpret using analysis of variance, multiple comparisons (Newman Keuls), regressions and correlations (MSTAT-C statistical software, SAS / SAT, PASW.)

RESULTS AND DISCUSSIONS

From the study of behavior of the 29 genotypes of rape can be seen that most of them have achieved on average in 2004-2010 production over 4000 kg \ ha (*tab. 1*).

From research conducted in the agricultural area highlights the Insula Mare a Brãilei is rapeseed hybrids: *Dynasty, Sitro and Exoce*t,

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which ranks first statitic level, with average yields of 4.55 t / ha, 4.51 t / ha and 4 , 47 t / ha which represents a significant increase in harvest of 11%, 11.8% and 11.7% from the average of all hybrids soir and taken into research. The other elements which determine their production levels are at statistically significant, which demonstrates their close interdependence (seed weight per plant, number of silicve per plant, MMB).

In terms of stability of their production during the investigations are witnessing some minor variations between 4.7 to 7.2% of both production and other productive structures of winter rape.

Table 1

Productive capacity of varieties and hybrids of winter rapeseed Insula Mare a Brăilei 2004-2010

Genotypes		Production		Weight seed plant		Pods per plant		MMB	
		t\ha	Cv%	g	Cv%	Numărl	Cv%	g	Cv%
1	Artist	4.18 c	7.8	8.92 c	8.3	275,6 de	8.9	3.202 b	5.6
2	Astrid	4.03 def	8.3	8.23 ef	8.5	272.9 def	9.5	3.012 efg	5.7
3	Betty	4.33 b	4.8	9.09 c	8.8	283.7 bc	10.7	3.204 b	3.4
4	Dante	3.34 jk	10.4	6.51 mno	8.2	238.0 jk	10.0	2.732 mn	9.1
5	Dexter	3.17 l	11.8	6.35 o	10.6	237.7 jk	12.5	2.669 no	7.9
6	Dinasty	4.55 a	5.3	9.72 a	6.1	293.3 a	6.7	3.407 a	5.8
7	Eclarte	3.27 jkl	19.9	6.98 l	22.7	255.2 gh	18.2	2.736 mn	10.5
8	Elvis	3.75 g	12.8	7.36 jk	9.9	252.5 h	13.4	2.918 hi	8.2
9	Hidromel	3.96 ef	9.3	8.03 fg	11.1	268.9 f	9.7	2.977 fgh	8.4
10	Exocet	4.47 a	7.2	9.61 a	8.2	296.1 a	5.0	3.224 b	7.4
11	Extend	3.98 hi	8.7	7.72 gh	7.9	274.7 cd	4.9	3.14 c	4.5
12	Formula	3.61 hi	13.9	7.69 hi	17.5	273.7 def	15.2	2.806 kl	6.9
13	Exagon	4.29 b	9.5	8.72 d	10.2	285.1 b	13.7	3.045 de	4.5
14	Ilia	4.11 d	11.3	8.72 d	12.1	277.6 cd	10.6	3.122 c	7.2
15	Kiribik	3.53 i	11.2	7.85 gh	18.1	285.8 b	18.0	2.750 lm	9.3
16	Lilian	4.15 cd	7.7	8.24 ef	9.2	269.0 f	9.9	3.063 cde	5.6
17	Nelson	3.94 f	12.3	8.35 e	15.6	276.6 cde	11.4	3.011 efg	7.5
18	PR45 D01	4.12 cd	11.8	8.28 ef	10.4	271.7 def	10.7	3.032 ef	6.6
19	PR46 W09	3.64 ghi	10.2	6.42 no	14.0	237.1 k	8.3	2.698 mn	7.1
20	PR46 W15	3.67 gh	8.0	7.14 kl	9.5	251.0 hi	7.4	2.835 jk	7.0
21	Rally	3.95 ef	9.6	8.04 fg	9.2	269.6 ef	9.9	2.964 gh	7.0
22	Remy	2.96 m	26.6	5.64 p	28.2	215.8 l	25.1	2.614 o	8.8
23	Safran	4.23 bc	9.1	8.81 d	10.4	283.6 bc	10.3	3.102 cd	4.5
24	Sitro	4.51 a	5.1	9.36 b	9.0	290.1 ab	7.9	3.226 b	4.7
25	Tassilo	3.53 i	13.5	7.14 kl	11.4	254.6 gh	10.9	2.805 kl	6.5
26	Toccata	3.54 i	12.4	6.64 mn	11.1	236.3 k	9.5	2.805 kl	6.5
27	Triangle	4.07 de	10.3	7.58 ij	10.5	252.3 h	6.2	3.000 efg	4.4
28	Valevsca	2.56 n	18.9	5.98 o	31.7	207,9 m	28,3	2.598 o	12.1
29	Vectra	2.99 kl	20.2	6.72 m	22.8	248.0 hi	211.5	2.712 mn	9.9
LSD 5 %		0.1094		0.2383		6.603		0.0589	

On the second level of statistically fall: *Betty, Exagon, Safran* with productive capacity of 4.33 t / ha, 4.29 t / ha respectively 4.23 t / ha, which causes an increase in production 11.2%, 11.2% and 10.48% compared to the average experiment. Also the formation of production elements are at a significant statistically.

The third level is occupied statistically by *Artist, Lillian, PR45 D0*1 with production of 4.18 t / ha, 4.15 t / ha, ie 4.12 t \ ha, with significant production increases of 9.1% 8,3% and respectivly 7.5% from the average of all genotypes studied.

Zoning varieties and hybrids of rape, even within the same ecosystem is deteminată in most of the defects that limit their usefulness genotypes in areas where these defects have less influence on yields. For these reasons the criteria for choosing genotypes should be considered in evolving assortment based on features available at this time.

Of the 29 genotypes of rape was only number 12 selected genotypes considered the most valorem, with safe and stable production of 4.0 to 5.5 t / ha (*tab. 2*).

With individual regressions and average production was possible graphical representation of genotypes adaptability of the Insula Mare a Brailei rape *(fig. 1)*. He created a total of four squares with different graduations of varieties and hybrids adaptability to environmental conditions and technology applied.

Thus the lower right - are the most adapted genotypes with high yields secure and stable agricultural area under the Insula Mare a Brailei (*Dynasty, Lilian, PR45 D01, Extend, Kiribik, Sitro, Exocet, Artist, Betty and Astrid*).

The top - right genotypes *W09 PR46, PR46 W15, Safran, Hydromel, Nelson,* and *Triangle* are those that have high production capacity, are more demanding in climatic conditions and cultivation technology.

Table 2

The limits of variation and variance of production and productive structures to winter rape Insula Mare a Brãilei 2004-2010

Genotipes	Production		Weight seed plant		Pods per plant		MMB	
	t \ ha	s^2	g \ pl	s^2	nr \ pl	s^2	g	s^2
Dinasty	4.09- 5.33	0,046	8.5- 13.8	0.294	279.4-406.9	287.08	3.2 – 4.1	0.009
Sitro	3.83- 5.24	0.082	7.8- 13.8	0.956	273.9-394.4	496.18	3.0 - 4.0	0.028
Exocet	3.75- 5.28	0.108	8.9- 13.5	0.888	285.3-397.2	492.86	3.0 - 3.9	0.038
Betty	3.59- 4.89	0.114	7.1- 11.8	1.075	283.7-371.4	580.52	2.9 - 3.8	0.030
Exagon	3.68- 4.84	0.102	6.8- 10.8	1,379	282.9-379.2	631.17	2.9 - 3.7	0.030
Safram	3.61- 4.93	0.182	7.7- 12.0	1.112	281.8-395.9	646.92	2.9 - 3.8	0.020
Artist	3.59- 4.81	0.045	7.8- 12.2	1.162	286.5-374.6	527.33	3.0 - 3.7	0.012
Lilian	3.61- 4.85	0.054	7.3- 12.5	1.487	284.8-378.1	714.97	3.0 - 3.7	0.024
PR45 D01	3.41- 4.71	0.336	6.1- 10.6	2.196	219.7-331.3	968.71	2.5 - 3.5	0.061
Ilia	3.24- 4.56	0.292	7.6- 11.5	2.135	228.6-379.7	832.57	2.5 - 3.6	0.040
Triangle	3.05- 4.37	0.149	6.5- 10.6	2.210	229.6-326.9	1053.89	2.8 - 3.6	0.051
Astrid	3.42 4.47	0.130	6,5- 11.0	1.864	228.9-326.7	846.42	2.6 - 3.4	0.041
Mean 54 genotypes	1.23- 5.33	0.348	4.4-12.5	2.340	129-395.8	1193.3	2.3-3.7	0.066

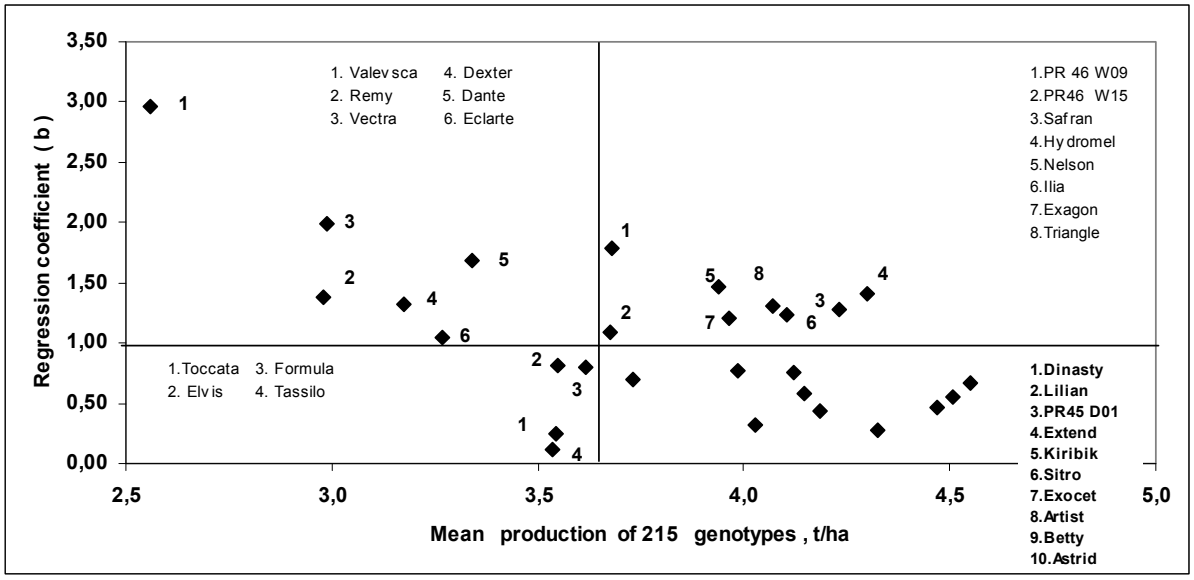

Figure 1 **Adaptability winter rapeseed genotypes Insula Mare a Brãilei 2004-2010**

Genotypes *Toccata, Elvis, Formula, Tassilo* are located in the lower production, varieties and hybrids in the media studied, but stable, adapted to environmental conditions in the ecosystem Insula Mare a Brăilei.

The other genotypes located the left - above: *Valevsca, Remy, Vectra, Dexter, Dante, Eclarte* have little floating production, influenced to a greater extent by climatic conditions, and demanding in terms of technology.

Optimizing the structure of rapeseed varieties should provide sufficient diversity of cultivated assortment in terms of growing season, the genes for disease resistance and winter and morpho-physiological features that allow more efficient use of technological diversity and microclimatic conditions the Insula Mare a Brãilei. Output is obtained per unit area is undoubtedly due to several features of the genotype, but it may come off a series of interactions with elements of cultivation technology.

In this respect we show how the various structures how they interact to achieve productive winter rape production to a total of three genotypes *Dinasty, Betty and Ilia* (variety restored) with different morphological and physiological architecture.

So hybrid *Dinasty* (*fig. 2*) shows that the density at harvest tends to increase production, but the correlation coefficients of these elements are insignificant (R = 0.334), which shows that other elements of production have a training degree greater participation

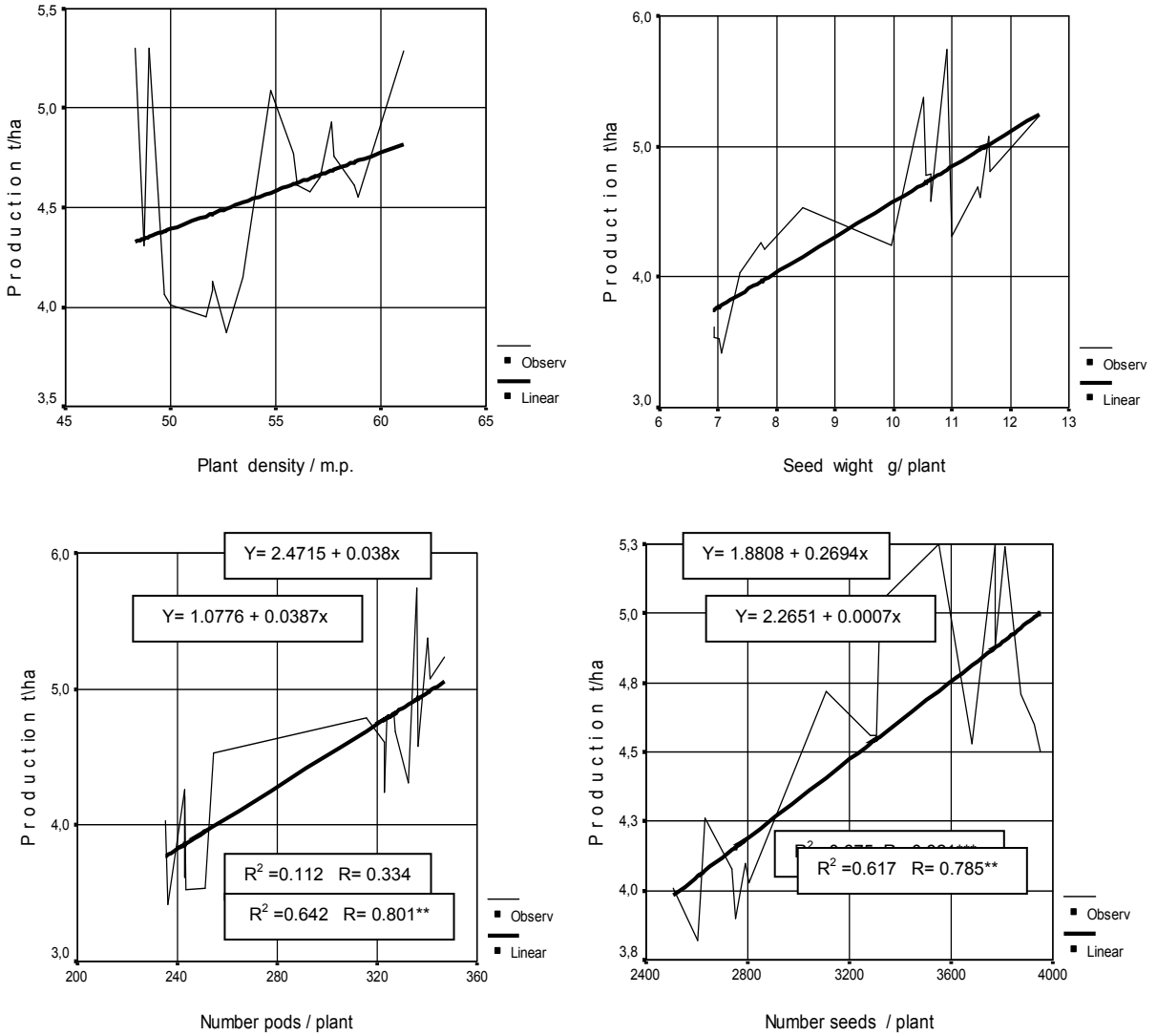

Figure 2 **The influence elements of productivity on the production hibryd Dynasty Insula Mare a Brãilei 2004-2010**

Number of pods per plant has an essential role in increasing the production of this genotype (R = 0.801 ***).

Also the number of seeds on the plant is another structure of great importance in the formation of productive hybrid crop *Dinasty*, it causing significant increases (R = 0.785 ***).

Making a synthesis of elements of production interaction (*tab. 3*) that influence the production of winter rape hybrid *Dinasty* notice that the density at harvest and MMB have insignificant influence on its growth, while the weight of seeds, and number per plant pods significant condition yield formation.

Hybrid high productive capacity, *Betty,* (*fig.3*) also shows that by increasing density Dynasty hybrid plants at harvest, the production of rapeseed is slightly influenced (R = 0.118).

Table 3

Nonparametric correlations (Spearman) between production and elements productivity hybrid Dynasty Insula Mare a Brãilei 2004-2010

Correlations	Elements of productivity				
	Plant density at harvest	Seed weight plant	Number pods per plant	Number seeds per plant	MMB
Production t/ha	0.267	0.726**	0.882**	0.756**	0.177

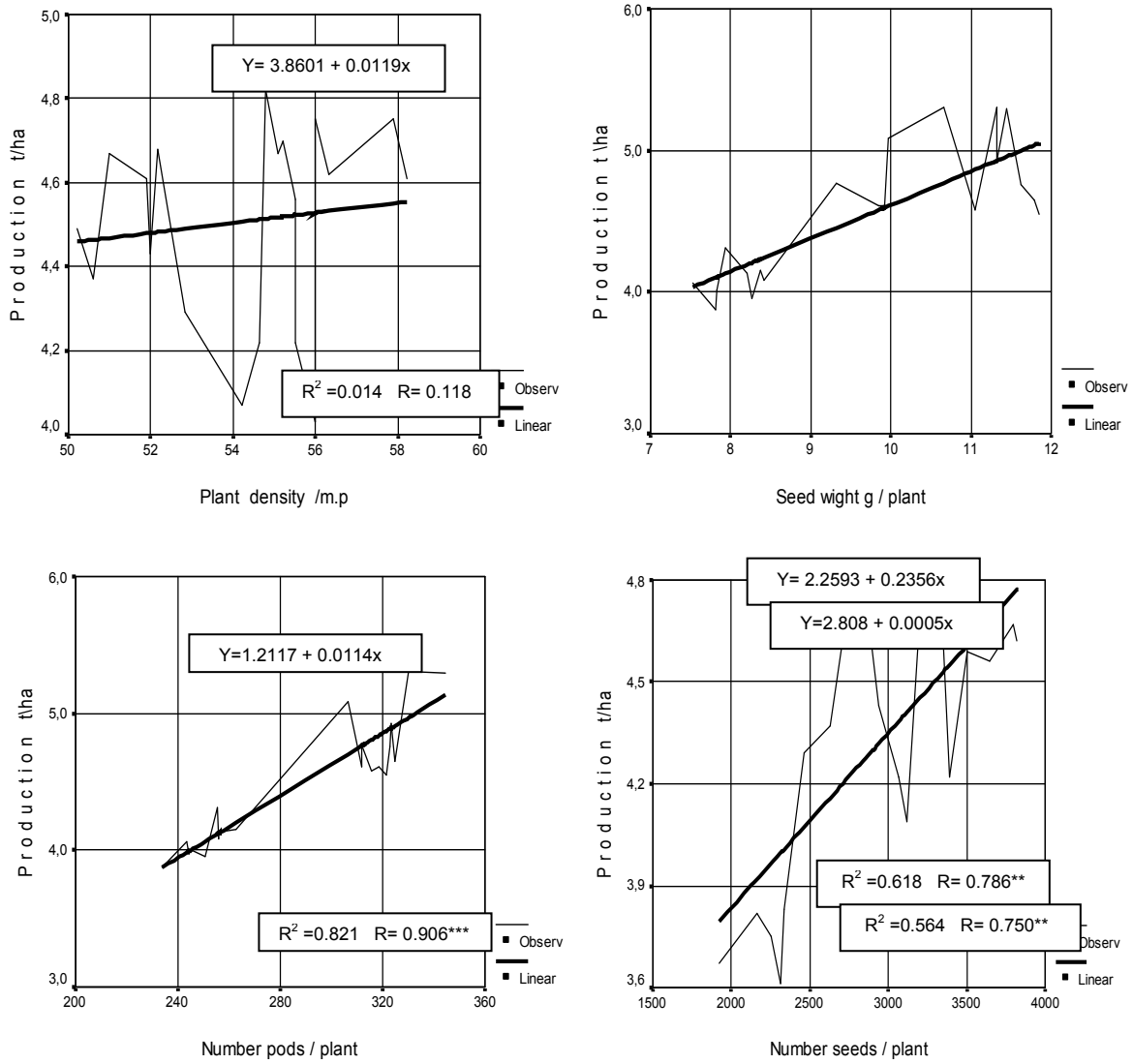

Figure 3 **The influence elements of productivity on the production hibryd Betty Insula Mare a Brãilei 2004-2010**

Also found in this hybrid that by increasing other productive structures (seed weight, their number and number per plant silicvelor) rapeseed production is significantly affected.

It appears from table 4, the existence of significant correlations between the production of hybrid rapeseed *Betty* and density at harvest, seed weight per plant, number pods and seeds (R = 0.501***, R = 0.640*** and that R = 0.695***). Between MMB and production there is a correlation insignificant.

Table 4

Nonparametric correlations (Spearman) between production and elements productivity hybrid Betty Insula Mare a Brãilei 2004-2010

Correlation	Elements of productivity				
	Plant density at harvest	Seed weight plant	Number pods per plant	Number seeds per plant	MMB
Production t/ha	0.501**	0.640**	0.490**	0.695**	0.363

Ilia variety production (*fig. 4*) relate somewhat differently to the various elements of productivity growth of rape plants under alluvial soils of the Insula Mare a Brãilei.

Thus, by increasing the density at harvest, there is a significant increase in rapeseed production (R = 0,661 *). At the same time it is significantly influenced by increased seed weight at individual plants (R = 0,932***) and the number of pods and number of seeds per plant (R = 0,903 , respectively R=0,933***).

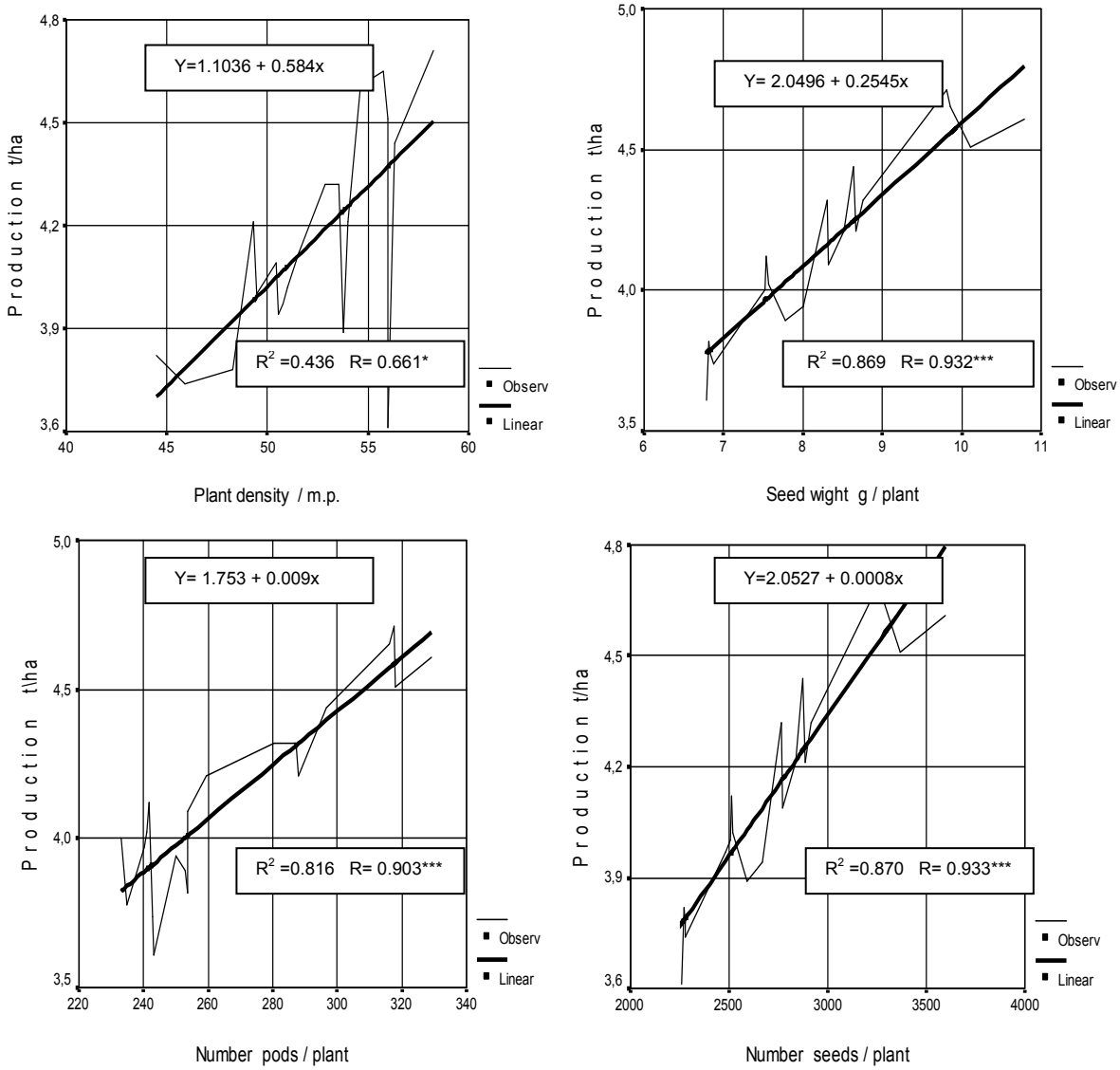

Figura 4 **The influence elements of productivity on the production variety Ilia Insula Mare a Brãilei 2004-2010**

Analyzing the interaction of production per ha *(tab. 5),* with productivity, method type Spearman correlations, features that makes its formation, it appears that this kind of winter rape all the productivity significantly conditioned crop formation, unlike the other genotypes studied in some of the elements of productivity were offset by the other.

Table 5

Nonparametric correlations (Spearman) between production and elements productivity variety Ilia Insula Mare a Brãilei 2004-2010

Correlations	Elements of productivity				
	Plant density at harvest	Seed weight plant	Number pods per plant	Number seeds per plant	MMB
Production t / ha	629**	916**	804**	916**	398*

CONCLUSIONS

Rapeseed hybrids *Dynasty, Exocet, Sitro* prove to be the most productive genotypes under Insula Mare a Brãilei.

Genotypes *PR45D01, Lilian, Extend, Kiribik, Artist, Betty, Astrid* complete range of genotypes well adapted to climatic rape and technological agricultural area Insula Mare a Brãilei.

Optimizing stucturii varieties of winter rapeseed provides a wide assortment of grown enough in terms of the vegetation period, resistance to pests in winter and the morpho-physiological features that allow the best use of theclimatic conditions of Insula Mare a Brãilei and reduce genetic vulnerability of this crop.

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