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A DECADE OF EXPERIENCE IN MATURITY GROUP AND PLANTING DATE IN SOYBEAN [*GLYCINE MAX* L. (MERR.)] FOR NORTH-WEST ARGENTINA

SARTORI S*, SALAS G, GHIO C & ROSSI R

Nidera S.A., Ruta provincial 304 km 44, La Cruz, Dpto. Burruyacu, Tucumán, Argentina, 03731-15405171
E-mail: ssartori@nidera.com.ar

The area planted to soybeans in Argentina has experienced a progressive increase, reaching 18.7 million hectares in the 2011/12 season. Accompanying this growth, there has been an increased supply of cultivars of different maturity groups adapted to the different areas occupied by the crop in the country, allowing soybean production in areas considered marginal for this crop and risk diversification with a greater range of planting dates. In order to analyze the behaviour of cultivars from different maturity groups (MG) with different planting dates (PD) for the period 2001-2012, tests were carried out in the experimental field trials of Nidera SA located in the town of La Cruz, Department Burruyacu, Tucumán, Argentina. These cultivars belonging to MG IV to VIII were: A 4910RG indeterminate (I), NA 5009RG (I), NA 5509RG (I), NA 5909RG (I), A 6126RG, A 6411RG, A 7321RG (I), NA 7708RG. A 8000RG, NS 8004 and NA 8009RG (I). The PD was conducted from the first week of October to the end of January, spaced 15 days apart. The data show different behaviour patterns depending on performance, height, growth habit and response to PD. The bell-type curves generated correspond to the most determinate cultivars, being in some cases more stringent or broader, depending on the cultivar. Indeterminate cultivars of later maturity groups have long descending curves, with the highest values for early PD, decreasing for later PD. Finally, certain cultivars of a later maturity group and plant structure have bell type graphics but are high in later PD showing a better performance and adaptation to these PD compared to earlier PD.

A Decade of Experience in Maturity Group and Planting Date in Soybean [Glycine max L. (Merr.)] in Northwest Argentina

S. Sartori*, G. Salas, C. Ghio y R. Rossi

NIDERA S.A.
ssartori@nidera.com.ar

Agenda

- Introduction
- Materials and Methods
- Yields Analysis
- Conclusions

Introduction

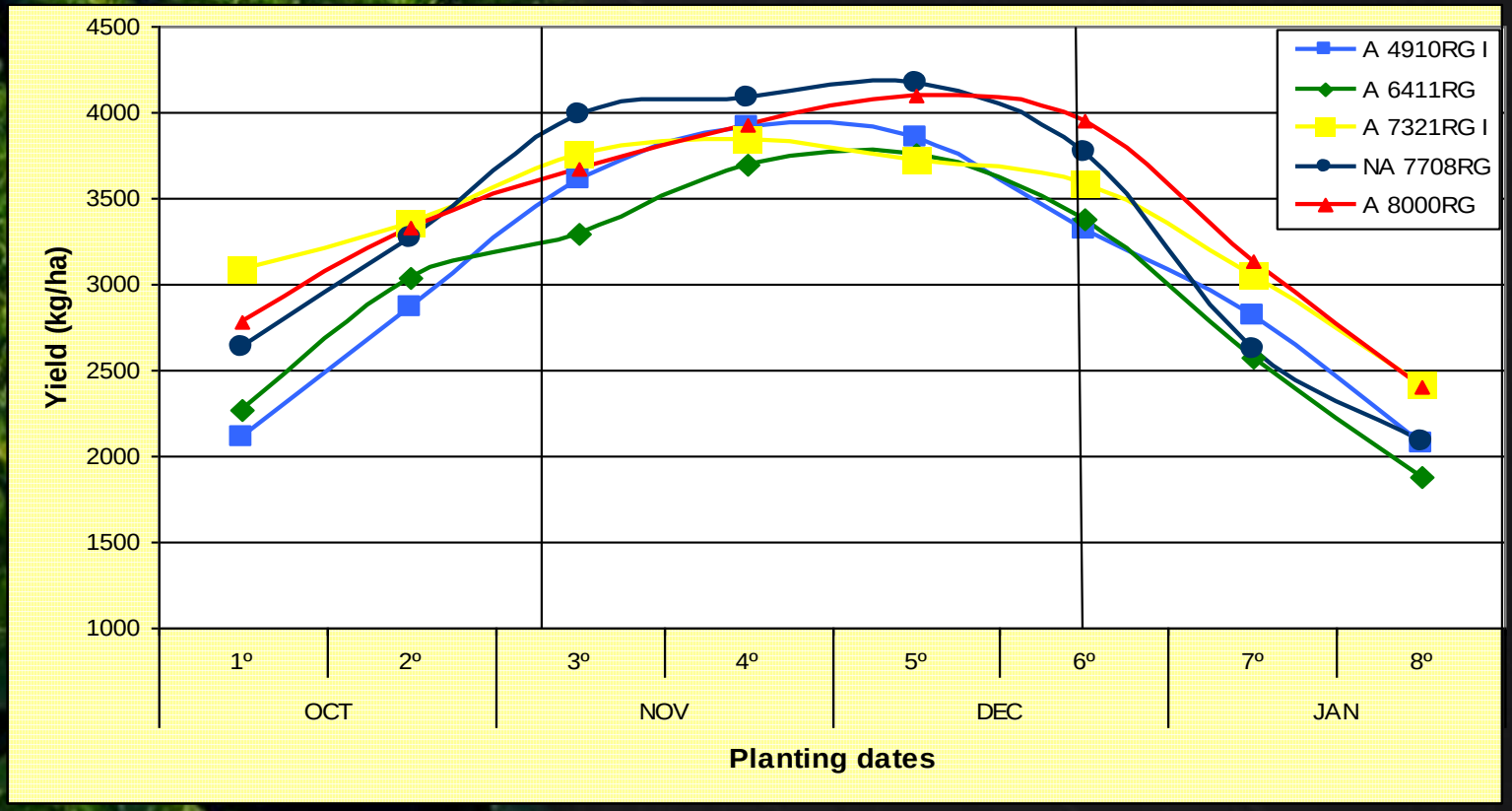
- Tests were run yearly throughout a 12 year period starting in 2001* in La Cruz, Tucumán, Argentina (26°37´lat. South, 64°52´lon. West)
- Monsoon-type hydric regime. Rainfalls occur mainly during the summer months and winters are usually dry. The historical annual mean rainfall in the area is 1023 millimeters
- The evaluated cultivars belong to Maturity Group (MG) IV to VIII, and are of determinate and indeterminate (I) growth habit. The planting dates (PD) run from the first week of October to the end of January, spaced 15 days from each other

*Results for the period 2001-2002 and 2012 were not included due to low rainfall levels

Materials and Methods

- Implanted varities for period 2004-2011: A 4910RG (I), A 6411RG, A 7321RG (I), NA 7708RG and A 8000RG (the first two numbers of the variety indicate the maturity group)
- Implanted varities for period 2009-2011: the same that previous period and NS 4903RG (I), NA 5009RG (I), NA 5509RG (I), NA 5909RG (I), NA 6126RG, NS 6448RG (SD), NS 8004RG, NA 8009RG (I) and NS 8282RG
- Four-row no tillage planter, four-row x 6m long x 0.52m, with a density of 20 seeds per linear meter.
- Fertilizer used was Super phosphate simple (150 kg/ha)
- Data recorded for each cultivar and planting date: Days to maturity, plant height and yield grain.

YIELD - 2004 through 2011 Period

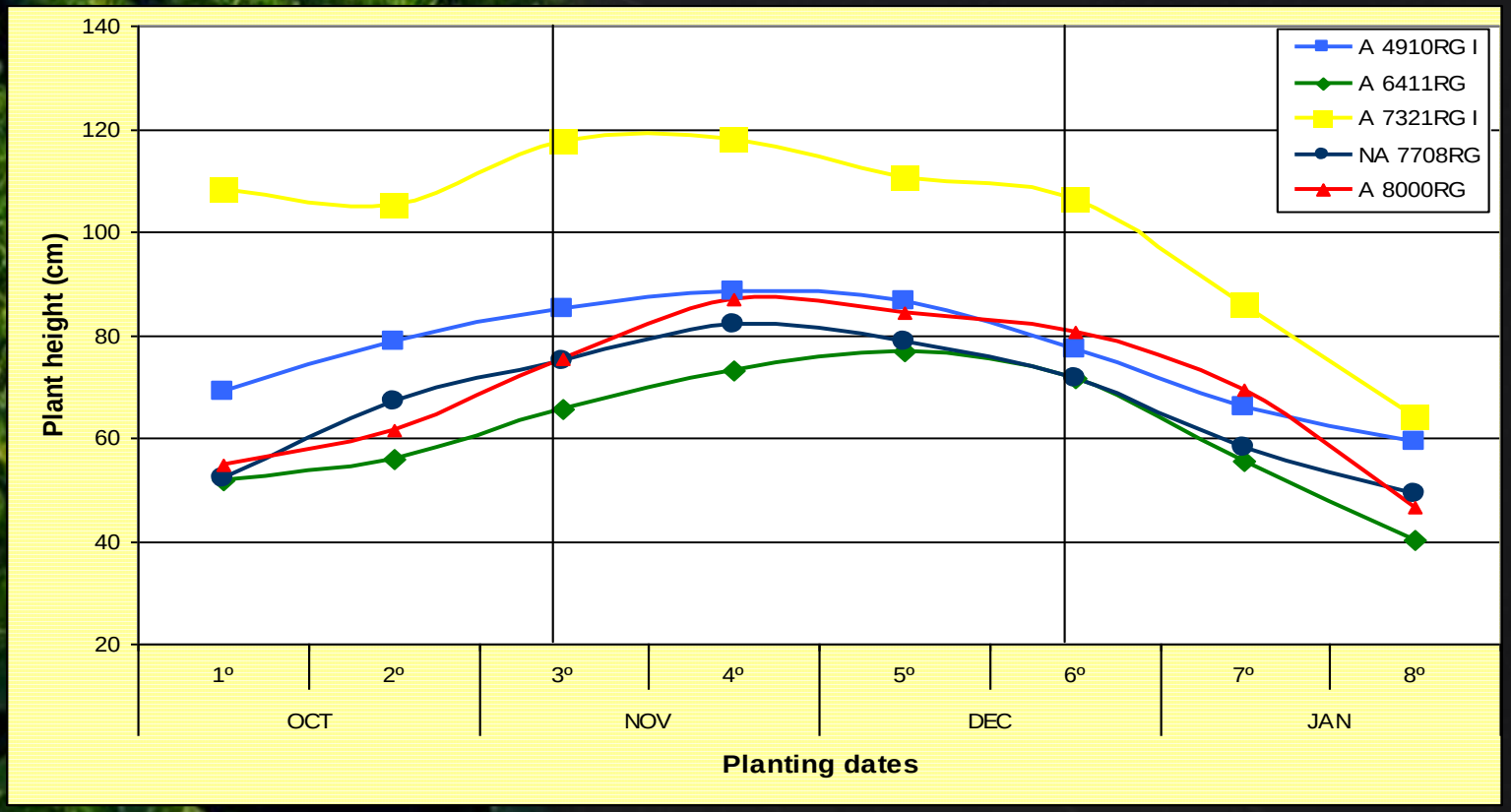


In early PD (OCT) A 7321RG I presented better performance

In optimal PD (NOV and DEC) A 8000RG and NA 7708RG varieties behaved better

In late PD (JAN) A 7321RG I and A 8000RG outperformed other cultivars

PLANT HEIGHT – 2003 through 2011 Period

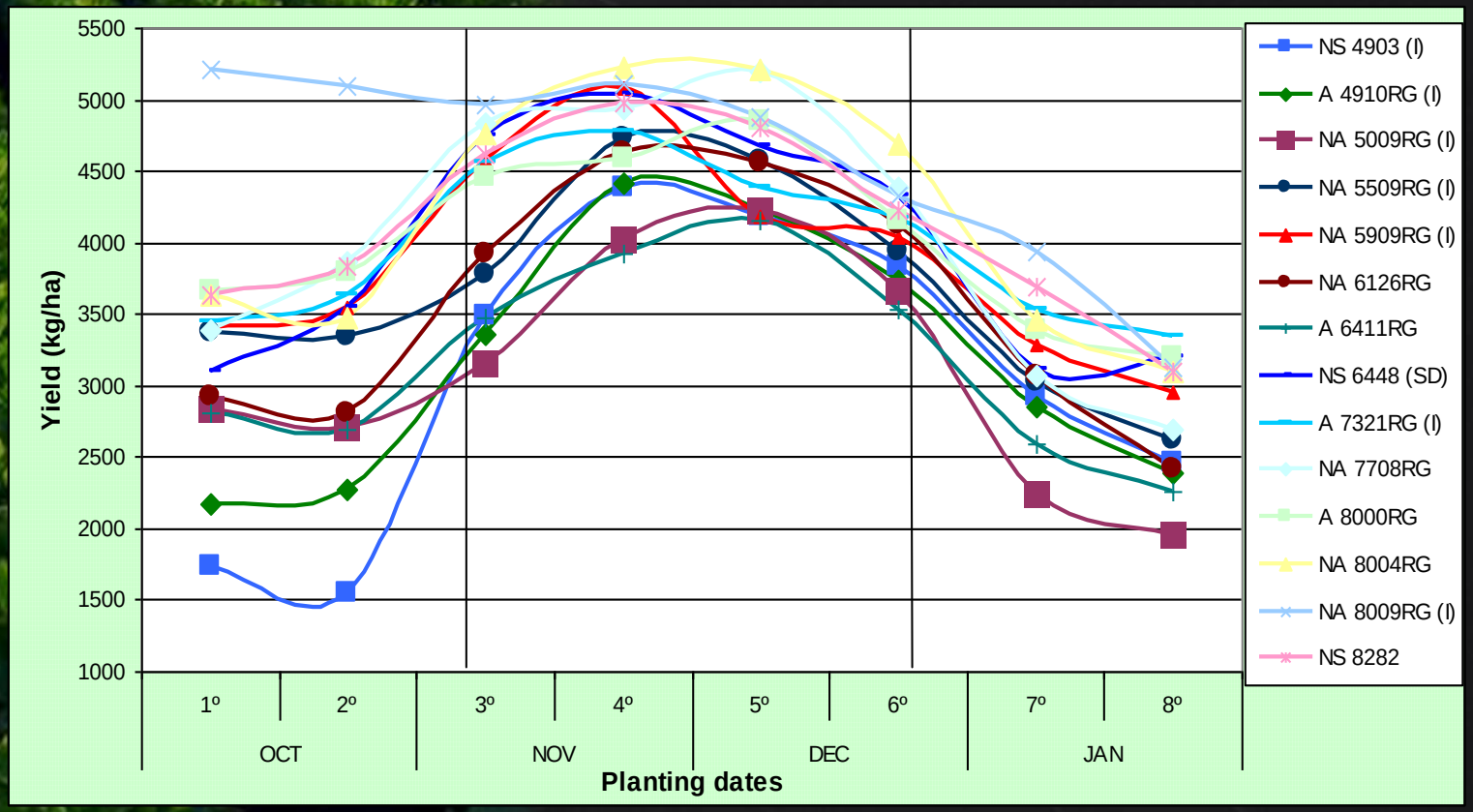


Height curves correlate with performance curves

Indeterminate varieties reached higher values in both early and late PD regarding determinate varieties (A 7321RG I)

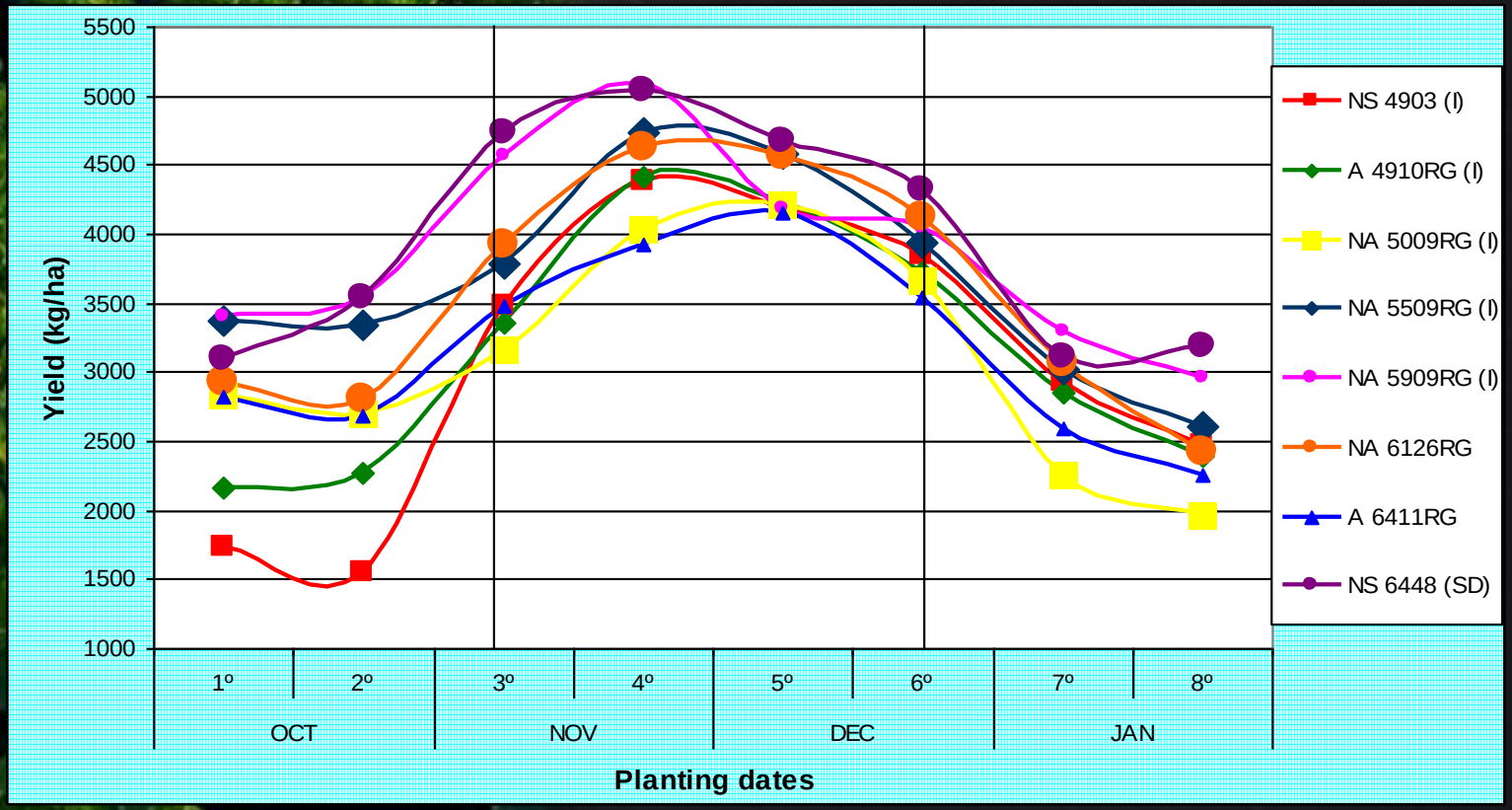
Determinate varieties had low height values in early and late PD and reached greater heights in optimal PD (A 8000RG)

YIELD – 2009 through 2011 Period



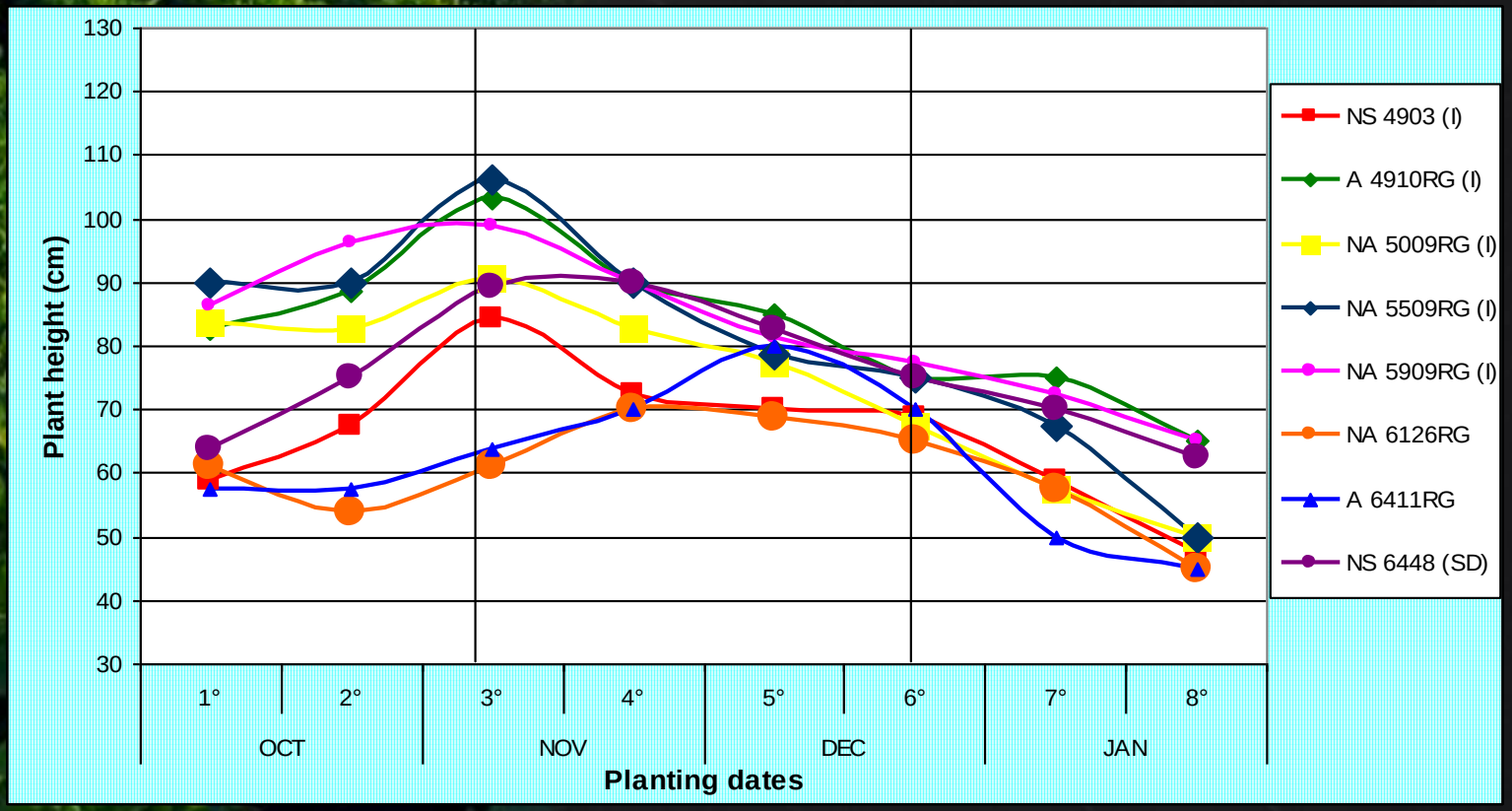
The trend kept the same, the optimal PD focused on November and December From the 14 varieties tested NA 8009RG I stood out with maximum values in the first 3 PD, in optimal PD (4 , 5 and 6) NS 8004 showed a better performance and A 7321RG I in 8th PD

YIELD EARLY MG (IV, V and VI)



The optimal PD for earlt MG were 4 , 5 , 6 and 3 PD.
NS 6448 SD and NA 5909RG I produced higher yields in most PD
In both early and late PD, NA 5909RG I, NA 5509RG I and NS 6448 SD outperformed the rest

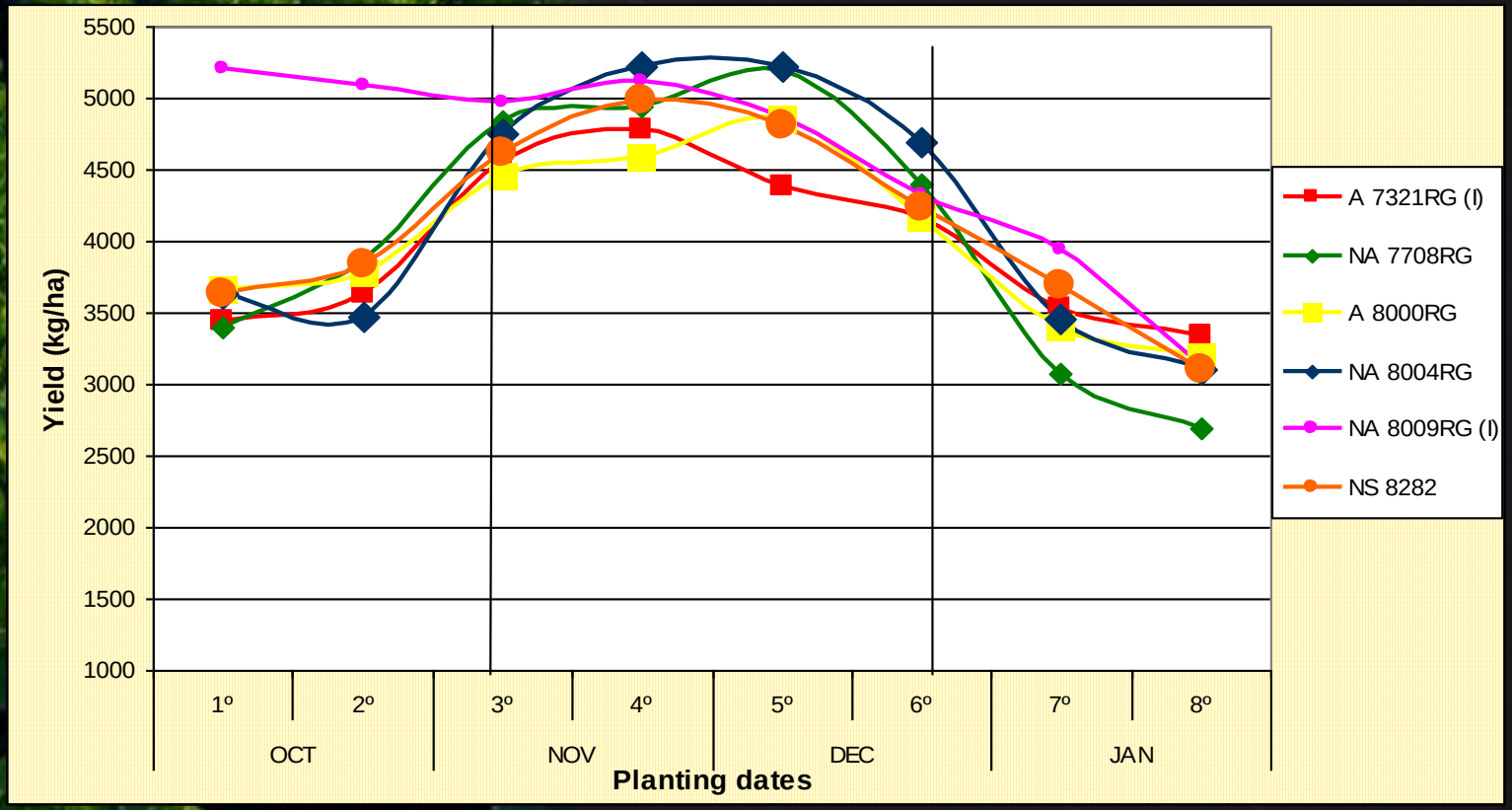
PLANT HEIGHT EARLY MG (IV, V and VI)



In early and late PD indeterminate varieties are taller than determinate varieties (A 4910RG, NA 5509RG and NA 5909RG)

In optimal PD determinate varieties reach greater height but did not exceed indeterminate varieties the same group

YIELD LATE MG (VII and VIII)

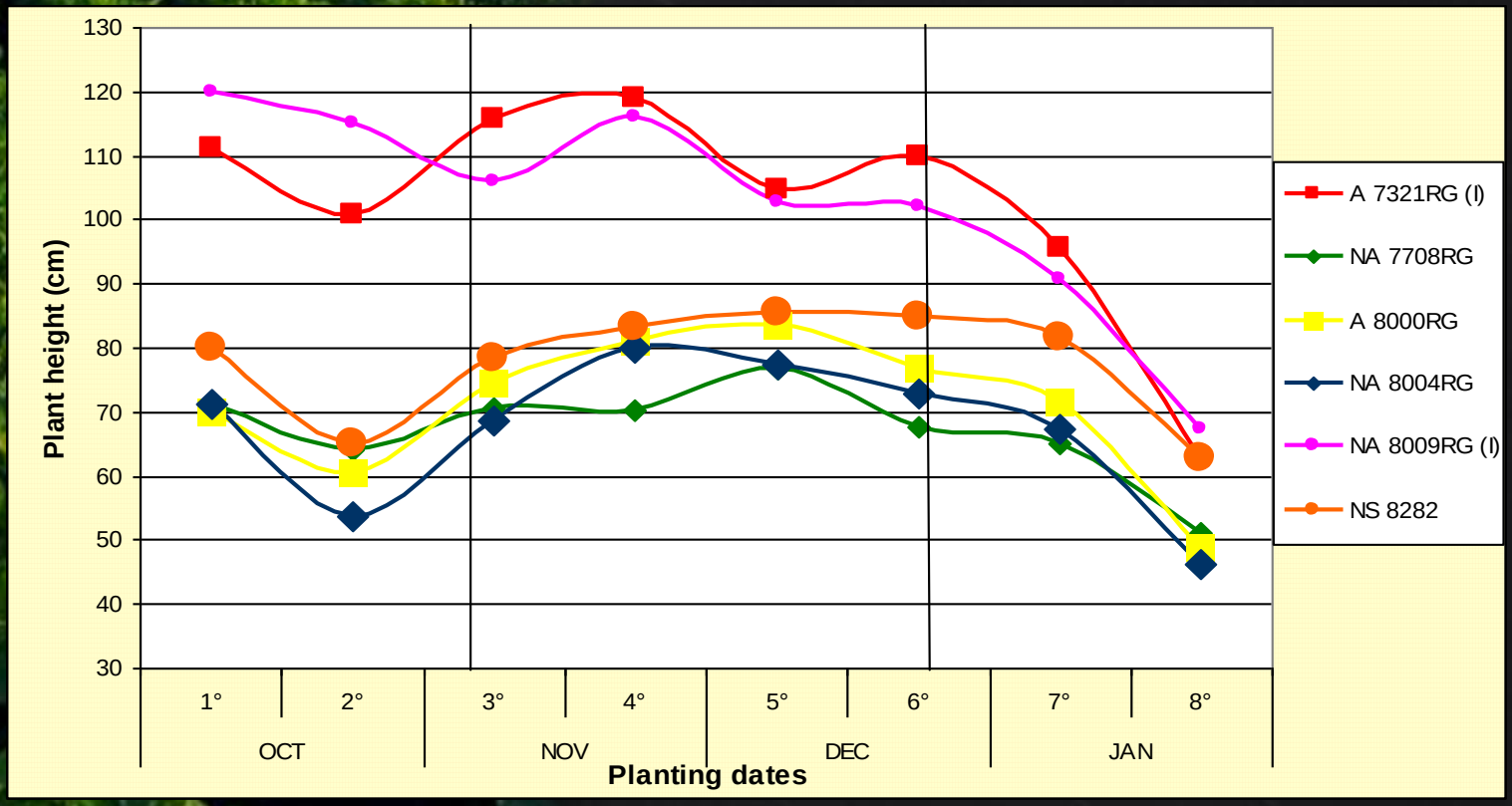


Late MG varieties had higher average values in November and December. NS 8004 outperformed the rest in these PD

In early PD (1 , 2 and 3) NA 8009RG I showed better performance, as well as the 7th PD

In late PD A 7321RG I and all MG VIII varieties showed the best performance

PLANT HEIGHT LATE MG (VII and VIII)

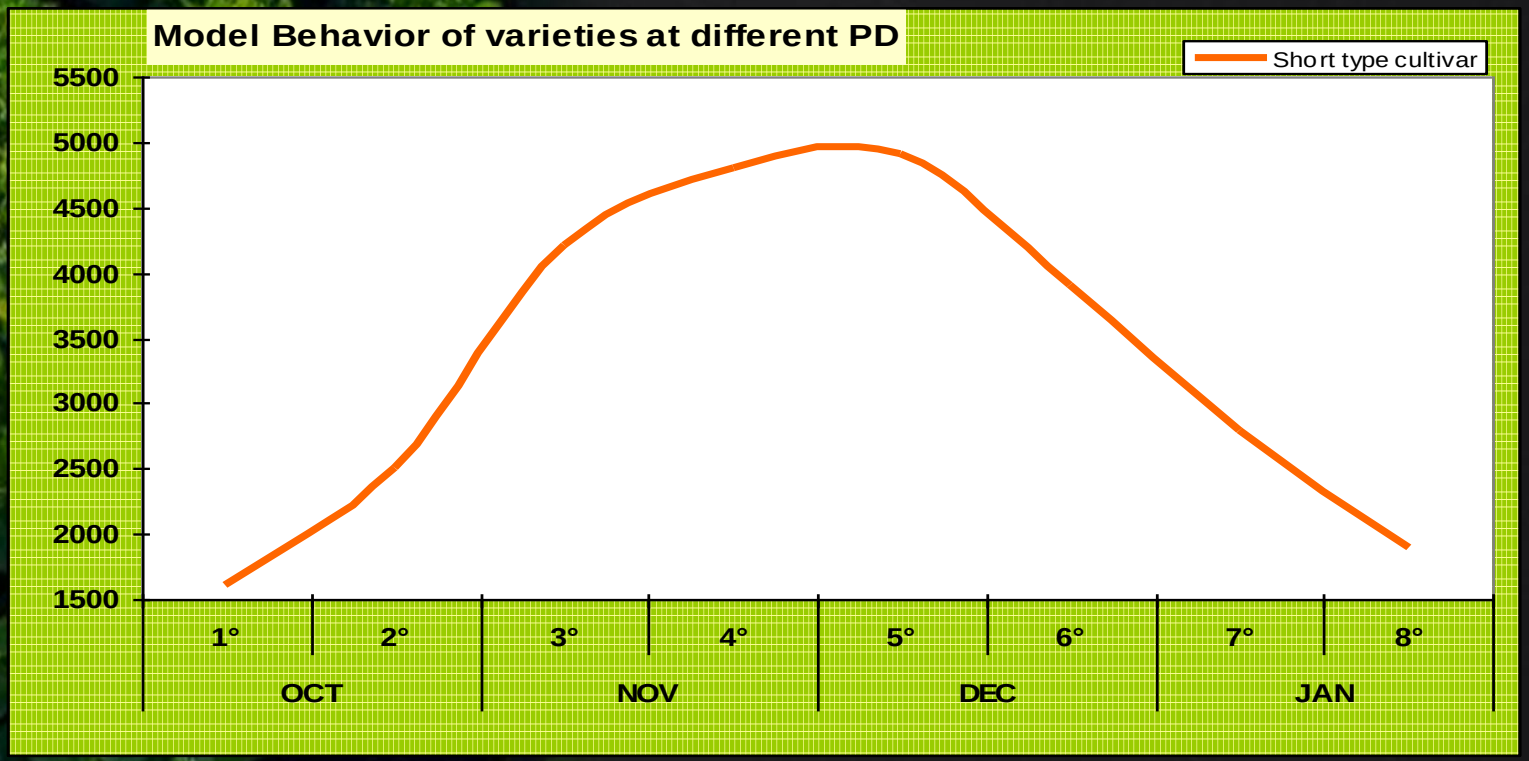


Cultivars A 7321RG I and NA 8009RG I reached the maximum height values in all PD

Determinate cultivars reached maximum heights in optimal PD (NOV-DEC) NS 8282 being the tallest, especially in late PD approaching indeterminate varieties of the same MG

Yield (Model I)

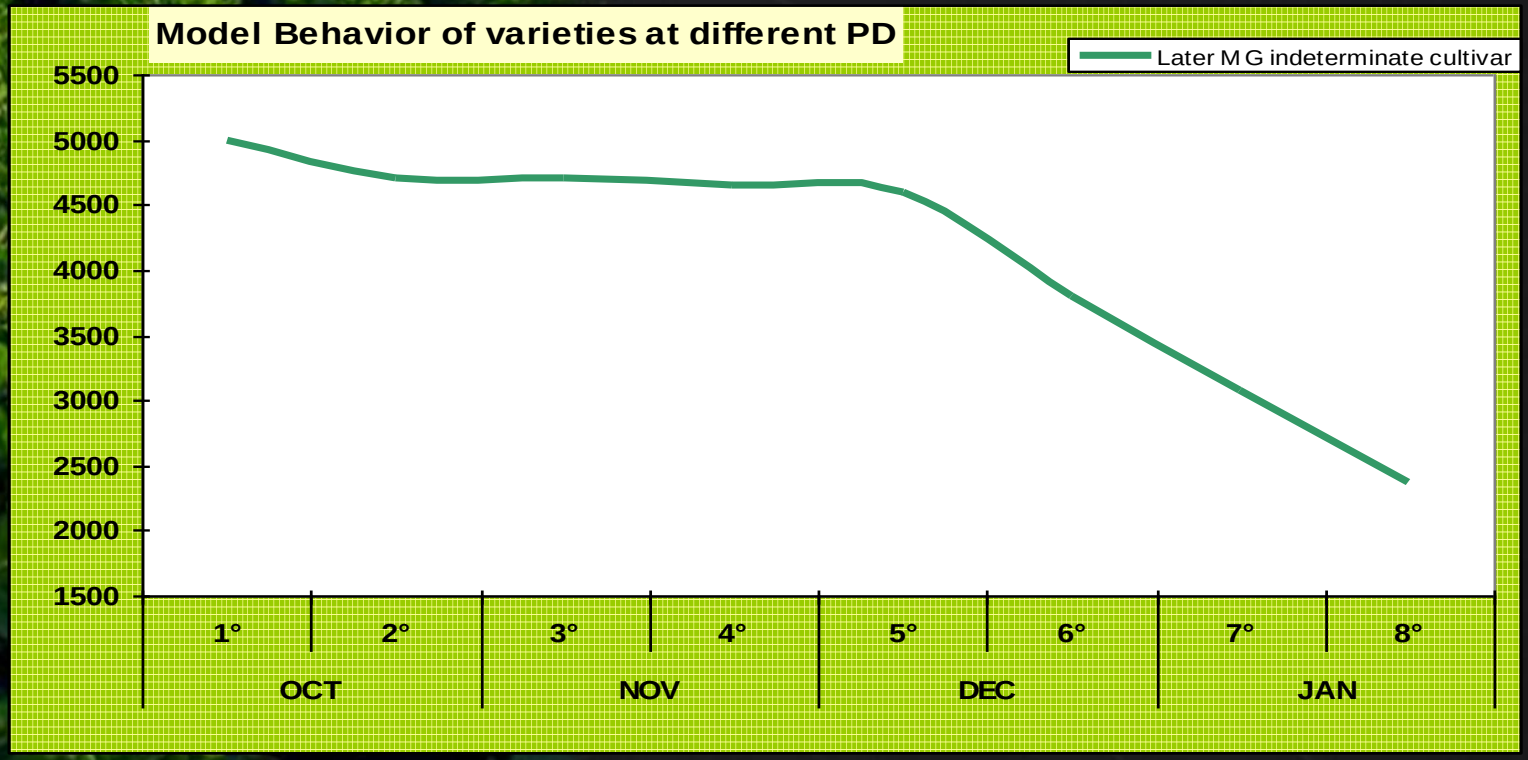
From the analysis of the behavior of varieties in the 12 years studied, three model graphics were seen according to the PD, GH and MG



1 –A typical bell-type curve represented by low bearing (short type) determinate cultivars (NA 6126RG), with very low values in height and performance in extra-early and late PD, and maximum values in optimal PD (NOV-DEC)

These bell-type curves can be more or less strict depending on the degree of photoperiod sensitivity

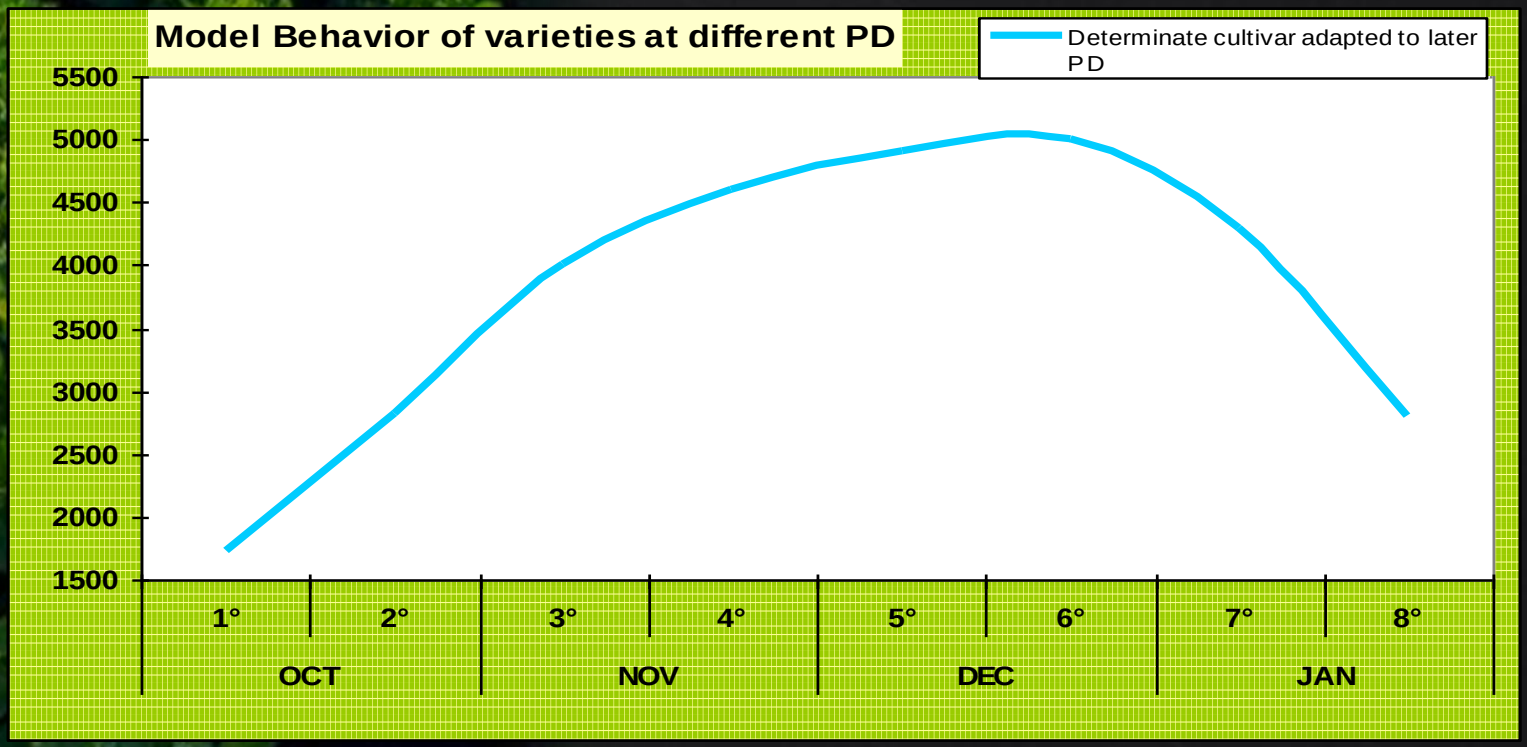
Yield (Model II)



2 – Late MG Indeterminate cultivars (VII and VIII) have a decreasing curve with maximum values in early PD and minimum in late PD (NA 8009RG I and A 7321RG I)

Yield (Model III)

3 –Some determinate cultivars have a bell-type curve wich is higher towards the end.



They have low yields in early extra-PD, high yields in optimal PD and they stand out specially in late PD (NS 8282). This behavior suggests certain photoperiod insensitivity towards the end of cycle

Conclusions

•Height at Maturity Stage: varieties of earlyMG IV and V and all determinate varieties presented bell-type height curves, whereas the long cycle indeterminate varieties showed flattened curves with higher values

•Yield: in general all varieties tested presented bell-type curves and correlation between performance and height at maturity. NA 8009RG I is the exception showing a high curve in early PD decreasing towards late PD

•The PD of higher average yield for all varieties was the 2nd half of November, followed by the 1st half of December, then 1st half of November and finally 2nd half of December

•Note that from all PD analyzed only the 2nd half of January did not exceed 4000kg/ha. In PD considered optimal (November and December) the majority of the cultivars reached and exceded 4000kg/ha.
The average performance values from all tested varieties did not exceed 4000kg/ha in October and January PD, except NA 8009RG I reaching values above 5000kg/ha in October PD.

Maturity Group and Planting Dates Recommendations

Based on the analyzed results:

For the early PD (October) indeterminate cultivars to medium-late MG are recommended (NA 8009RG, A 7321RG, NA 5909RG). Determinate cultivars to MG VII and VIII (NA 7708RG, A 8000RG, NS 8004 and NS 8282) also have good results in these PD, but they express their full potential in subsequent PD.

In November and December PD , considered optimal for the region, determinates cultivars to MG VII and VIII (NA 7708RG, A 8000RG, NS 8004 and NS 8282) and indeterminates cultivars to MG V and VIII (NA 5909RG and NA 8009RG) expressed their full potential . Indeterminate varieties to MG IV and early V and determinate varieties to MG VI also express a great potential, especially in the second half of November and early December.

In the first half of January determinate varieties to MG VIII (A 8000RG, NS 8004 and NS 8282) and indeterminate cultivars to MG VII and VIII (A 7321RG and NA 8009RG) continue to excel, outperforming earlier MG varieties in both yield and stability. Towards the end of January trend kept the same, having indeterminate varieties the best performing.

Acknowledgement

NIDERA breeding team

My family

Thank you for your attention