

DESCRIPTION OF THE USER INTERFACE

The DRIMERA application has an easy-to-use interface with input data "*Input*" in quadrant 1 and on the other hand, the simulation results present in quadrant 2 "*Output*". "*File*" provides access to "*New*" to create a new user interface while keeping the old one and "*Quit*" to close the app completely. As for the "*Help*", it provides assistance in using the application (**Figure 1**)

The screenshot displays the DRIMERA application window. The left panel, labeled 'Inputs', is highlighted with a red border and contains three sections: 'Spray mixture' with fields for 'Pesticide used' (a dropdown menu), 'Pesticide volume (l)', and 'Carrier material' (a dropdown menu); 'Operational data' with fields for 'Boom height (m)', 'Application rate (l/ha)', 'Nozzle spacing (cm)', 'Spray particle size' (a dropdown menu), 'Forward speed (m/s)', and 'Ground concentration (µg/l)'; and 'Meteorological data' with fields for 'Wind speed (m/s)', 'Temperature (°C)', and 'Relative humidity (%)'. The right panel, labeled 'Outputs', is highlighted with a blue border and includes fields for 'Ejection point (m) : x =', 'y =', and 'Times step (s)', along with a 'Calculus' button. Below these are 'Plot' and 'Datasheet' buttons, a large empty plot area, a 'Z position (m) : ' slider, and an 'Export' button. A red circle with the number '1' is placed over the 'Nozzle spacing (cm)' field, and a blue circle with the number '2' is placed over the plot area. The window title bar shows 'DRIMERA' and standard minimize, maximize, and close buttons. The bottom right corner indicates 'v 1.0.0'.

Figure 1 : DRIMERA User Interface

The input data to be filled in is categorized into three (03) groups: "*Spray mixture*" relating to the properties of the spray mixture to be sprayed, "*Operational data*" which are the operational data of the spraying itself and finally the block of meteorological data called "*Meteorological data*".

1. Characteristics of spray mixture

The various data to be provided on the spray mixture are presented on the **Figure 2**.

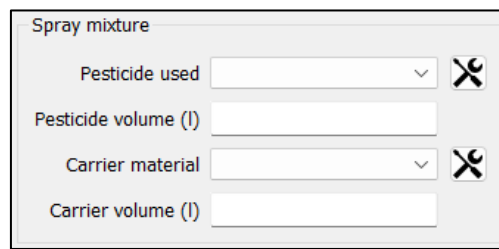



Figure 2 : Parameterization of the characteristics of the mixture

- "Pesticide used" provides information on the pesticide to be used during the phytosanitary treatment. An existing database of pesticides currently used in Côte d'Ivoire and Cameroon for the treatment of Black Stripe Disease of the Banana is present in the application. It can be updated by adding new products via the button that gives access to the read and  write database (**Figure 3**).

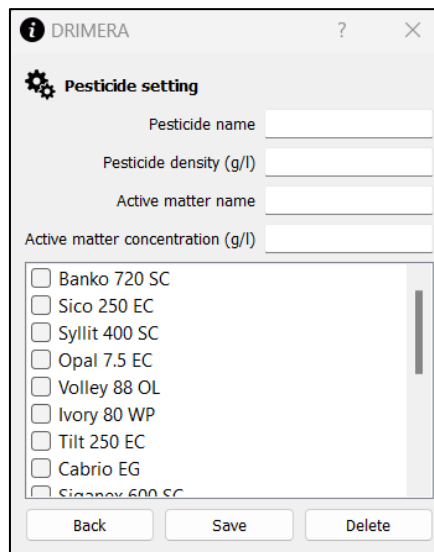

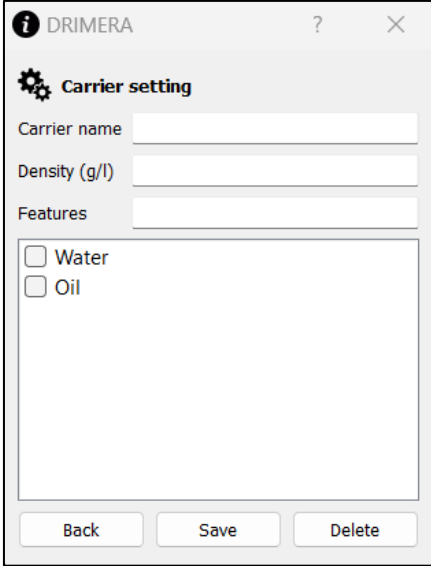


Figure 3 : Pesticide database settings window

In the settings window of the pesticide database, we have:

- "Pesticide name" for the trade name of pesticide;
- "Pesticides density" which provides information on the density of the pesticide;
- "Active matter name", which provides information on the name of the pesticide's active ingredient;
- "Active matter concentration" for the concentration of the pesticide as an active ingredient.

- "Pesticide volume" is used to specify the quantity (equivalent) of liquid pesticide to be used
- «Carrier material» allows you to choose the carrier liquid to be used during mixing. An existing database of water at 25 °C and natural oil is already present in the app. It can be updated by adding new supporting liquids via the button that gives read and write access  (*Figure 4*).



The screenshot shows a mobile application window titled "DRIMERA". Inside, there's a section titled "Carrier setting" with a gear icon. It contains three text input fields labeled "Carrier name", "Density (g/l)", and "Features". Below these fields are two checkboxes labeled "Water" and "Oil". At the bottom of the window are three buttons: "Back", "Save", and "Delete".

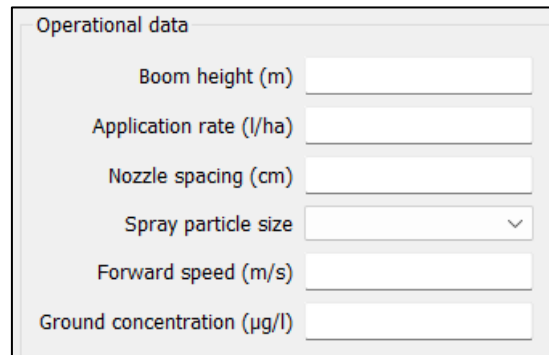
Figure 4 : Carrier Fluid Database Setup Window

At this window, there are:

- "Carrier name" for the common name of the carrier liquid;
- "Density" which provides information on the density of the liquid;
- "Features" which provides information on the various features.
- "Carrier volume" specifies the quantity of carrier liquid used to obtain the slurry

2. Operational data

The various operational data to be provided during application are presented on the **Figure 5**.



A screenshot of a software interface titled "Operational data". It contains six input fields arranged vertically. The first five fields are text boxes, and the sixth is a dropdown menu. The labels for the fields are: "Boom height (m)", "Application rate (l/ha)", "Nozzle spacing (cm)", "Spray particle size", "Forward speed (m/s)", and "Ground concentration (µg/l)".

Field Label	Input Type
Boom height (m)	Text box
Application rate (l/ha)	Text box
Nozzle spacing (cm)	Text box
Spray particle size	Dropdown menu
Forward speed (m/s)	Text box
Ground concentration (µg/l)	Text box

Figure 5 : Operational data configuration

This data is composed of:

- "*Boom height*" for the spray height above the canopy;
- "*Application rate*" for the quantity of spray applied per hectare of field;
- "*Nozzle spacing*" for nozzle spacing;
- "*Spray particle size*" for the medium diameter characteristics (types: *Fog*, *Very fine*, *Medium*, *Coarse*, *Fine rain*) of the spray droplets. This value is related to the properties of the nozzle used for spraying and the ejection speed;
- "*Forward speed*" for the speed at which the aircraft is forward;
- "*Ground concentration*" for the residual amount of pesticides present on the ground ($z = 0$) in the environment before spraying. This value is considered uniform in all respects.

3. Weather data

The various meteorological data to be provided during the spreading are three (03) in number as presented on the **Figure 6**.

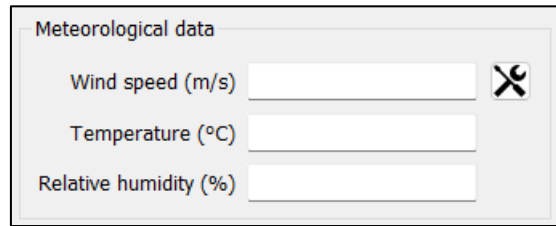



Figure 6 : Parameterization of meteorological data

These are:

- «Wind speed" for the wind speed in the direction of the flow considered. Since the spatio-temporal variability of the wind is taken into account, an adjustment of the compass rose of the geographical area via  the button is necessary (**Figure 7**).

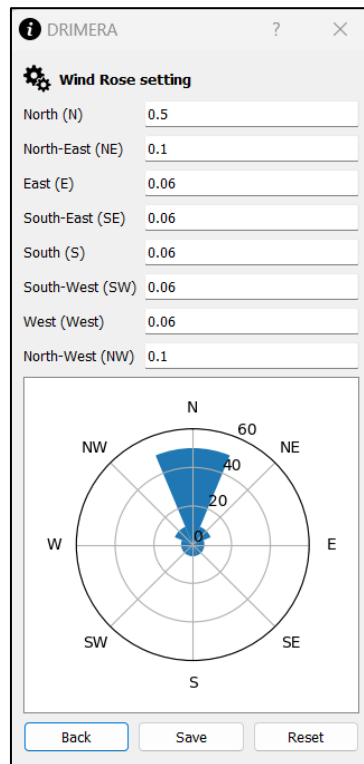


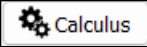
Figure 7 : Compass rose settings window


The values to be entered are expressed as the corresponding wind speed probabilities in each of the (08) defined directions, the total sum being equal to 1. Default values are already entered there. Thus, there are at the level of this window:

- "North (N)" which indicates the probability following North;

- "North-East (NE)" which provides information on the probability following the North-East;
 - "East (E)" which indicates the probability following East;
 - "South-East (SE)" which provides information on the probability following the South-East;
 - "South (S)" which provides information on the probability following South;
 - "South-West (SW)" which provides information on the probability following the South-West;
 - "West (W)" which indicates the probability following the West;
 - "NW" which indicates the probability following the Northwest.
- "*Temperature*" for room temperature;
 - "*Relative humidity*" for relative humidity.

4. Displaying results

The results of the simulation, after entering the calculation time "*Time step*" and starting the simulation by the button, are  presented in "*Plot*" graphically on the one hand and in the form of a data table in the "*Datasheet*" tab. The different concentration values are obtained at "*Z position*" varying from the ground ($z = 0$) to the boom *height from the* "ejection point" x and y ejection position.

The  button also allows you to download the results obtained in each of the tabs (*Figure 8*).

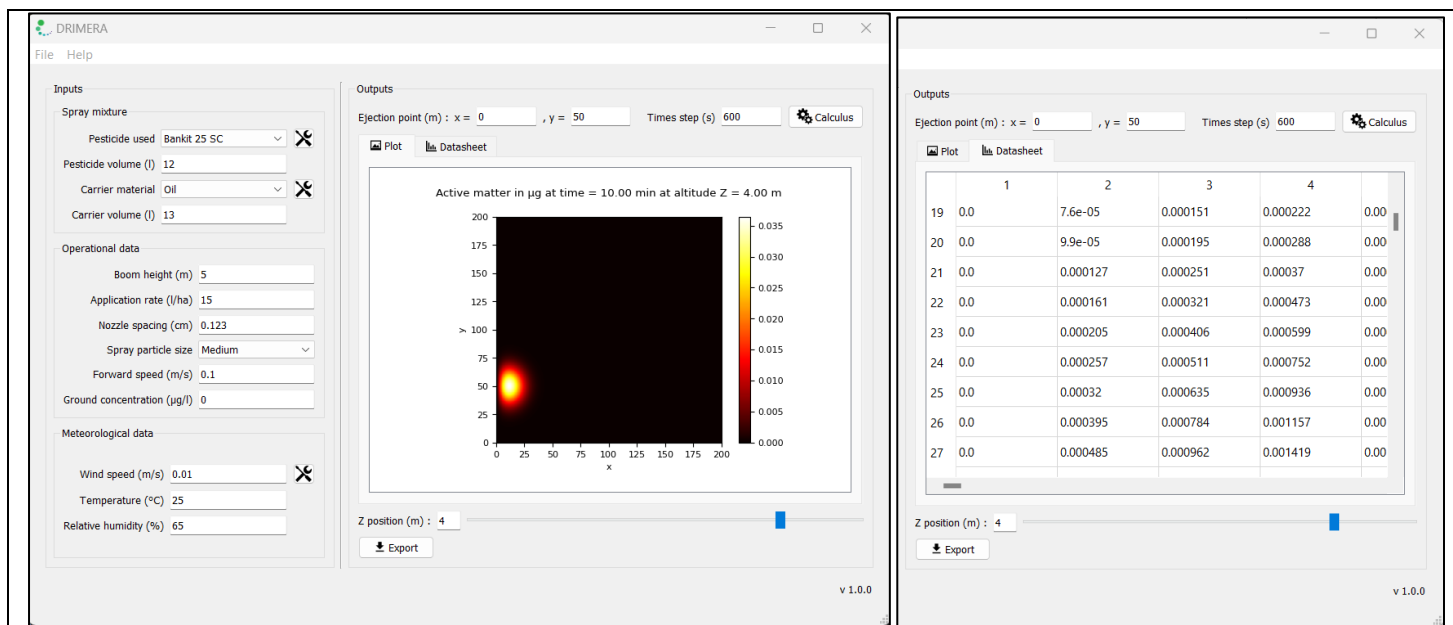


Figure 8 : Results windows (graph and table)