CONGRESO DE MAÍZ TARDÍO

EL FENÓMENO DEL MAÍZ TARDÍO: SUS RAZONES Y SU PROYECCIÓN

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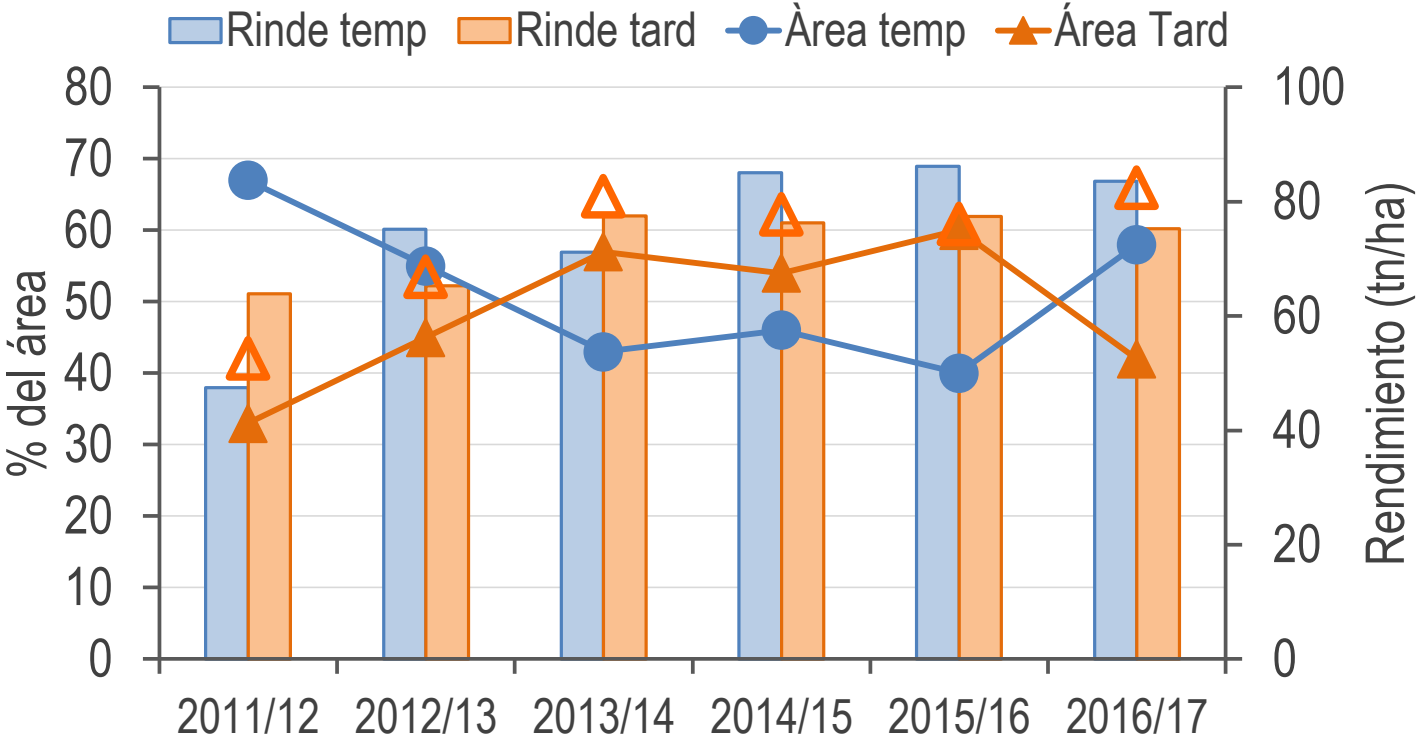
CREA / I+D

El desarrollo técnico más importante de la última década



74 qq/ha

72 qq/ha

MAIZ TARDIO

Elaboración propia en base a informes semanales de la Bolsa de Cereales de Buenos Aires y a anuarios estadísticos de AACREA

Las factores que permitieron el desarrollo

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Sowing Date and Maize Productivity: I. Crop Growth and Dry Matter Partitioning

A. G. Cirilo and F. H. Andrade*

ABSTRACT

Changes in the environment that are associated with different sowing dates can be expected to alter maize (*Zea mays* L.) growth and development in temperate regions. The objective of this work was to study the effect of sowing date on growth and dry matter partitioning of maize crops grown without water and nutrients limitations. A commercial hybrid (DK636) was grown in the field at four sowing dates (mid-September through mid-December) for 3 yr. Delays in sowing date hastened development between seedling emergence and silking, decreasing cumulative incident radiation on the crop during the vegetative period. However, late sowings increased crop growth rate during the vegetative period because of high radiation use efficiency and higher percent radiation interception. Conversely, late sowings decreased crop growth rate during grain filling because of low radiation use efficiency and low incident radiation. Late sowings affected grain yield by decreasing kernel weight and kernel number per unit area. Moreover, maize subject to these treatments accumulated more dry matter before silking than from silking to physiological maturity, while the inverse was true for early sowings. Thus, delaying the sowing date strongly decreased dry matter partitioning to grain.

VARIATION IN SOWING DATE in maize modifies the radiative and thermal conditions during growth. The amount of incident radiation and the proportion of this radiation that is intercepted by the crop directly determine crop growth rate (Tollenaar and Bruulsema, 1988; Muchow et al., 1990). Temperature affects the duration of crop growth (Brown, 1977; Hardacre and Turnbull, 1986; Warrington and Kanemasu, 1983a), and consequently the time during which incident radiation can be intercepted and transformed to dry matter. Temperature also affects final leaf number (Hesketh et al., 1969; Tollenaar and Hunter, 1983; Stevenson and Goodman, 1972) and leaf canopy development (Tollenaar et al., determine the proportion of the incident radiation that is intercepted by the crop. Moreover, low temperatures reduce radiation use efficiency (RUE) in maize (Carberry et al., 1989; Andrade et al., 1993).

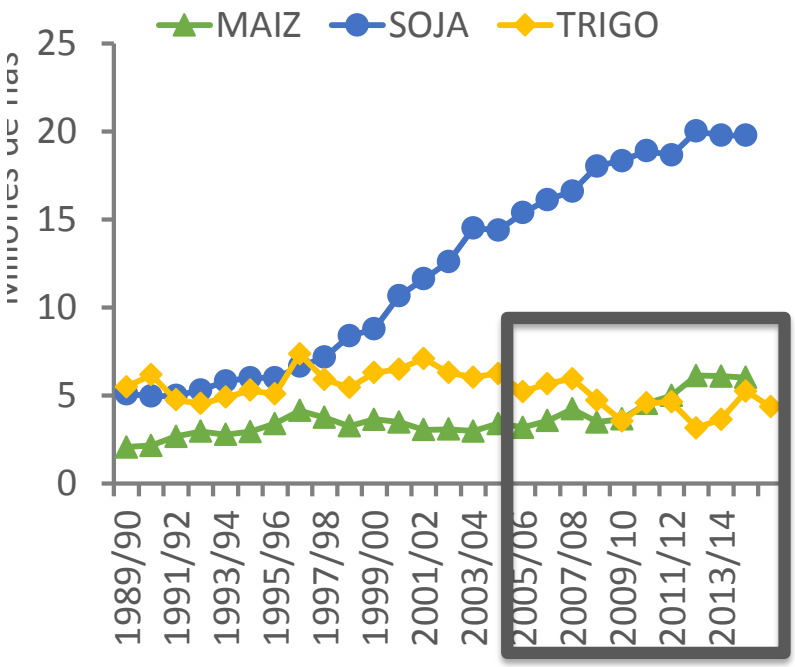
Thus, important effects of these environmental factors on growth and development could be expected when sowing date is modified in temperate regions. The effect of different sowing dates on the ecophysiological determinants of crop growth and dry matter partitioning has not been reported for maize. The objective of this work was to study the effect of sowing date on intercepted radiation, radiation use efficiency, and dry matter partitioning during the growing period of maize grown in a temperate area, without water and nutrients limitations.

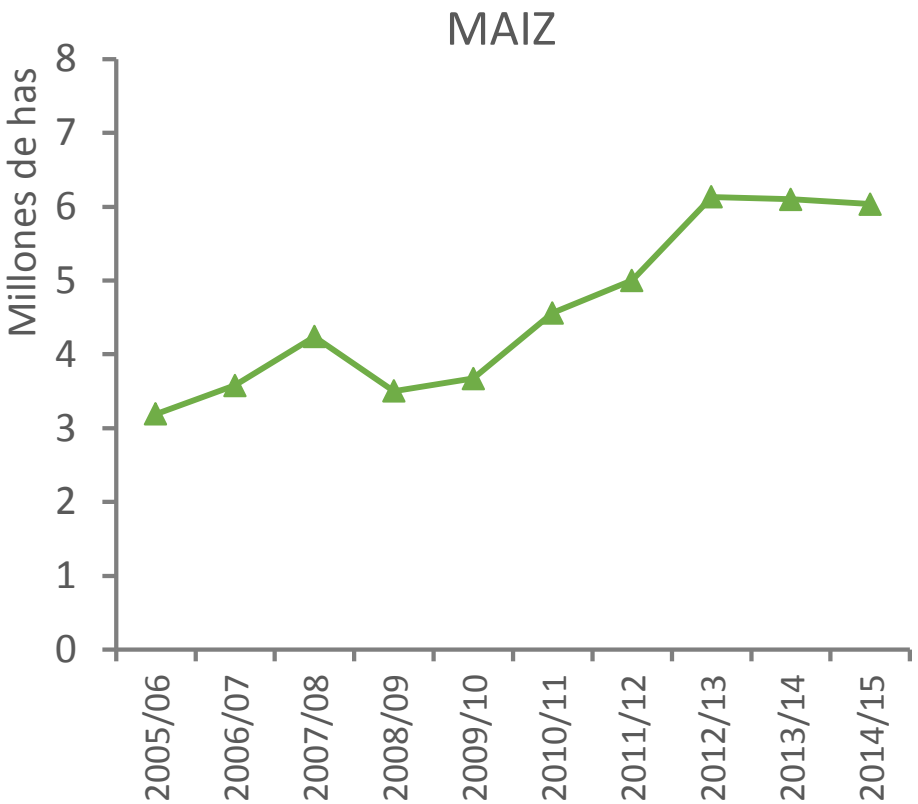
MATERIALS AND METHODS

The experiment was conducted at the INTA Balcarce Experimental Station (−37° 45′ lat., 58° 18′ long., altitude 130 m) during the 1989–1990, 1990–1991, and 1991–1992 growing seasons where water and nutrients were at non-limiting levels. The soils were Typic Argiudols with an organic matter content of 56 g kg^{-1} in the first 25 cm of depth. With irrigation, soil water content was kept above 50% of maximum soil available water to 1 m. The experimental fields were fertilized with 30 kg P ha^{-1} at sowing and 150 kg N ha^{-1} at crop stage V5 (Ritchie and Hanway, 1982) in the first and second growing season. Fields in the third season were fertilized similary, except that 200 kg N ha^{-1} were applied. Weeds, insects, and diseases were adequately controlled.

Commercial hybrid Dekalb 636 (FAO 530) was sown in mid-September, mid-October, mid-November, and mid-December each year. Only the first three planting dates were studied in the first year. Sowing dates were 19 September, 17 October, and 16 November for the first year; 17 September, 16 October, 16 November, and 14 December for the second

Los impactos del desarrollo





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Entendiendo y proyectando el fenómeno

Ventajas como cultivo

Estabilidad productiva

Aporte a la diversificación

Pero…

Integración al sistema

Manejo de adversidades

Performance como antecesor

Otros…

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Estabilidad productiva

Diseñamos un acople más seguro entre oferta y demanda

Febrero
Marzo

Localidad	Lluvia OCT-NOV	Lluvia/ETP DIC	Lluvia/ETP FEB
Junín	231	0.68	1.31
Pehuajó	238	0.77	1.37
Laboulaye	174	0.80	1.04
Marcos Juárez	199	1.00	1.23
Gualeguaychú	220	0.63	1.38
Oliveros	225	1.04	1.22
C. Suárez	196	0.59	0.78

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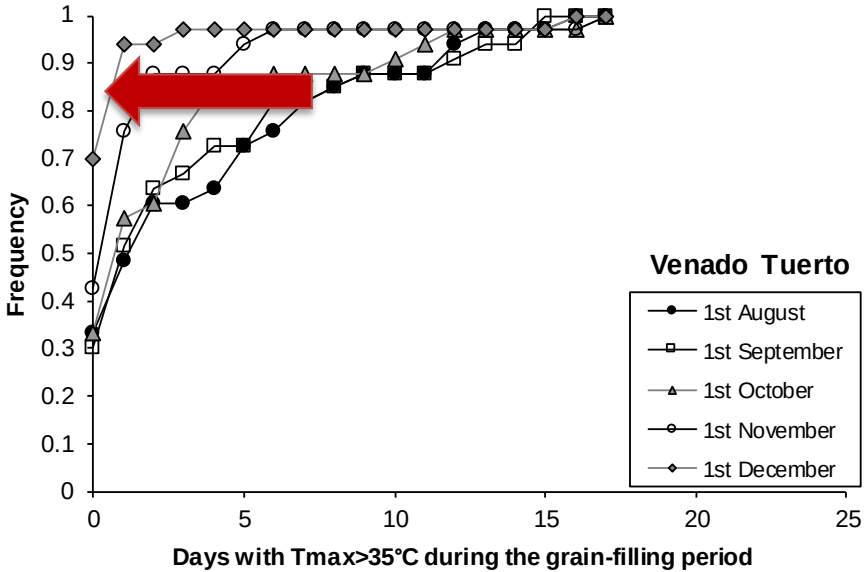
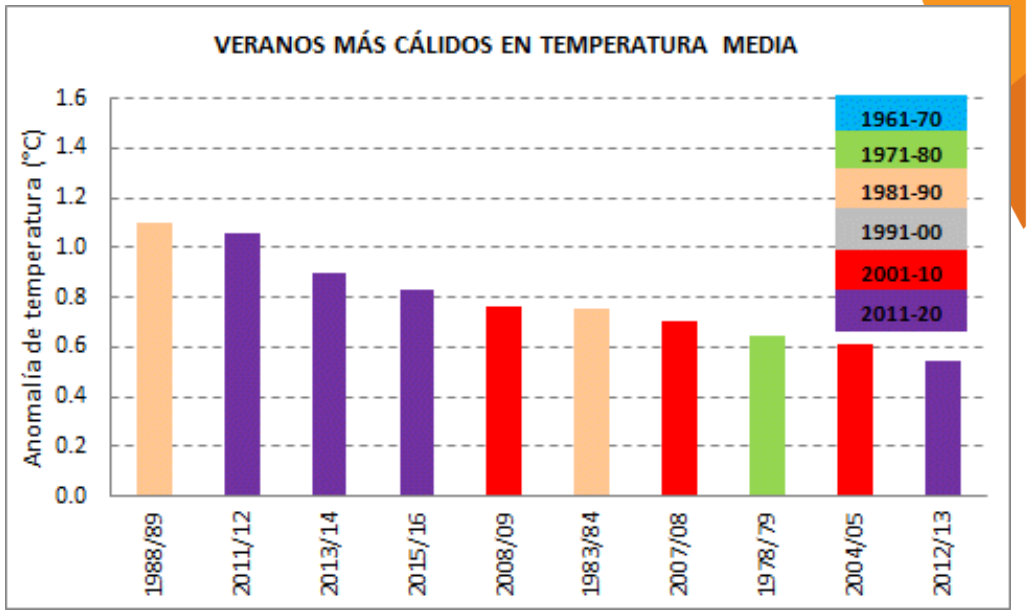
Estabilidad productiva

Elegimos un planteo menos expuesto a altas temperaturas





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Derecha: Servicio Meteorológico Nacional, Izquierda: Maddonni 2012

Aporte a la diversificación

Incorporamos un cultivo con comportamiento distinto…
A quién?

Coeficientes de correlación Spearman entre Maíz tardío y Maíz temprano y Soja de 1ra

Datos de proyecto Biblioteca de Rindes, AACREA – Cultivar SA

Localidad	Maíz temp	Soja 1ra
Río Cuarto	0.12	-0.15
Pilar	0.07	0.18
Paraná	0.29	0.06
Junín	0.30	**0.63**
Reconquista	-0.03	**0.52**
Pehuajó	0.00	-0.16
Gral Villegas	0.02	-0.11
Cnel Suárez	0.07	**0.29**

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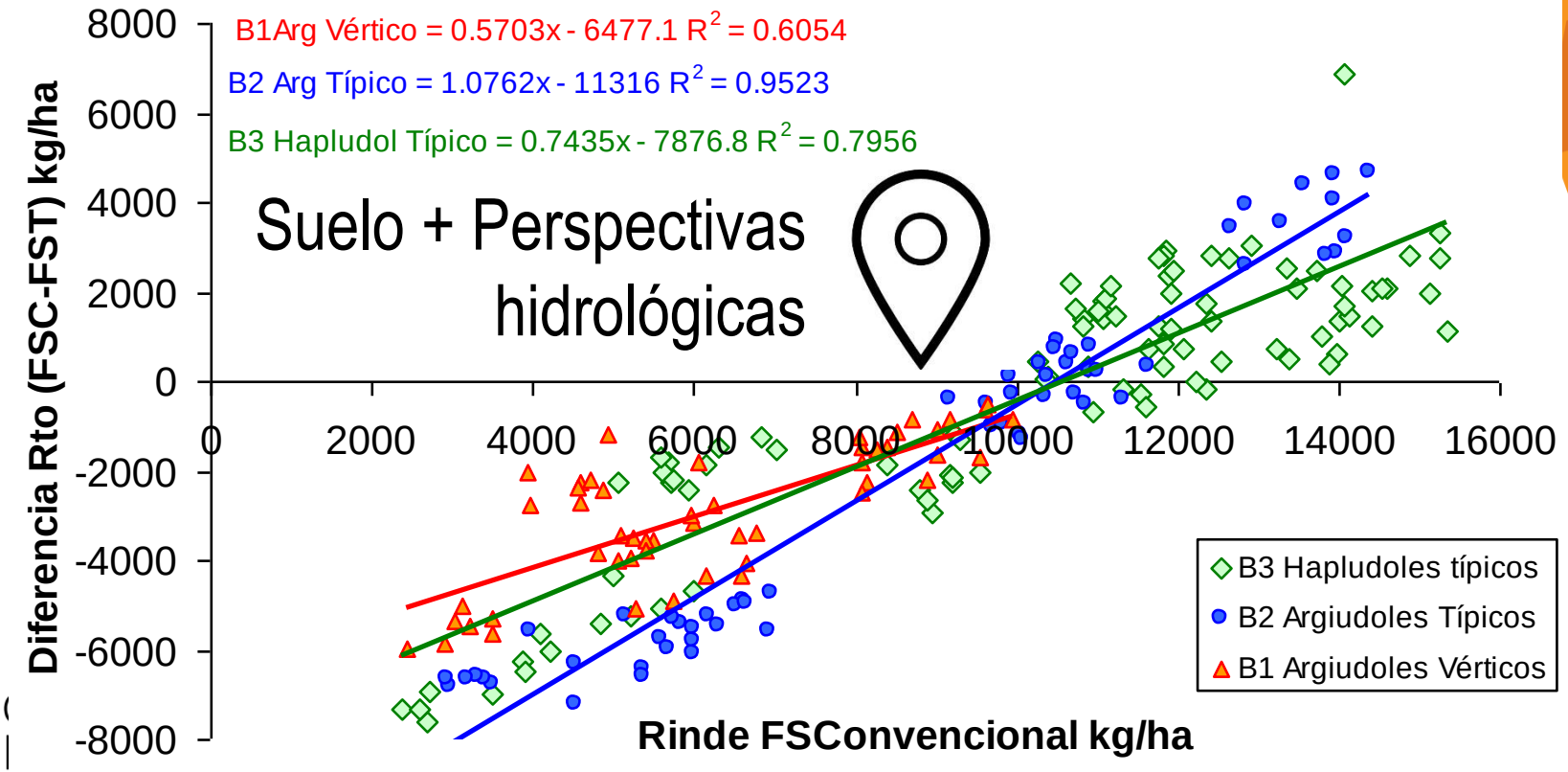
Diversificación inteligente (no automática!)



M. Ermacora, Zona Norte de Buenos Aires, CREA (8 campañas)

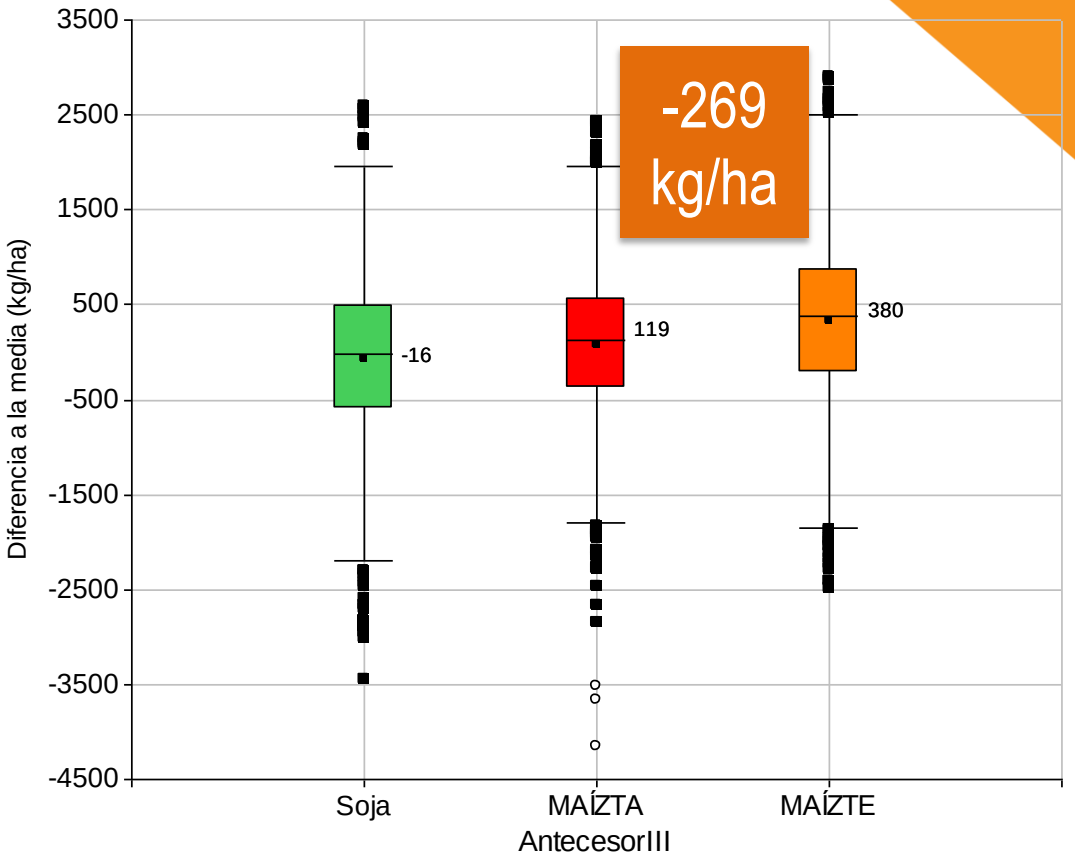
El futuro

Integración al sistema

Performance como antecesor

Efecto del antecesor (campaña anterior) sobre el rendimiento de soja de 1ra.

Datos de zona Centro de CREA, campañas 2009/16



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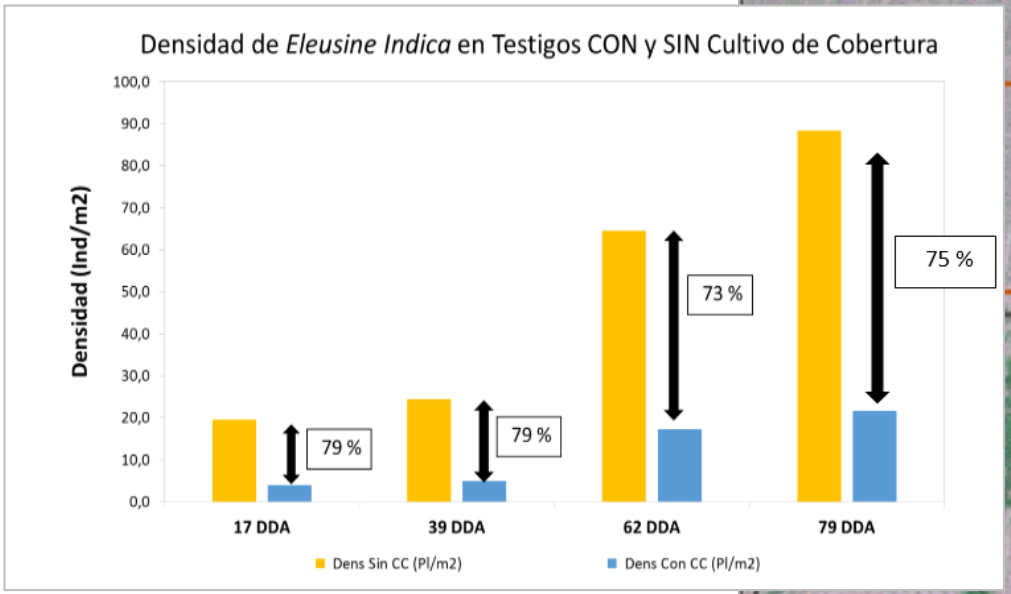
Manejo de adversidades: malezas

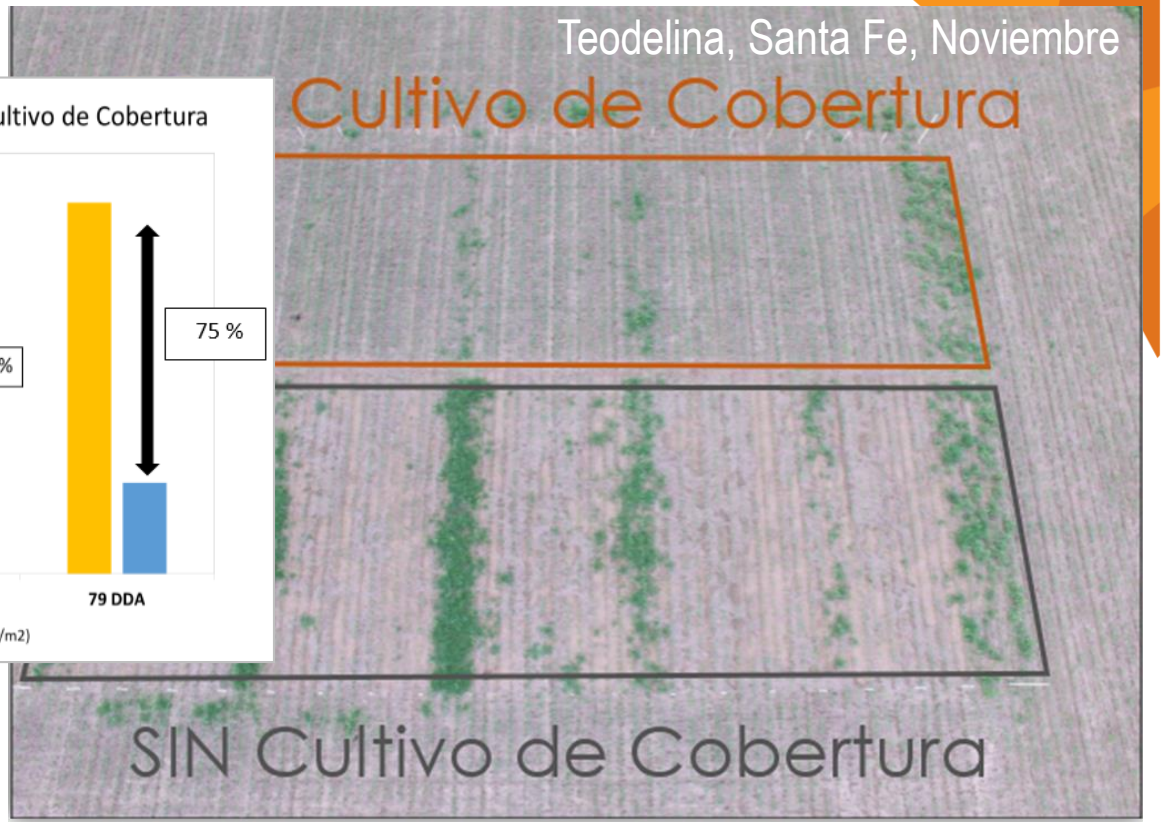
Temprano		Tardío
Gli+Atz+2,4D	JUL	Gli+Atz+2,4D
	AGO	
Gli+Atz+Picl+Adengo/Acu	SEPT	
	OCT	Gli+Atz+2,4D+Cle
Topr	NOV	Gli+Atz+2,4D+Picl
	DIC	Adengo/Acu
	ENE	Topr
US$/ha 111		**US$/ha 160**

Posibles estrategias químicas en lotes con maleza problema Eleusine para Temprano y Tardío
Proyecto Malezas CREA

Manejo de adversidades: malezas

Efecto de cultivo de cobertura (trigo) en población de Eleusine. Módulo CREA Sur de Santa Fe. Proyecto Malezas CREA





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Manejo de adversidades: plagas

Pérdida de rendimiento (kg/ha) en las últimas 7 campañas pare fecha Tardía y Temprana, promedio de 4 localidades (Daño de Eliotis+Carpophilus)

Datos de zona Norte de Buenos Aires de CREA

	Fecha de siembra Tardía							Fecha de siembra Convencional			
Evento	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2011-12**	**2012-13**	**2013-14**	**2014-15**
MGRR	479 a	492 a			a		357 a	36			85 a
Hx	473 a	486 a			c			28			
VT3Pro	346 b	368 b			b	177 b	186 b	17			62 b
Td		484 a			b	224 a		38			81 a
PW					b	169 b	216 b				53 b
Vip3					d	28 c	53 c				
Probabilidad	0.02	0.12			0	0.00	0.00	0.4			0.06
DMS (5%)	92	110	167	68	47	40	40	29	65	40	25

Tardío
25-492
kg/ha

Temprano
15-100
kg/ha

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Dependencia de tecnologías

POWERCORE

LIBERTY LINK

Clearfield
Sistema de Producción

Roundup Ready TECHNOLOGY

Agrisure Viptera

HERCULEX Insect Protection HX ™

MaízGard
Protegido de Insectos

genuity
VT TRIPLE PRO CORN

Resultados económicos 2017/18

Índice de Viabilidad Económica

Rinde de Indiferencia vs Rinde Promedio

1

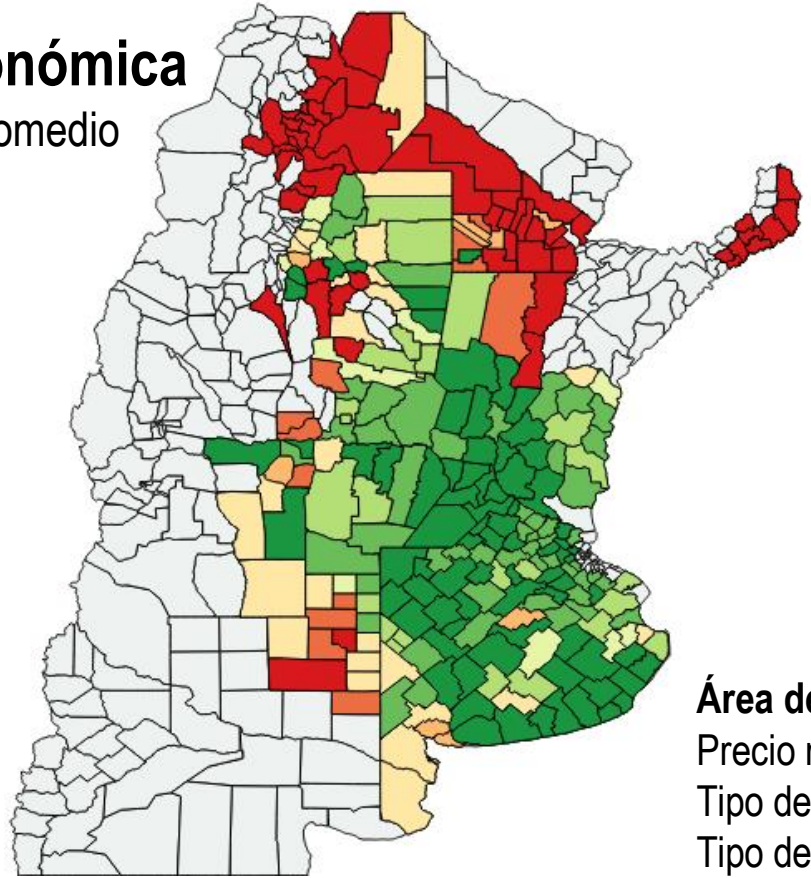
RI = RP

0

59% superficie >10%

30% superficie 10 / -10%

11% superficie <-10%



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Área de Economía, CREA

Precio maíz: 150 US$/Ton

Tipo de cambio compra: 18,12

Tipo de cambio venta: 18,64

Comentarios finales

- EL desarrollo técnico de la última década
- Complemento pero nunca reemplazo del temprano: tiene su nicho
- Llegó para quedarse; su futuro depende de su inserción en el sistema
- Clave el comportamiento como antecesor y manejo de adversidades
- **Es un buen año para que seguir recuperando maíz!**

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GRACIAS!

A ustedes

Al Equipo de I+D de CREA

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Al equipo de estimaciones de la Bolsa de Cereales de BA

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Al Servicio Meteorológico Nacional

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