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Yield evaluation trial of specialty maize inbreds

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A completely randomized block design yield trial was sown by the beginning of November 2009 in a surface gently loaned by the School of Agriculture-Universidad Nacional de Lomas de Zamora within their experimental campus placed at the location of Virrey del Pino (Province of Buenos Aires, Argentina). The growing season 2008/09 was characterized by high temperatures and droughtness. Fourty-four inbreds, including the six termed CIG8, CIG12, CIG29, CIG30, CIG18 and CIG39 that are under official channels to be inscribed in the National Register of Cultivar Property (R.P.N.C.) were evaluated by their grain yield according to the following methodology. The ears of each plot were hand harvested, threshed and the grains weighted. Kernel´s humidity degree was determined using a portable humedimeter *Protimeter Grainmaster 900* and kernels weight was corrected to commercial starndard humidity (15%). The *average yield per plant* (AYP) was obtained dividing the kernels weight per plot by the number of plants at harvest and was expressed in grams. Potential yield (PY) expressed as kilograms of grain per hectare, was estimated multiplying the AYP by 71,500 (plants density at harvest).

According to the type of grain the inbreds tested can be grouped as: **I.** *Modified starch, high amylopectin content maize (waxy)*, **II.** *High-quality protein maize (HQP)*, **III.** *High-quality protein and modified starch maizes (double mutants or DR)*, **IV.** *Soft and starchy endosperm (SE)*, **V.** *Hard and vitreous endosperm maize (VE).*

The data for AYP and PY calculated for each inbred tested are included in Table 1. The general media of the trial was 52.3 ± 10.6 grams of kernels/plant (*range= 31.4 to 72.9 grams.*) and 3739.9 ± 759.6 kilograms of kernels/hectare (*range= 2245.1 to 5212.4 Kg. kernels/hectare*) of which the minimun values belong to the waxy inbred CIG8 and the highest to the double mutant *wxo2* CIG29.

The AYP, average PY and yield range for each group of inbreds are as follows=

waxy ***50.3 ± 10.1 gr. kernel/plant and 3597,0 ± 724,1 Kg. kernel/ha***
(*31.4 to 64.5 gr. kernel/plant to 2245,1 to 4611.8 Kg. kernel/ha*)

HQP ***45.4 ± 10.3 gr. kernel/plant and 3244,2 ± 740,4 Kg. kernel/ha***
(*32.5 to 69.4 gr. kernel/plant and 2323,8 to 4962,1 Kg. kernel/ha*)

DR ***55.7 ± 8.5 gr. kernel/plant and 3983,6 ± 607,0 Kg. kernel/ha***
(*44.1 to 72.9 gr. kernel/plant and 3153,2 to 5212,4 Kg. kernel/ha*)

SE ***57.6 ± 6.1 gr. kernel/plant and 4118,4 ± 439,9 Kg. kernel/ha***
(*50.1 a 64.1 gr. kernel/plant and 3582,2 to 4583,2 Kg. kernel/ha*)

VE ***69.0 ± 3.8 gr. kernel/plant and 4933,5 ± 273,0 Kg. kernel/ha***
(*66.3 to 71.7 gr. kernel/plant and 4740,5 to 5126,6 Kg. kernel/ha*)

The groups of inbreds with hard and starch endosperm (VE and SE) showed the shortest dispersion of values for AYP (*CV%= 5.5 and 10.7 respectively*) whilst the HQP inbreds shown the greatest divergence for this descriptor (*CV%= 22.7)*. The above results point out that in average, the quality protein materials are the less yielding ones, all the opposite than hard endosperm inbreds whilst similar results were obtained for the double mutants and starchy endosperm inbreds tested.

When the averages were compared applying *Student´s t* test it was found that there are highly significant differences amongst the *waxy*, *HQP* and *DR* inbreds in relation to the *VE* group as well as significant differences were detected between HQP and SE or HQP and DR inbreds (*see Table 2*).

It must be said that the yield of the inbreds termed CIG1 to CIG32 decreased approximately a 15% in relation to the values calculated in a MET conducted at the location of Llavallol (Province of Buenos Aires) during 2002/03 to 2004/05.

TABLE 1= *Yield average for each inbred evaluated during 2008/09 growing season*

INBRED	TYPE	AYP	PY	INBRED	TYPE	AYP	PY
CIG1	*Waxy*	*55,1*	*3939,7*	*CIG56*	*H*	*32,5*	*2323,8*
CIG4	*Waxy*	*60,7*	*4340,1*	*CIG57*	*H*	*35,8*	*2559,7*
CIG6	*Waxy*	*51,2*	*3660,8*	*CIG27*	*DR*	*67,0*	*4790,5*
CIG7	*Waxy*	*41,4*	*2960,1*	*CIG29*	*DR*	*72,9*	*5212,4*
CIG8	*Waxy*	*31,4*	*2245,1*	*CIG30*	*DR*	*61,5*	*4397,3*
CIG9	*Waxy*	*53,7*	*3839,6*	*CIG36*	*DR*	*60,4*	*4318,6*
CIG10	*Waxy*	*64,5*	*4611,8*	*CIG38*	*DR*	*55,8*	*3989,7*
CIG11	*Waxy*	*44,0*	*3146,0*	*CIG39*	*DR*	*50,1*	*3582,2*
CIG12	*Waxy*	*55,3*	*3954,0*	*CIG40*	*DR*	*60,3*	*4311,5*
CIG13	*Waxy*	*64,5*	*4611,7*	*CIG42*	*DR*	*47,8*	*3417,7*
CIG15	*Waxy*	*37,7*	*2695,6*	*CIG43*	*DR*	*45,9*	*3281,9*
CIG41	*Waxy*	*48,9*	*3496,4*	*CIG44*	*DR*	*53,7*	*3839,6*
CIG49	*Waxy*	*45,6*	*3260,4*	*CIG47*	*DR*	*44,1*	*3153,2*
CIG16	*HQP*	*43,2*	*3088,8*	*CIG50*	*DR*	*63,4*	*4533,1*
CIG17	*HQP*	*55,0*	*3932,5*	*CIG52*	*DR*	*45,5*	*3253,3*
CIG18	*HQP*	*49,6*	*3546,4*	*CIG55*	*DR*	*51,6*	*3689,4*
CIG20	*HQP*	*69,4*	*4962,1*	*CIG48*	*SE*	*60,8*	*4347,2*
CIG23	*HQP*	*49,3*	*3525,0*	*CIG51*	*SE*	*64,1*	*4583,2*
CIG34	*HQP*	*41,5*	*2967,3*	*CIG53*	*SE*	*55,4*	*3961,1*
CIG35	*HQP*	*37,3*	*2667,0*	*CIG54*	*SE*	*50,1*	*3582,2*
CIG45	*HQP*	*40,2*	*2874,3*	*CIG32*	*VE*	*71,7*	*5126,6*
CIG46	*HQP*	*45,3*	*3239,0*	*CIG37*	*VE*	*66,3*	*4740,5*

TABLE 2= *Comparison of groups AYP by means of Student´s t test*

	HQP	DR	SE	VE
waxy	**1.17 ns**	**1.47 ns**	**1.75 ns**	**4.79 ****
HQP		**2.64 ***	**2.79 ***	**5.73 ****
DR			**0.49 ns**	**3.71 ****
SE				**2.78 ns**

ns= *non-significant differences*; ***=** *significant at p: 0.05 level*; ****=** *significant at p: 0.01 level*