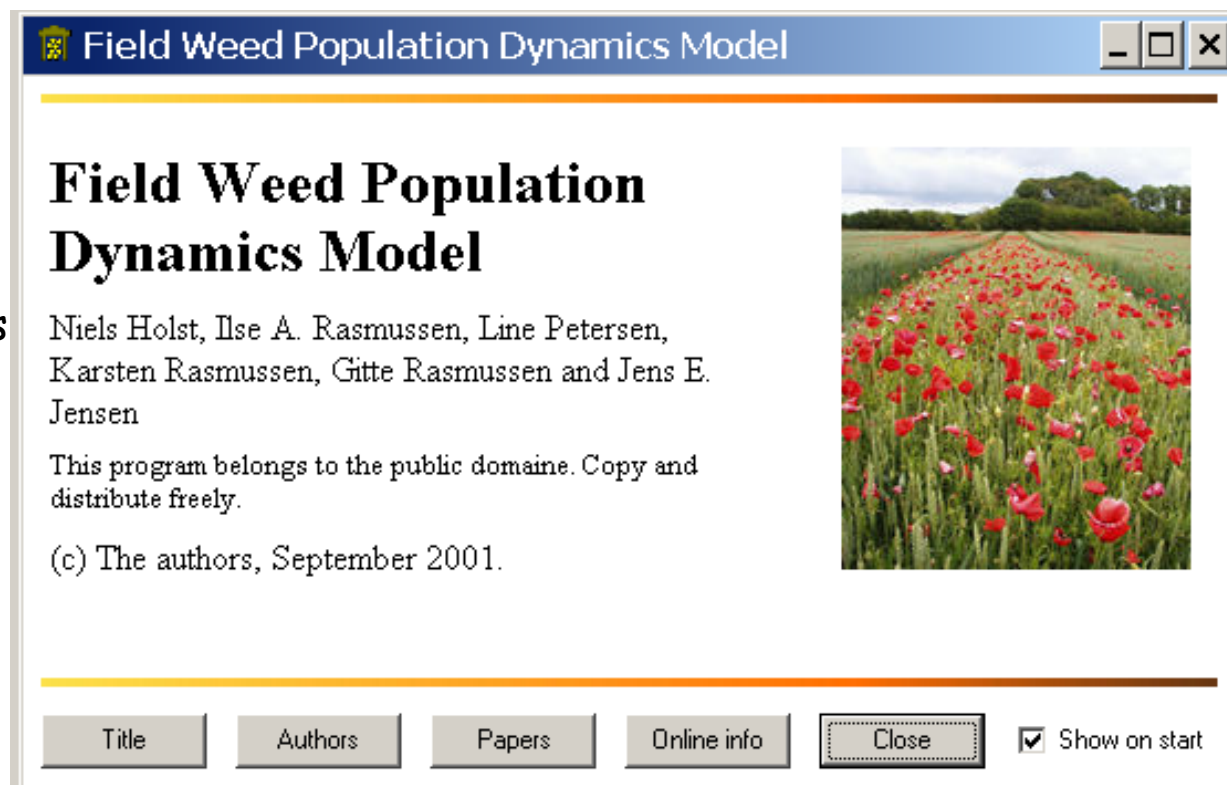


# Computer model for simulating the long-term dynamics of annual weeds under different cultivation practices

Hands-on! Try the model!

I.A. Rasmussen, N. Holst,  
L. Petersen, K. Rasmussen  
Department of Crop Protection  
Danish Institute of Agricultural Sciences  
Research Centre Flakkebjerg  
Denmark



Run	Ctrl+R
Load...	
Configure	Weeds...
Scenarios...	Interventions...
Ecosystem...	Crops...
Exit	Language...

- Choose
  - Model
    - Configure
      - Language (Danish, English, Scientific)
    - Browse through and edit
      - Weeds
      - Interventions
      - Crops

## Duration of development in each stage

**Configure weed species**

Weed species: **apesv** Apera spica-venti

OK Cancel

Germination calendar Development Language Other parameters

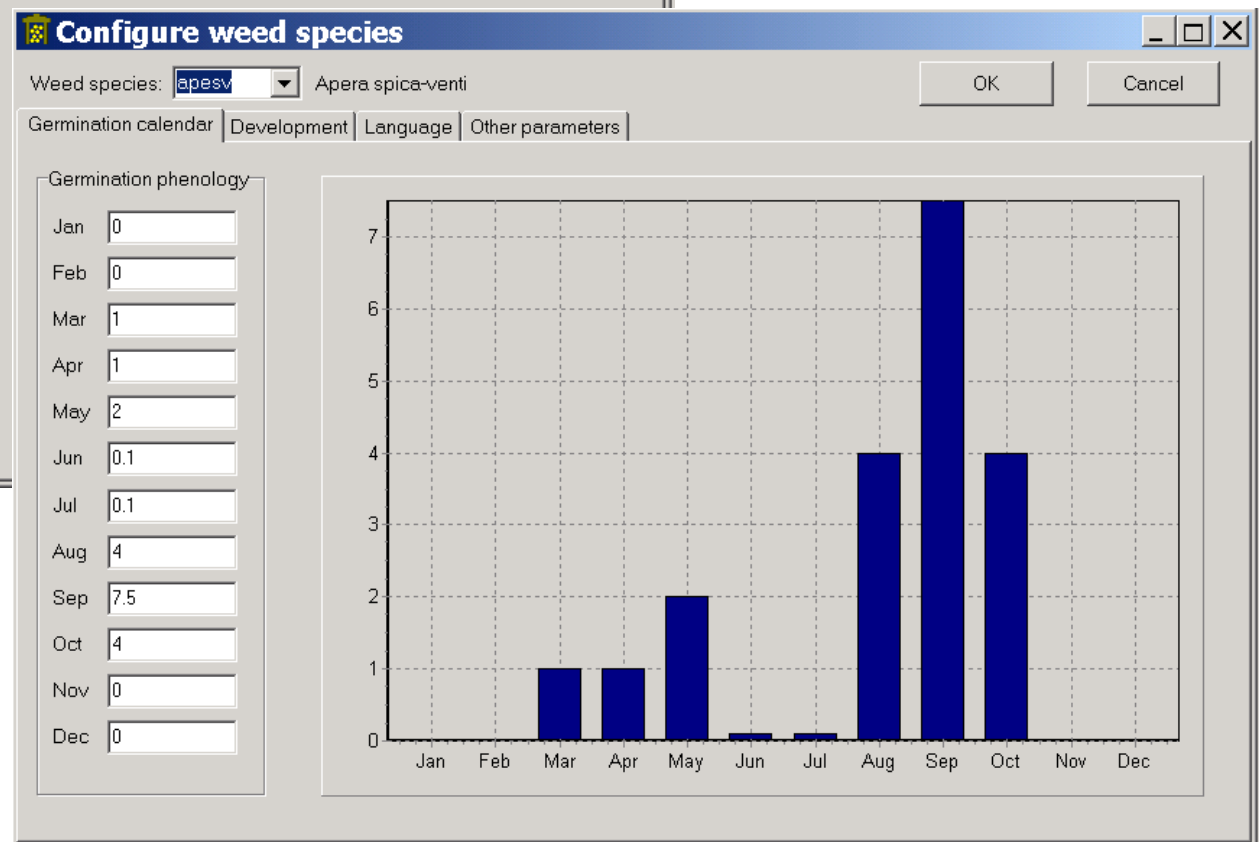
Growth stages

	Duration	k
Seedlings	100	10
Vegetative	1500	100
Reproductive	500	100
Seeds on plant	500	100

Duration is in day-degrees above the lower threshold.  
k determines the variability of development. Larger k gives less variability.

Is plant frost-resistant?

## Germination behaviour through the season



# Density, germination, mortality, reproduction

**Configure weed species**

Weed species:  ▼ *Apera spica-venti*

Germination calendar | Development | Language | Other parameters

**Density**

Initial density (per m <sup>2</sup> )	<input type="text" value="1000"/>
Max. final mass (g/m <sup>2</sup> )	<input type="text" value="500"/>
Final mass of one solitary plant rel. to max mass (%)	<input type="text" value="5"/>

**Mortality**

Half-life when undisturbed (years)	<input type="text" value="1"/>
Mortality of seeds on ground (% per day)	<input type="text" value="3"/>

**Basic germination**

In undisturbed soil (% per year)	<input type="text" value="10"/>
In disturbed soil (% per disturbance)	<input type="text" value="50"/>

**Reproduction**

Seed production (seeds per g)	<input type="text" value="76.9"/>
Proportion of shed seeds entering primary dormancy (%)	<input type="text" value="0"/>

**Vertical distribution of germination**

Optimum depth (cm)	<input type="text" value="0.484"/>
Spread (cm)	<input type="text" value="0.439"/>

# Effect of interventions

**Configure field interventions**

Intervention: WEHAI weed-harrowing, intensive

Effects | Language

Soil perturbation

Type: Random

Depth (cm): 3

Weed mortalities (%)

Seedlings: 90

Vegetative: 75

Reproductive: 75

Seeds on plant: 0

Crop competition changes to

Closed crop

No change

Closed crop

**Strong competition**

Average competition

Weak or no competition (row crop or bare soil)

Delete OK Cancel

# List of interventions in each crop - and competition

The image shows two overlapping windows of a software application titled "Configure crops". The top window is in the foreground and displays the "Interventions" tab. It shows a list of dates and corresponding agricultural interventions:

- 01/01/01 ploughing
- 08/04/01 harrowing
- 15/04/01 sowing
- 15/08/01 harvest
- 15/09/01 crop closes

The bottom window is partially obscured and shows the "Competition" tab. It features a dropdown menu for "Competitive strength of crop" with the following options:

- Strong competition
- No change
- Closed crop
- Strong competition
- Average competition
- Weak or no competition (row crop or bare soil)

Both windows show the crop type as "BAPEA" (Barley/Pea wholecrop, undersown) and include "Delete", "OK", and "Cancel" buttons. The top window also has an "Add" button and a "Name" field.

# Build a scenario (or load one to edit) and push the "Finish"-button

The screenshot displays the 'Field Weed Population Dynamics Model - defaultmodel.txt' application window. The main menu is open, with 'Scenarios...' selected. A 'Scenarios' dialog box is open, showing a list of weeds: 'Spring barley, undersown', 'White clover', 'Oats', and 'Potatoes'. The 'Potatoes' entry is selected in a dropdown menu. The dialog box includes buttons for 'New', 'Load', 'Save', 'Save as...', and 'Close'. Below the list, there are 'Up', 'Down', and 'Delete' buttons. At the bottom right, there is a 'Finish >>' button. The dialog box also shows '4 years' and an 'Add' button.

Field Weed Population Dynamics Model - defaultmodel.txt

Model Advanced Window Help

Run Ctrl+R  
Load...  
Configure ▶  
Scenarios...  
Ecosystem...  
Exit

Scenarios

New Load Save Save as... Close

Create Edit Weeds

POTAT Potatoes Add

Spring barley, undersown  
White clover  
Oats  
Potatoes

Up  
Down  
Delete

4 years

Finish >>

# Edit the interventions in your scenario

The screenshot shows the 'Scenarios' application window. At the top, there is a title bar with the text 'Scenarios' and standard window controls. Below the title bar is a menu bar with 'Create', 'Edit', and 'Weeds' options. A toolbar contains buttons for 'New', 'Load', 'Save', 'Save as...', and 'Close'. The main area features a date selector set to '2/21/2002', a dropdown menu set to 'CLOSE', and the text 'crop closes'. To the right of this area is an 'Add' button. A large text area on the left contains a list of interventions with their dates. To the right of this list are 'Edit' and 'Delete' buttons. At the bottom right, there is a label 'No. of rotations to simulate:' followed by a text input field containing the number '4'.

Scenarios

New Load Save Save as... Close

Create Edit Weeds

2/21/2002 CLOSE crop closes Add

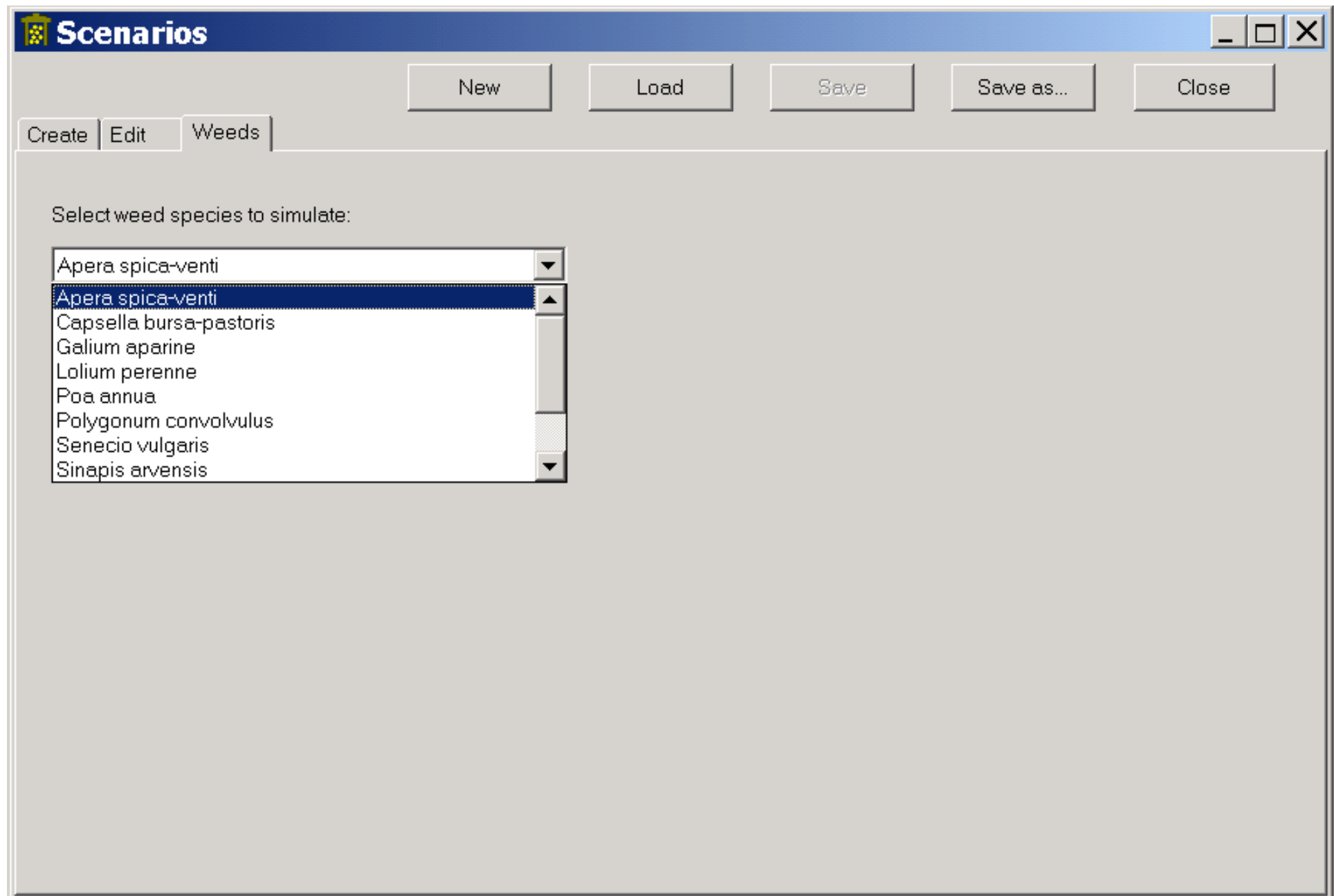
01/01/01 ploughing  
08/04/01 harrowing  
15/04/01 sowing  
15/08/01 harvest  
15/09/01 crop closes  
01/06/02 mowing  
01/08/02 harvest  
01/01/03 ploughing  
08/04/03 harrowing  
15/04/03 sowing  
15/08/03 harvest  
01/01/04 ploughing  
01/04/04 harrowing  
15/04/04 planting  
01/05/04 weed-harrowing, light  
15/05/04 ridging  
01/06/04 weed-harrowing, light  
15/06/04 ridging

Edit Delete

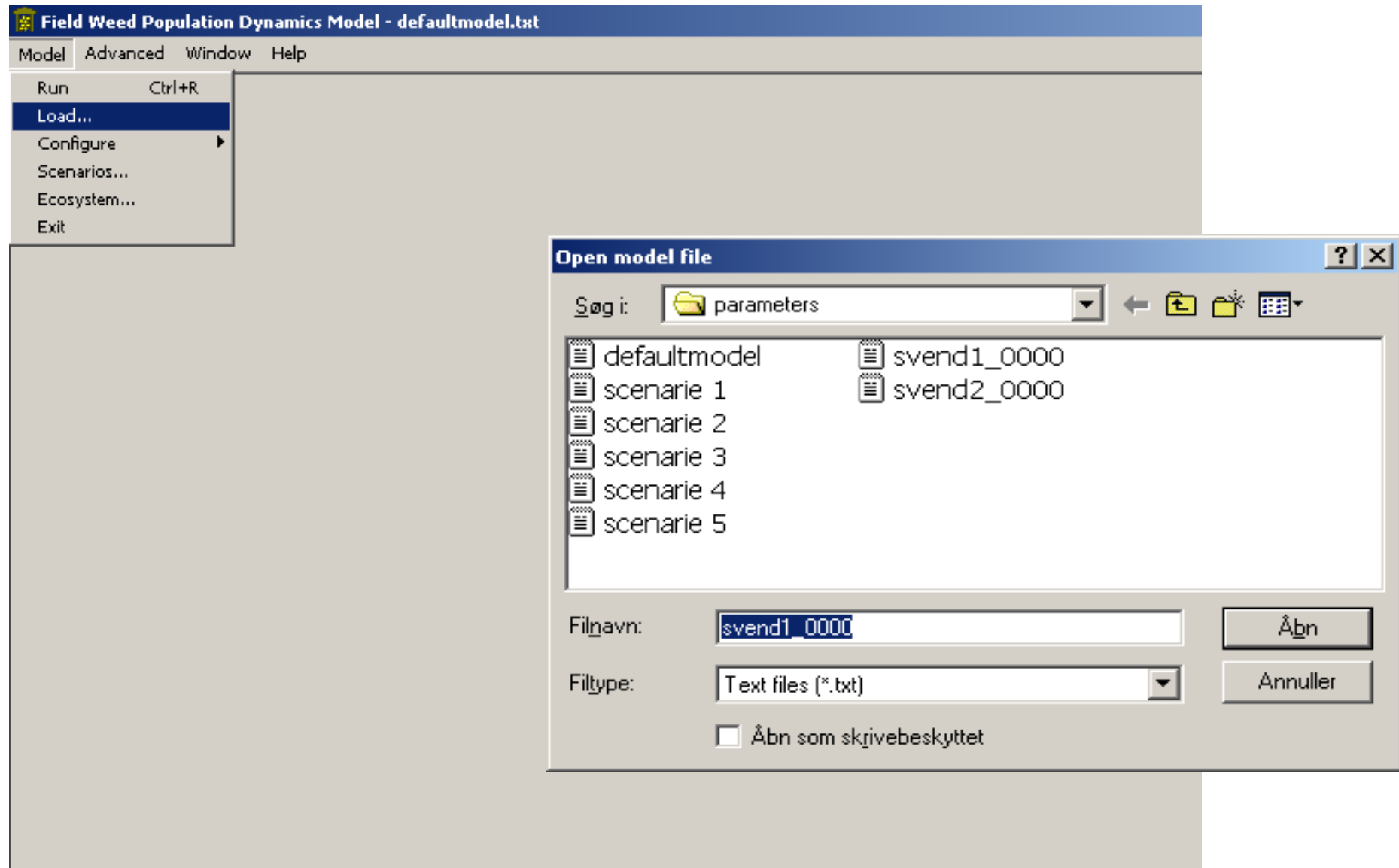
No. of rotations to simulate:  
4



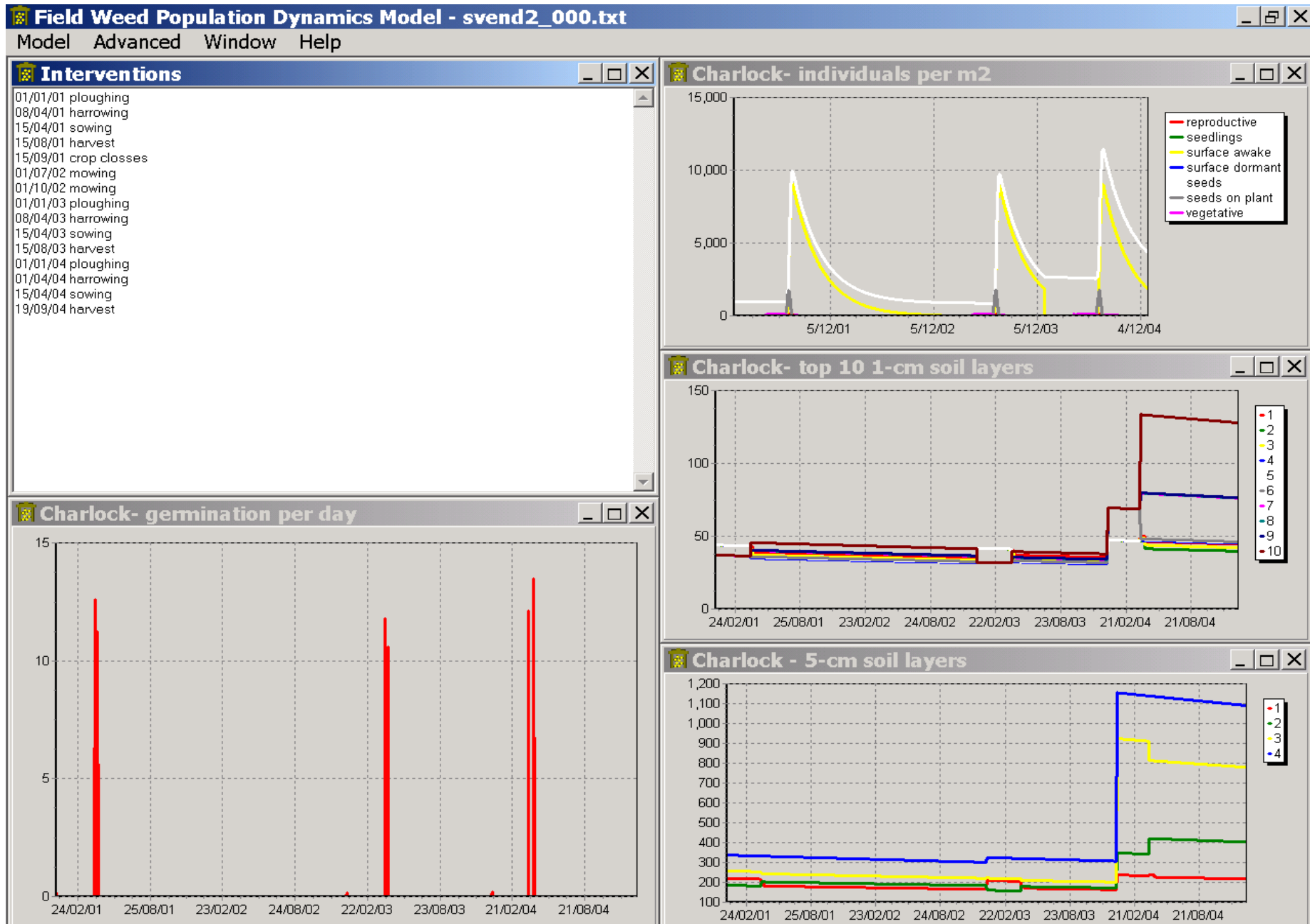
# Choose a weed - and save your scenario



# Load a scenario



# Run - and see the results



Do you want the model  
to try on your own computer?

- Download from

<http://www.agrsci.dk/plb/nho/fieldweeds.htm>

- Install from CD-rom - ask Ilse