

VALIDATION OF EMPIRICAL MODEL OF SOYBEAN PHENOLOGY SIMULATION

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The use of a simulation model to predict the occurrence date of different development stages of soybean is of great interest for the decision-making process. A simulation model (SIFESOJA 2011) was developed from a database generated during ten years of soybean trials (2001–2010) placed at 23 locations (from 23° 48' to 38° 20' SL). These trials included different sowing dates (from September to February) and cultivars differing in terms of maturity group (from III to VIII). By using cultivar, sowing date, and latitude, the model calculates times to full flower (R2), the beginning of seed formation (R5), full seed (R6), beginning of maturity (R7), and full maturity (R8). Data simulated by SIFESOJA 2011 were compared to i) phenology data (n=540) registered at Paraná from 18 cultivars growing during six sowing dates for phenostages R2, R5, R6, R7, and R8, and ii) phenology data (n=290) registered at 22 locations for phenostages R2 and R8 (*Red Nacional de Evaluación de Cultivares de Soja*, RECSO).

Model validation in Paraná showed that 64.4% of deviation was less than or equal to 3 days, and 80.3% was less than or equal to 5 days. When only sowing dates from November to February were analyzed, deviations increased to 81.1% and 94.2%, respectively. Model validation from RECSO showed that 60.1% of deviation was less than, or equal to, 3 days, 78.1% was less than, or equal to, 5 days, and 90.3% was less than or equal to 7 days. The lower data fit from RECSO information may be attributed to less experimental pressure that characterized these trials. When the total data (830) were analyzed, mean deviation was 3,38 days.

Validation of Empirical Model of Soybean Phenology Simulation

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- A simulation model (SIFESOJA 2011) was developed from a database generated during ten years of soybean trials (2001–2010) placed on 23 locations (from 23° 48' to 38° 20' SL).
- These trials include different sowing dates (from September to February) and cultivars differing in terms of maturity group (from III to VIII).

- By using cultivar, sowing date, and latitude, the model calculates times to full flower (R2), begin seed (R5), full seed (R6), begin maturity (R7), and full maturity (R8) according to Fehr and Cavinnes (1977).
- It also performs inverse simulation; by choosing cultivar and critical period date (R5) it calculates the sowing date
- It shows graphics of yield and plant height when modifying sowing date, which allows you to compare pairs of cultivars

- SIFESOJA has reached an important spreading in Argentina, where it is used as a tool to help in the decision making process.
- It is mainly used in order to avoid the coincidence between critical period and hydric stress.
- It is also used to program plague and disease controls, and to predict harvest date.

Si.Fe.Soja 2012 - Simulación directa - Sin título

ArchivoEdiciónVerHerramientasAccionesAyuda



Fecha de repetición: 14/11/2012Fecha de inicio de secuenciamiento: 15/09/2012Intervalo: 10

Filtrar

A 3302

DM 3000

DM 3100

SP 3X1

NK 3200

SRM 3402

SRM 3300

SRM 3410

AZUL 35

☒ Grupo 3C☐ Grupo 3L

☐ Grupo 4☐ Grupo 5☐ Grupo 6

☐ Grupo 7☐ Grupo 8

	Cultivar	Fecha de siembra	R2	R5	R6	R7	R8
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Configuración de latitud

Elija la latitud para cada grupo de madurez. Los mismos tienen un rango valido determinado

Grupo 3C:

31+
-51+
-

Grupo 3L:

31+
-51+
-

Grupo 4:

31+
-51+
-

Grupo 5:

31+
-51+
-

Grupo 6:

31+
-51+
-

Grupo 7:

31+
-51+
-

Grupo 8:

31+
-51+
-

Información de cultivares

Filtrar

A 3302

A 3401

A 3901

Ciclo

Hábito de crecimiento

Flor

Pubescencia

3.0

Indeterminado

Púrpura

Gris



Fecha de repetición: 14/11/2012 Fecha de inicio de secuenciamiento: 15/09/2012 Intervalo: 10

Filtrar

A 8000

DM 7.8I

SRM 7800

DM 8002

NS 8004

A 8009 RG

NS 8282

☐ Grupo 3C ☐ Grupo 3L

☐ Grupo 4 ☐ Grupo 5 ☐ Grupo 6

☐ Grupo 7 ☒ Grupo 8

	Cultivar	Fecha de siembra	R2	R5	R6	R7	R8
1	NK 3200	14/11/2012	15/12/2012	12/1/2013	5/2/2013	25/2/2013	9/3/2013
2	SRM 3410	14/11/2012	22/12/2012	21/1/2013	16/2/2013	8/3/2013	20/3/2013
3	DM 4250	14/11/2012	23/12/2012	26/1/2013	19/2/2013	7/3/2013	19/3/2013
4	NA 4990	14/11/2012	23/12/2012	24/1/2013	15/2/2013	11/3/2013	23/3/2013
5	NA 5509	14/11/2012	18/1/2013	18/2/2013	12/3/2013	26/3/2013	7/4/2013
6	MG 5631	14/11/2012	17/1/2013	11/2/2013	5/3/2013	26/3/2013	4/4/2013
7	A 6411	14/11/2012	17/1/2013	12/2/2013	2/3/2013	29/3/2013	5/4/2013
8	NS 6448	14/11/2012	22/1/2013	25/2/2013	13/3/2013	31/3/2013	6/4/2013
9	A 7636	14/11/2012	24/1/2013	25/2/2013	13/3/2013	9/4/2013	20/4/2013
10	TJ 2170	14/11/2012	21/1/2013	23/2/2013	16/3/2013	2/4/2013	14/4/2013
11	A 8000	14/11/2012	28/1/2013	2/3/2013	20/3/2013	15/4/2013	26/4/2013
12	NS 8004	14/11/2012	3/2/2013	13/3/2013	1/4/2013	13/4/2013	21/4/2013

Configuración de latitud

Elija la latitud para cada grupo de madurez. Los mismos tienen un rango válido determinado

 Grupo 3C: 31 + - 51 + -

 Grupo 3L: 31 + - 51 + -

 Grupo 4: 31 + - 51 + -

 Grupo 5: 31 + - 51 + -

 Grupo 6: 31 + - 51 + -

 Grupo 7: 31 + - 51 + -

 Grupo 8: 31 + - 51 + -

Información de cultivos

Filtrar

A 3302

A 3401

A 3901

Ciclo Hábito de crecimiento Flor Pubescencia

3.0 Indeterminado

Púrpura Gris

Si.Fe.Soja 2012 - Simulación inversa - Sin título

Archivo
Edición
Ver
Herramientas
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Ayuda

Fecha de repetición: 15/02/2013
Fecha de inicio de secuenciamiento: 15/09/2012
Intervalo: 14

Filtrar

NA 5009
A 5766
DM 5.1
SRM 5001
FN 5.45
RAR 503
RA 532
RA 514
NA 5485
A 5435
A 5409
BIO 5.40

☐ Grupo 3C
☐ Grupo 3L
☐ Grupo 4
☒ Grupo 5
☐ Grupo 6
☐ Grupo 7
☐ Grupo 8

	Cultivar	Fecha de R5	Fecha de siembra
1	A 3302	15/2/2013	24/12/2012
2	NA 4990	15/2/2013	13/12/2012
3	NA 5485	15/2/2013	25/11/2012
4	A 6411	15/2/2013	20/11/2012
5	A 7636	15/2/2013	24/10/2012
6	NS 8282	15/2/2013	2/10/2012
7			
8			
9			
10			
11			
12			

Configuración de latitud

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Grupo 3C:

31

+

-

51

+

-

Grupo 3L:

31

+

-

51

+

-

Grupo 4:

31

+

-

51

+

-

Grupo 5:

31

+

-

51

+

-

Grupo 6:

31

+

-

51

+

-

Grupo 7:

31

+

-

51

+

-

Grupo 8:

31

+

-

51

+

-

Información de cultivos

Filtrar

A 3302
A 3401
A 3901

Ciclo

Hábito de crecimiento

Flor

Pubescencia

3.0
Indeterminado
Púrpura
Gris

- Cortar Ctrl+X
- Copiar Ctrl+C
- Pegar Ctrl+V
- Eliminar Del

SD

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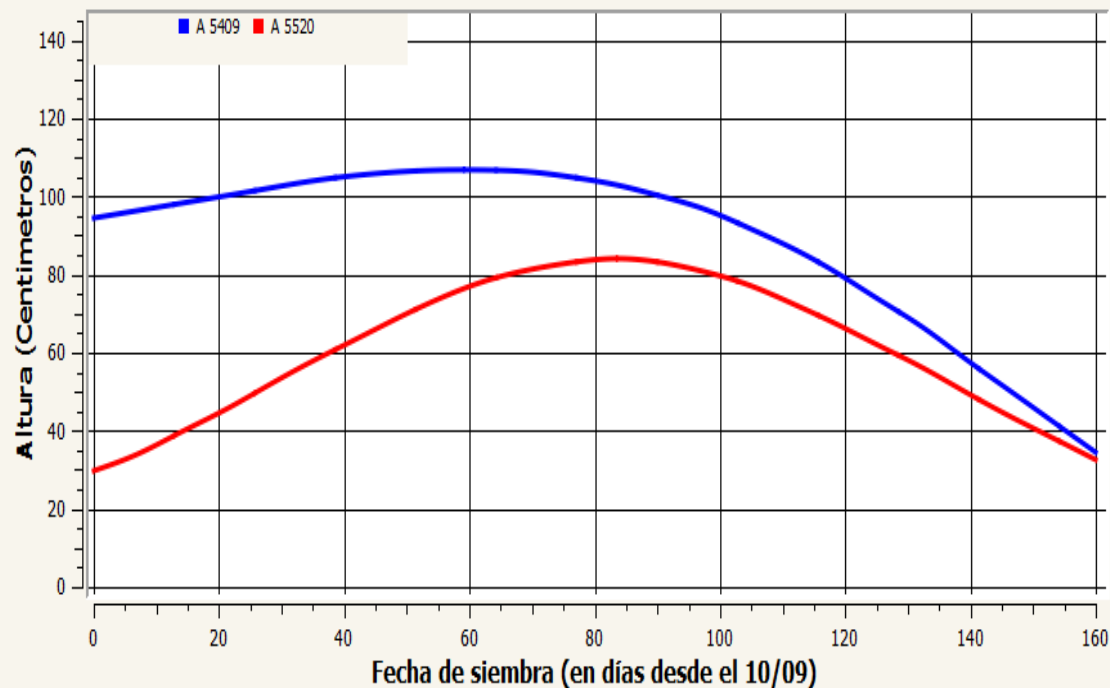
■

Fecha de inicio de secuenciamiento:

15/09/2012 ▼

Intervalo:

14 ▲▼



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Grupo 5: 31 + - 51 + -

Grupo 6: 31 + - 51 + -

Grupo 7: 31 + - 51 + -

Grupo 8: 31 + - 51 + -

Filtrar

FN 5.45

RA 532

RA 514

NA 5485

A 5409

BIO 5.40

Filtrar

NA 5485

A 5409

BIO 5.40

A 5520

NA 5509

NA 5909

Información de cultivos

Filtrar

A 3302

A 3401

A 3901

Ciclo Hábito de crecimiento Flor Pubescencia

3.0 Indeterminado

Púrpura Gris

- Data simulated by SIFESOJA 2011 were compared to :
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- Lower data fit from RECSO information may be attributed to less experimental pressure that characterize this kind of trials.
- When total of data (830) were analyzed, mean deviation was 3,38 days.

FIGURE 1: FREQUENCY DISTRIBUTION OF THE DEVIATIONS PRESENTED BETWEEN SIMULATED AND OBSERVED DATA TOOK FROM 6 SOWING DATES (SEPTEMBER TO FEBRUARY) WITH 18 CULTIVARS IN PARANÁ

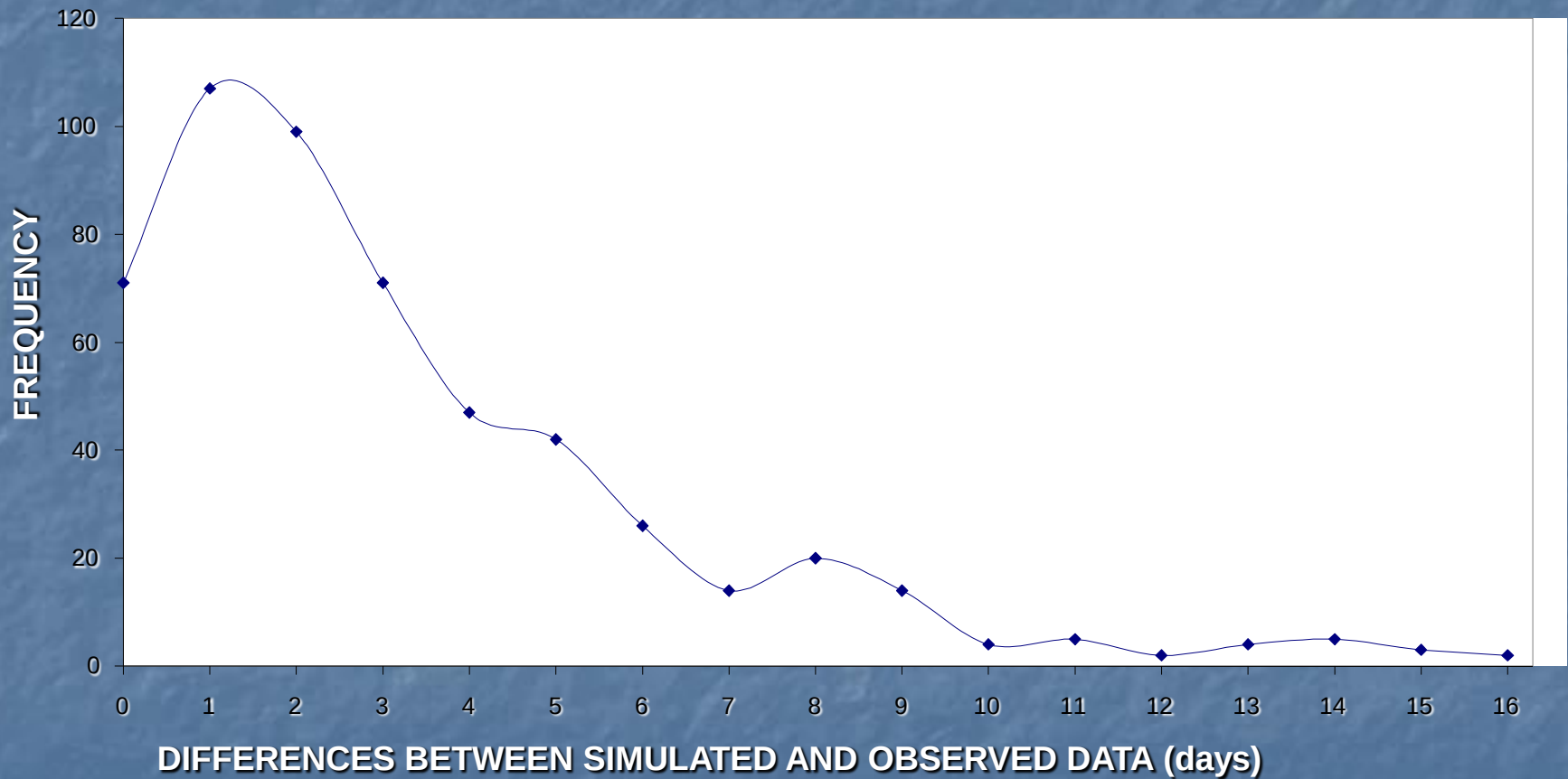
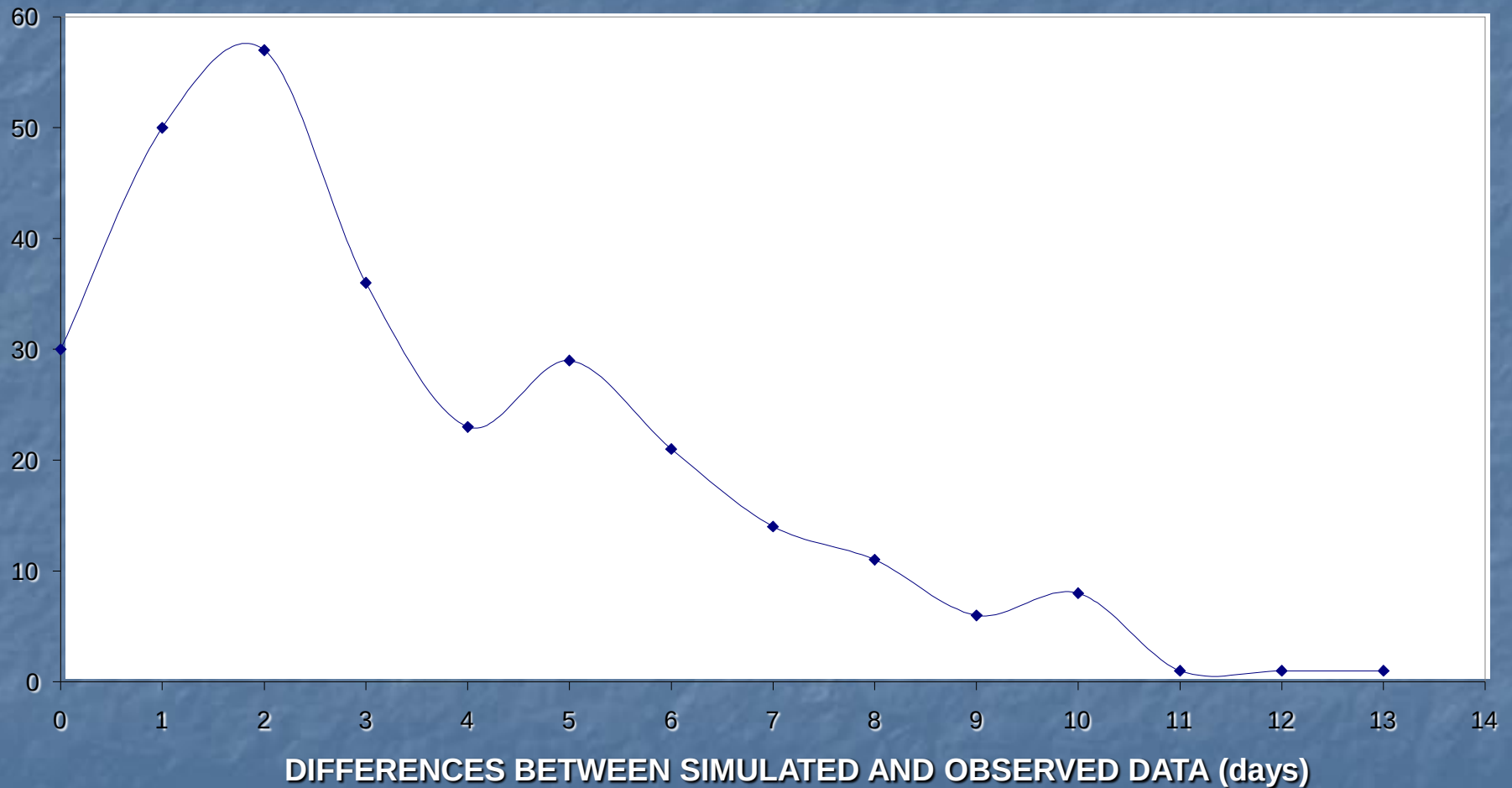


FIGURE 2: FREQUENCY DISTRIBUTION OF THE DEVIATIONS PRESENTED BETWEEN SIMULATED AND OBSERVED DATA TOOK FROM RECSO'S TRIALS





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