Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada

CIPRA:

Computer Centre for Agricultural Pest Forecasting

Version 10

User's Guide

Canada

CIPRA:

Computer Centre for Agricultural Pest Forecasting

Version 10

User's Guide

Dominique Plouffe, B.Sc.[1]
Gaétan Bourgeois, Ph.D.[1],
Carole Brodeur, M.Sc.[1],
Nathalie Beaudry, D.E.C.[1],
Gérald Chouinard, Ph.D.[2]

[1] AAFC-Horticulture R&D Centre, Saint-Jean-sur-Richelieu, QC
[2] *Institut de recherche et de développement en agroenvironnement Inc., Saint-Hyacinthe, QC*

Cat. No. A54-9/2004-4E-PDF
ISBN 0-662-38850-X

Cat. No. A54-9/2004-4E-HTML
ISBN 0-662-38851-8

Acknowledgements

The authors wish to sincerely thank the following people for their work and their implication in the development for the CIPRA software: Mario Asselin, Sylvie Bellerose, Luc Brodeur, Odile Carisse, Danielle Choquette, Julien Desaulniers, Anne-Marie Fortier, Geneviève Gay, Ginette Laplante, Vincent Philion, André Poliquin, and Pierre Sauriol.

USER'S GUIDE

Welcome to CIPRA, the Computer Centre for Agricultural Pest Forecasting. This accessible and user-friendly software allows you to visualise forecasts of insect development or risk of disease on various crops, and also to follow the development of some crops.

CIPRA uses mathematical models and hourly meteorological data, to produce charts which allow you to evaluate at a glance the risks of infection or sporulation of some diseases, and the development of insect populations.

For some time, there have been specific devices that use models based on mathematical equations to describe a given biological system. However, those devices are often specific to one culture or one disease and they do not give access to several models. Their use is also laborious for anyone not familiar with this technology.

CIPRA, which operates in the Microsoft Windows environment, allows easy access to the various forecast and risk evaluation modules. Nonetheless, the user conserves the ability to modify any meteorological data whose values exceed the limits by using a meteorological data verification and correction module. For experienced users, who are accustomed to formulating their own risk indices by consulting the meteorological data, another module can generate weather reports. These reports can be used, for example, to predict the timing of events affecting a single crop (treatment against mites, bud break of apple trees, emergence of weevils and maggots in orchards, etc.).

To have a better understanding of the software and to optimize its use, you can access CIPRA help at any time by selecting the **HELP** menu in the main menu. In the help section, you can choose from a description of the various pests, references to the various models and information on how to interpret them. The numerous hypertext links should take you where you want to go.

Table of Contents

Conventions

This guide uses the following conventions:

SMALL CAPS	CIPRA main menu
bold	CIPRA sub-menu command
text box	additional information
italics	special notes
text box	error messages

INSTALLING CIPRA

System Requirements

To install and use CIPRA, your workstation must include the following:

- IBM or 100% compatible computer with at least a 486 processor;
- Windows 95 or higher;
- Minimum of 8 MB of RAM;
- 15 MB of free space on the hard drive;
- CD driver;
- Internet connection;
- Monitor and a VGA or higher resolution card;
- Mouse or a pointing device.

If you are working on a network, while CIPRA can in theory be shared, the data files cannot be accessed by more than one user at a time.

To Install CIPRA

To install CIPRA on your hard drive, close any applications you may be running, insert the CD, wait a few seconds and the install program will automatically start. If not, you just have to follow the instructions below that, in fact, represent the standard procedure to install any software under Windows.

1. Open the Control Panel.
2. Select the **Add/Remove Programs** icon.
3. Choose the **Install/Uninstall** tab and click on the **Install** button.
4. Follow the instructions on screen for the installation.

For the French version of Windows, open the **Panneau de configuration**. In this window, click on the **Ajout/suppression de programme** icon. A new window will open. From it choose the **Installation/Désinstallation** tab. Click on the **Installer** button, and then follow the instructions provided by the computer.

The installation of CIPRA is now launched. A dialogue box will suggest the directory **C:\Program Files\Cipra**. It is recommended that you keep that directory. The computer will tell you when the installation operation is complete.

USING CIPRA

To launch CIPRA, go to the **Start** menu, then **Programs** and **Cipra**.

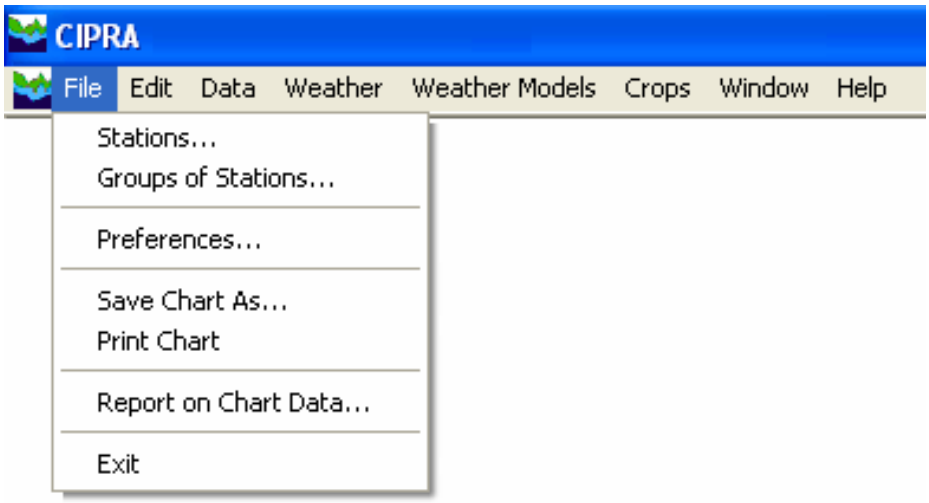
For the French version of Windows, go to the **Démarrer** menu, then **Programmes** and **Cipra**.

To be able to use this software, you must have meteorological data and CIPRA will analyse it.

How to Use CIPRA

You can now explore all the options available with CIPRA.

File



In the **FILE** menu, you will find the **Stations** command. When running the software for the first time, select the **New** command (in the left-hand side of the window, Environment Canada predefined stations for Quebec will be displayed) then **Other** to enter the name of the weather stations you plan to use with CIPRA. Latitude, longitude and altitude of the stations are essential if you want to complete the pest forecasting models by using climatological normals (30-year average). Under **Usual file names**, enter the name of the downloaded meteorological data file and the weather forecast data file.

Under the **Groups of stations** command, you have the possibility of grouping the stations that you use on a regular basis. Thus, when it is possible, you can display the graphs or the results from reports of all these stations without having to repeat the procedure for each station.

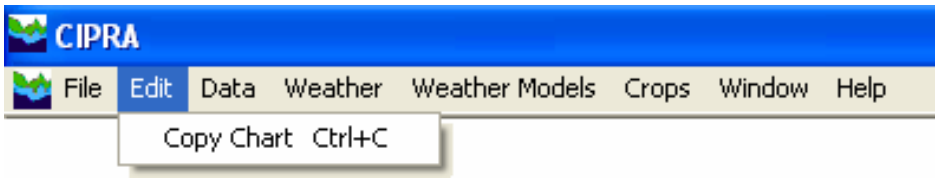
Preferences is used to specify the year of meteorological data required if you have had CIPRA for more than a year. This allows you, for instance, to compare the effect of a rainy summer with a warm or dry one on a particular infestation. In this menu, you can also choose the language of communication, **French** or **English**. Since you will download the raw data yourself, it is important that you choose to view error messages on your screen during the updating of the files. It is also possible to have these messages written to the file *Cipra.log* in the directory **C:\Program Files\Cipra** and to verify significant variations in the air and soil temperatures as well as variations in seasonal averages.

If you have access to the meteorological data through an FTP site, it is possible to automatically download data from the previously selected stations and to update CIPRA files. (See "Automatic Downloading", page 9). Only the stations included in the automatic reception will be updated.

You can also specify that the graphs provided by the model based on accumulated degree-days also include 30-year normals, provided that the latitude and longitude of the selected stations have been included in the **Stations** section of the **FILE** menu.

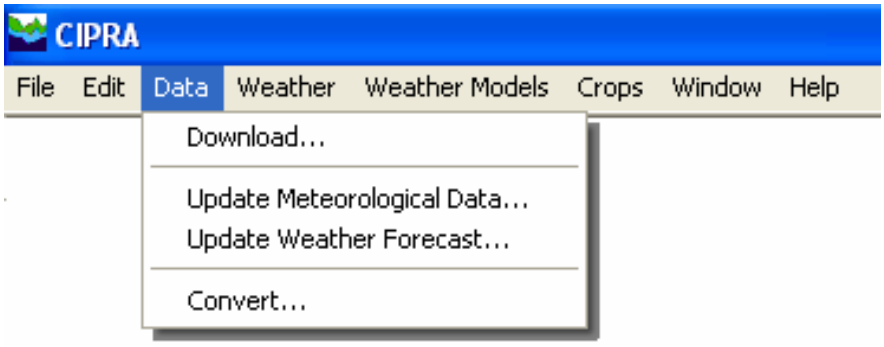
The **FILE** menu also includes the commands **Save Chart As** and **Print Chart**. They are only activated when a chart is displayed on screen. They allow you to save the chart on your hard disk or print it. If you want to have a text format report of all data from a chart, you select **Report on chart data**. **Exit** allows you to exit from CIPRA.

Edit



This menu is available only when a graph is displayed on your screen. It allows you to copy a selection or the entire screen in order to export it, in bitmap format, to other software.

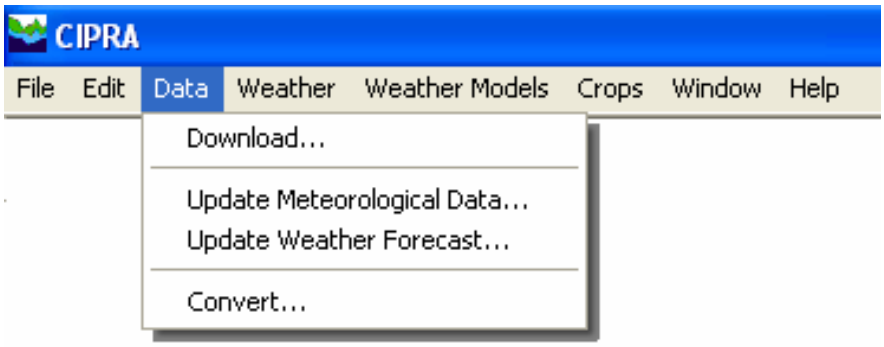
Data



Most of the mathematical models included in CIPRA use meteorological data starting March 1st. However, some models need data starting on April 1st. It is strongly recommended that you check to avoid error messages. See appendix for more information on meteorological data requires for some models.

To obtain results from CIPRA, you must provide meteorological data. See *Format of Data Files* (p.17) for the specific format for CIPRA. When the data is correctly formatted, you must then copy the file in the following directory:
C:\Program Files\Cipra\"current year"

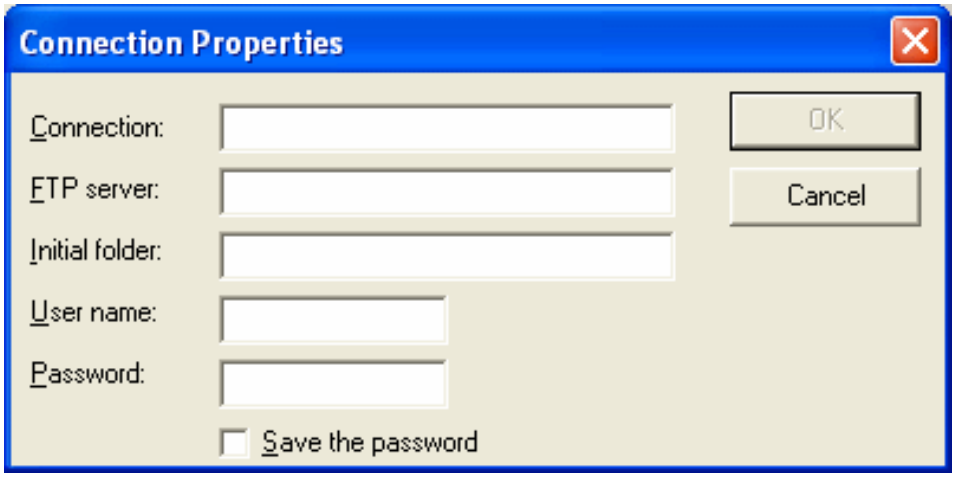
Since you use raw data, you have to go to the **DATA** menu and select **Update Meteorological Data**, so that CIPRA can validate the weather data.



The data will automatically be resaved by CIPRA in a binary format and transferred to the CIPRA database (files with the extension .CIP). For example, the file Acadie.cip will contain the old data (which may date back several weeks) and the new data that you have just added.

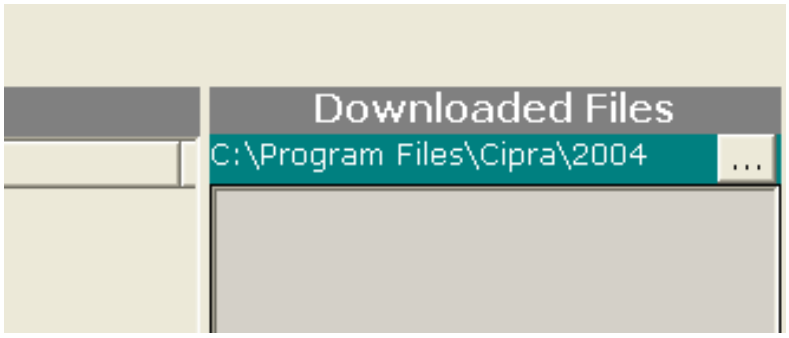
If you download data from an FTP site, select the **Download** command in the **DATA** menu. To establish a connection, select **List of FTP Connections** from the **FTP SERVER** menu then click on **Properties**.

The following window will appear:



The "*Initial folder*" is the name of the directory that your data will come from. The "*User name*" and "*Password*" will be given to you by the FTP site manager. If you check the "**Save the password**" box, this window will no longer appear in subsequent uses.
If you select **Add** from the preceding window, you can add a new address. Be sure to use a different name for each connection. Finally, you must define the default connection by selecting it and clicking on the **Set as default** button.

Before downloading any data for the new season, make sure you have selected the **C:\Program Files\Cipra\"current year"** directory in the "*Downloaded Files*" window of the downloading module. To change the directory, click on ... and select the current year directory (2004 in this example).



To establish a connection, select **Connect** from the **FTP SEVER** menu or click the first icon: 

The left-hand side of the window is used to select the files you wish to transfer. After you have chosen the stations you want, the other icons on the menu will be enabled.

To transfer the files, click  (**Download the Selected Files**).

Automatic downloading

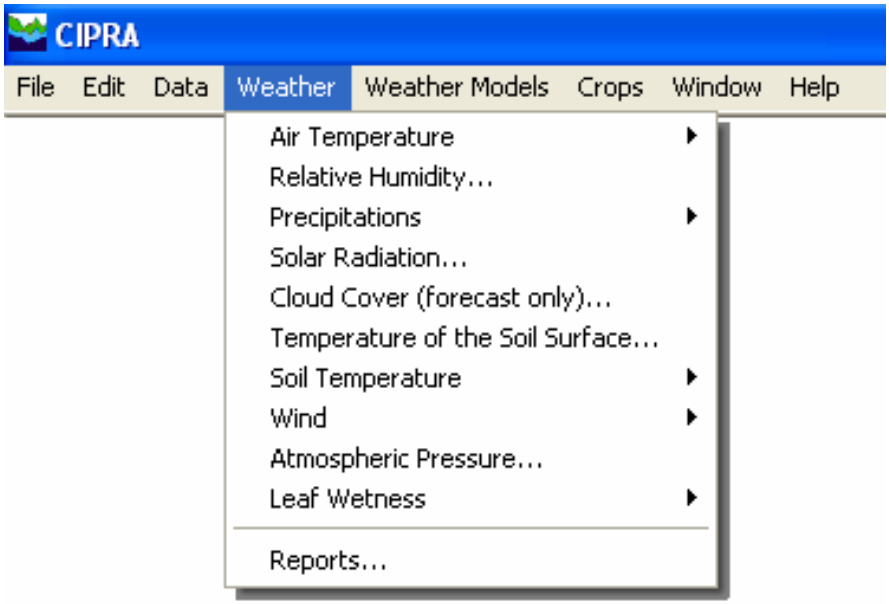
It is recommended and necessary if you want to automatically download the weather data at the opening of CIPRA, that you automate the weather file transfer process.

To do this, select the files desired and click the icon  (**Add the Selected Files to Automatic Downloading**). Then click the icon  (**Automatic Downloading**) and the files selected will be automatically copied to the directory you selected.

When the files have been downloaded, click  to log off and close the program.

The files, which make up the CIPRA database, are binary files. The **Convert** command makes it possible to translate into text the CIPRA meteorological data files, containing the data collected since the beginning, so they can be viewed using a spreadsheet. In fact, conversion is a way to manipulate the data for those who want to use a program other than CIPRA to calculate a temperature curve or to conduct sensitivity analyses on a model. It offers greater latitude for anyone who wants to go further.

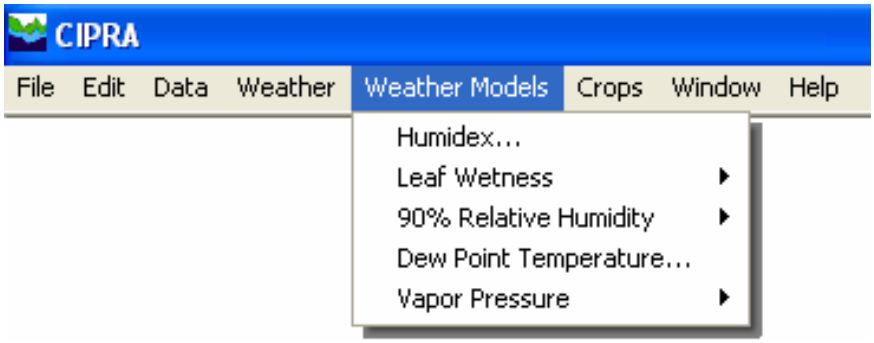
Weather



This option allows you to see various weather parameters displayed as charts.

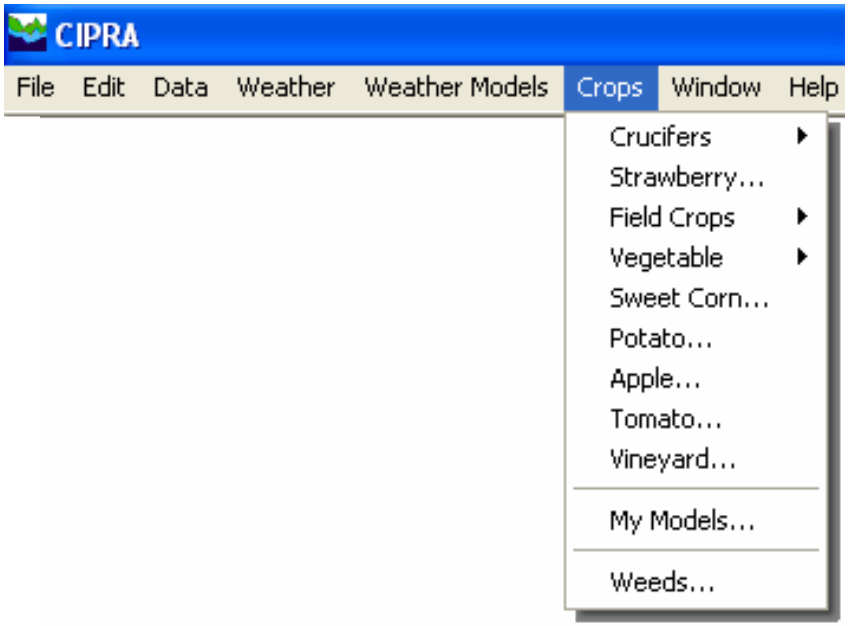
The **Reports** command allows you to obtain weather data for the parameters you have selected. You select the type of report, desired weather stations and their layout in the report under the **General** tab. The **Year's Data** tab presents all the meteorological parameters available by CIPRA. It also provides a choice of methods for calculating degree-days and corn heat units from different reference temperatures. The most frequently used calculation method in the CIPRA models is the single sine method, also called the Baskerville-Emin method. The **Normals** tab lets you add the meteorological normals for the stations you have selected. These values are calculated over a 30-year period from latitude and longitude values for each station. In the **View** section of the **Dates** tab, you indicate the period covered by the report you want to create. For instance, you may want a report for a particular month or week. CIPRA also offers the possibility of calculating the accumulated precipitation or number of degree-days. For example, if you want to know how many degree-days your crop has reached, enter the sowing date as the beginning date of the calculations and CIPRA will display the accumulated degree-days to date.

Weather Models



Sometimes, it may be useful to measure agrometerological parameters that are not related to a particular pest or crop. The **WEATHER MODELS** module allows you to do this, by calculating and displaying in graphic form such parameters as the Humidex index, leaf wetness predictions based on relative humidity and precipitation, the number of hours in which the relative humidity was above 90% during the last 24, 36 or 48 hours, dew point temperature, actual and saturation vapour pressure and the vapour pressure deficit.

Crops



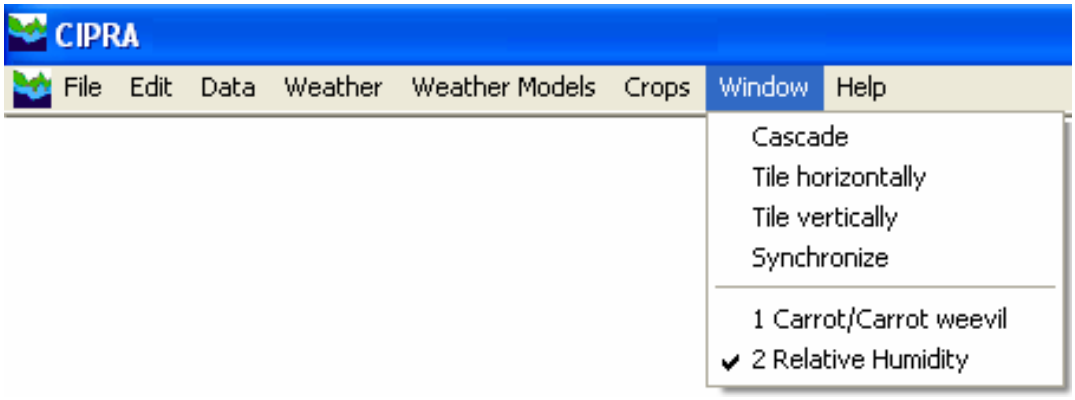
This CIPRA module provides a graphical display, for each weather station selected, of the evolution of insect populations, diseases and the development of some crops.

Choose a crop and CIPRA will display a window with two tabs: **On-Screen Chart** and **Summary Report**. In **On-Screen Chart,** you may choose the pest that interests you by clicking on the corresponding button, then on **Display the Chart**. You still have the choice of weather stations.

In the **Summary Report** panel, you can choose several pests and obtain a written report (click **Produce Report**), with words and figures, rather than one in chart form. CIPRA will save the reports in the **C:\Program Files\Cipra\Rapports** folder by default. To find out how to interpret the charts, and how to use the model in general, you can choose the **Information on the Model** command from the **HELP** menu.

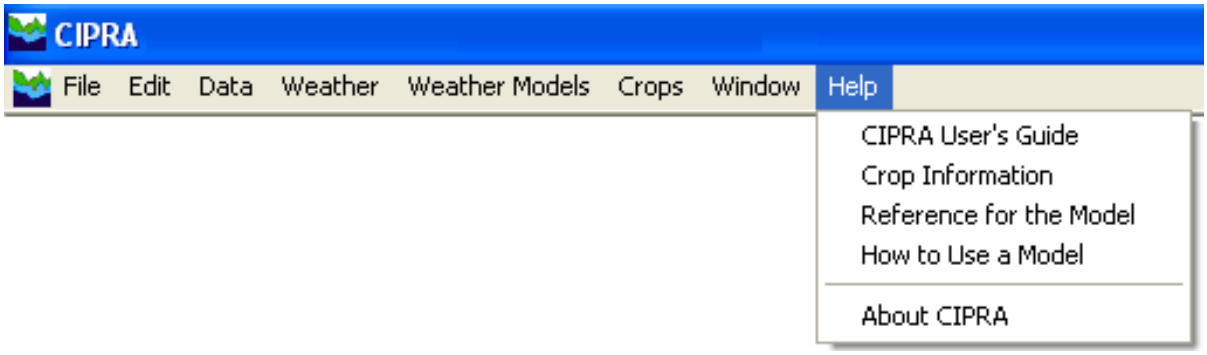
The command **Report on Chart Data** in the **FILE** menu, which is only activated when a graph is on the screen, allows you to export graph data in text format so that the data can be used in a spreadsheet program such as Excel. The data will be copied to **C:\Program Files\Cipra\Rapports.** The **copy** function, which can be accessed from the EDIT menu, allows you to export graphics in bitmap format to other software.

Window



It is possible to open several windows at the same time. Thus, you could display a chart of the relative humidity and another of a forecasting model (Carrot weevil in this case). Each one will be displayed in an individual window and you will be able to reorganize them all as you wish under the **WINDOW** menu (cascade, tile horizontally or vertically). By selecting **Synchronize**, all charts will display the same period as the one selected on the active window.

Help



CIPRA User's Guide contains almost the same information as this guide, but it is offered with the user-friendliness of the computer and hypertext links

Crop Information indicates the available models for that specific crop whereas **Reference for the Model** provides information on the model as well as the evaluation of it conducted in Quebec along with a brief description of the pest with a photo. These two commands become accessible only when a model is activated.

How to use a model explains, in a schematic way, the decision-making process including factors to consider at the time to take action in the field.

Finally, the **About CIPRA** command presents the development team of CIPRA, displays the license and the acknowledgments.

TROUBLESHOOTING

Error messages

Unfortunately, everything does not always work the way it is supposed to. The following section explains the various error messages that may occasionally occur and provides some troubleshooting tips. At the end of this section, you will find the procedure for correcting errors, which may occur in files.

Messages concerning files

This type of message can occur at any time when you request an on-screen chart, a report, or when you add data.

Incorrect file format

The file indicated (.CIP, .PRV or .INI) is probably corrupted. The only solution would be to erase this file and download a new one.

Access to *FileName* file is denied. File is being used by another user or program.

This message can have two causes:

- If you have installed CIPRA as a shared program on a network, two people on two different computers cannot use the same file at the same time.
- If you have opened a file, such as a report, with a word processing program to view it, CIPRA might not be able to open the same file at the same time.

FileName .CIP or .PRV file contains data from the year 2003. File is corrupted or should not be in the **C:\Program Files\Cipra\2004 folder.**

The file may be corrupted, i.e. unusable. This can happen if your computer was shut down abruptly (because of a power failure, for example) and this file was open. The only solution is to destroy the file.
If it is not corrupted, then the problem is that you have moved it. If it contains data for 2003, put it back in the **C:\Program Files\Cipra\2003** folder.

The requested operation cannot be performed for *StationName* because of missing values in the *FileName*.CIP file. Meteorological data must begin on March 1.

You have begun to collect your meteorological data later than March 1. For certain pest forecasting models, you must provide meteorological data beginning on March 1, while others require data beginning on April 1. Make sure that you begin to collect your meteorological data early enough, based on the requirements of the models you plan to use. See appendix for starting dates of meteorological data necessary for models.

The requested operation cannot be performed for *StationName* because the meteorological data for April 1 have not yet been recorded in the *FileName*.CIP file.

Certain pest forecasting models require meteorological data beginning on March 1, others beginning on April 1, etc. If you have not yet reached the starting date of the model, for example a model that begins on April 1, and the current date is still in March, the model cannot be used.

Messages concerning reports

Data not available.

If you see this message in a report, it is because:
- the .CIP file is empty;
- there is no meteorological data to process;
- the .CIP file does not contain data which begins on the model's starting date.

This report is not yet available.

If you see this message in a report, it means that this report has not yet been programmed. You can request it by contacting Gaétan Bourgeois at Agriculture and Agri-Food Canada in Saint-Jean-sur-Richelieu, QC.

Messages concerning updating of meteorological data and weather forecasts

(…) Correct the file and then select the **Update Meteorological Data** command again from the **DATA** menu.

One or more errors occurred during the addition of new meteorological data or the updating of weather forecasts. You can correct the downloaded data file by consulting the section entitled *Correction of Downloaded Data Files*. If the file cannot be corrected because it is too corrupted, download a new copy.

Line 18 is invalid.

Correct the file by consulting the section entitled *Correction of downloaded data files.*

Other messages

Invalid value.
Check the decimal symbol. You may have entered a period instead of a comma, or vice versa.

Verify **Regional Settings** of the **Control Panel** in Windows, under the **Number** tab, to find out which decimal symbol you must use.

Error no. 123 (or other number).

If you see this type of message, please contact Gaétan Bourgeois at Agriculture and Agri-Food Canada in Saint-Jean-sur-Richelieu and advise him of the circumstances under which this error occurred. This will help us improve the CIPRA software.

CORRECTION OF DOWNLOADED DATA FILES

It is quite possible, provided you take considerable precautions, to repair the file, as long as the number of errors is not too high. If, however, there is a large number of errors, or if you think you may add more errors rather than efficiently correct them, it would be safer and faster to obtain another copy of the data files.

To repair a file that is not too badly corrupted, open it with your preferred text editor (Notepad, Word, MS-DOS Editor, etc.). The downloaded files are normally in the **C:\Program Files\Cipra\"current year"** folder. While carefully following the order of the various parameters and ensuring that there is in fact one line of data per hour, make the necessary corrections, add lines if any are missing, and then save the file under *the same name*. Take care to save your file in text format only (without formatting). Now try again the **Meteorological Data** - **Automatic Update** procedure from the **DATA** menu.

Format of Data Files

The raw data must be in a specific format as described below. If you have to correct any data, they must keep the same format where each parameter is separated from the others by a comma, and where each line represents one hour.

Please note:

- Each number below (1 to 23) represents a value in a line.
- If one parameter is unavailable for a weather station, it is given a -991 value except for minimum and maximum air temperature where the average temperature value can be used.
- The following parameters must be integer values:
  year (1), day (2), time (3), station number (4), time of beginning of rain (10) and leaf wetness (21).
- An invalid data is replaced by -992.

1 Year in full (e.g., 2005)
2 Day of the year - from 1 to 365 or 366 (e.g., 156)
3 Standard time not corrected for daylight savings - from 0 (midnight) to 2300 (11 PM): e.g., 1500
4 Station number (e.g., 3874)
5 Maximum temperature in the hour - °C (e.g., 15.6)
6 Minimum temperature in the hour - °C (e.g., 15.2)
7 Average temperature in the hour - °C (e.g., 15.4)
8 Relative humidity - % (e.g., 75.4)

9 Precipitation - mm (e.g., 2.6)
10 Time of beginning of rain in the hour (e.g., 1423)
11 Solar radiation - kJ/m^2/h (e.g., 1235)
12 Average temperature at the soil surface - °C (e.g., 12.4)
13 Soil temperature at 5 cm - °C (e.g., 13.4)
14 Soil temperature at 10 cm - °C (e.g., 12.5)
15 Soil temperature at 20 cm - °C (e.g., 12.0)
16 Soil temperature at 50 cm - °C (e.g., 11.5)
17 Wind speed - km/h (e.g., 10.7)
18 Wind direction - degrees from 0 (North) to 360 (e.g., 245)
19 Barometric pressure - kPa (e.g., 95.7)
20 Leaf wetness - relative voltage (e.g., 0.74)
21 Leaf wetness - number of minutes over threshold (e.g., 43)
22 Parameter reserved for future use (e.g., -991)
23 Parameter reserved for future use (e.g., -991)

This is a data line using the examples above for each parameter:

2005,156,1500,3874,15.6,15.2,15.4,75.4,2.6,1423,1235,12.4,13.4,12.5,12.0,11.5, 10.7,245,95.7,0.74,43,-991,-991

Note the decimal point where applicable. The zero before the decimal point is optional. The times must be sequential throughout the file and lines must be separated by hitting the “Enter” key.

Appendix: Starting date of meteorological data necessary for models

Date	Model
March 1	Apple maggot
	Apple scab (CRDH/IRDA)
	Apple tree phenology (McIntosh)
	Codling moth
	Dogwood borer
	European apple sawfly
	European red mite
	Fruit-tree leafroller
	Grapevine leafhopper
	Oblique-banded leafroller
	Plum curculio
	Red-banded leafroller
	Speckled green fruitworm
	Spotted tentiform leafminer
	Tarnished plantbug
April 1	Alternaria blight
	Apple scab (St-Arnaud)
	Cabbage maggot
	Carrot rust fly
	Carrot weevil
	Colorado potato beetle
	Diamondback moth
	European corn borer (MAPAQ model)
	Imported cabbageworm
	Onion maggot
	Strawberry bud weevil
	Strawberry leaf spot
	Strawberry phenology
May 1	European corn borer (Bourgeois model)
	TOM-CAST - Tomato

Models not included in this list do not need a specific date. They can be started anytime during the season.