

smatrix  
by dawin

# MANUAL

smatrix agroscience  
for Android

V.1.1.4.0

EN

the future of mobile data collection

Do you have any questions? Then call our hotline on +49 2241 - 397 198 601 or send us an e-mail to [support@smatrix.systems](mailto:support@smatrix.systems). Also read [our FAQ on the website](#).

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## PLAY STORE DOWNLOAD

- Search the **Play Store** for „smatrix" or „smatrix agroscience".
- smatrix requires **Android 6 or higher**. If you are using an older Android version, smatrix will not be available in the Play Store.
- Owing to its size, we recommend downloading smatrix through a wifi connection.



## APP PERMISSIONS

**I** *smatrix requires the following four permissions for unrestricted use. **Telephone and Storage permission** will be requested when starting smatrix for the first time. **Microphone and permissions** will be checked when opening a trial for the first time. Location access will be requested when using the info field “Location” for the first time. If one of the above permissions is not granted, specific features **will not be available**.*

- 1 **Allow** smatrix to access photos, media and files, so that trials can be saved on your device.

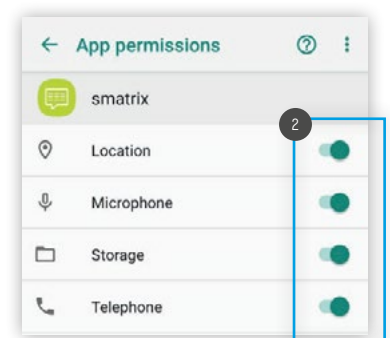
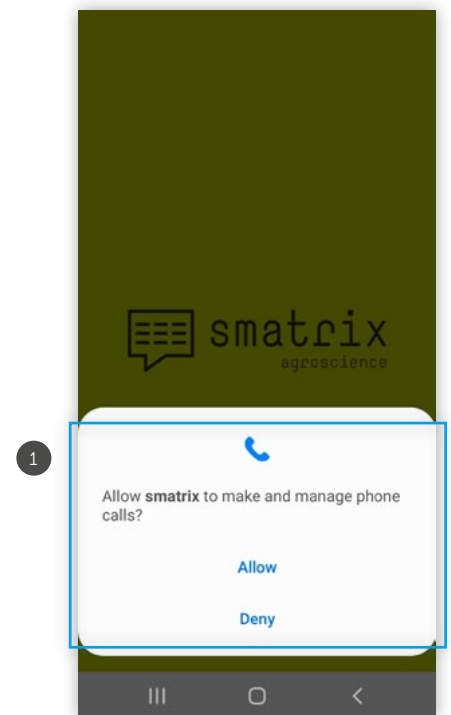
**Allow** smatrix to record audio, so that the speech-commands can be used.

**Allow** smatrix to make and manage phone calls so that incoming calls during a trial will not interfere with the speech input.

**Allow** smatrix to access your device’s location so that GPS coordinates may be added to a trial.

- 2 If a permission **has been denied**, it can be given at a later point:

**Android settings > Apps > smatrix > Permissions**



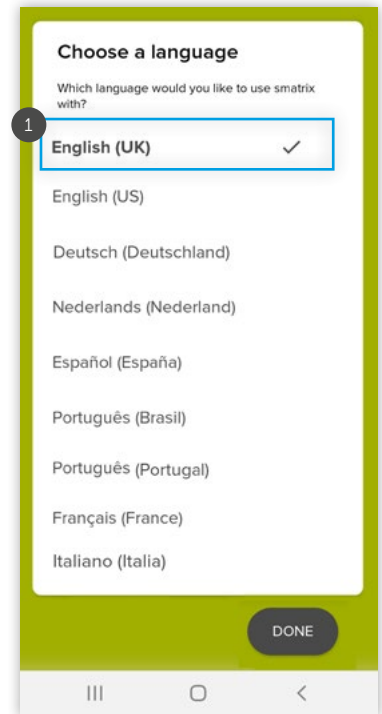
## CHOOSING A LANGUAGE

When you start smatrix for the first time, you will be asked to select a language in which you want to use smatrix. You can change the language later at any time using the **settings menu** <sup>1</sup>.

**Please note that a internet connection is required** to download the languages. We recommend due to the size of the language packs to use a WiFi connection.

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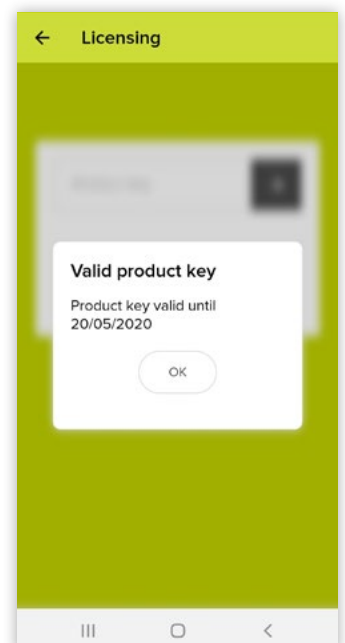
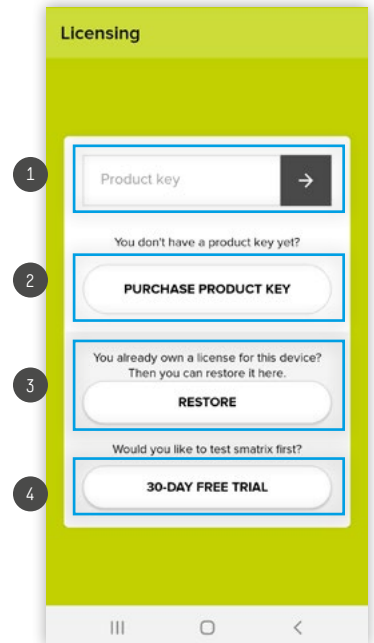
**ATTENTION:** A trial can only be used in the language in which it was created. Changing the language within a trial is not possible.



## LICENSE

- 1 Enter your **license key** here to use smatrix.
- 2 If you **do not have a license key** yet, you can contact us to purchase a key.
- 3 If smatrix was reinstalled on the current device, **the license key can be restored**.
- 4 smatrix can be tested free of charge with all features **for 30 days!**

The trial license ends automatically after 30 days. In the meantime, as well as after the 30 days, you can choose to subscribe at any time (Read here: „[Upgrade trial license](#)“ 🖱️).



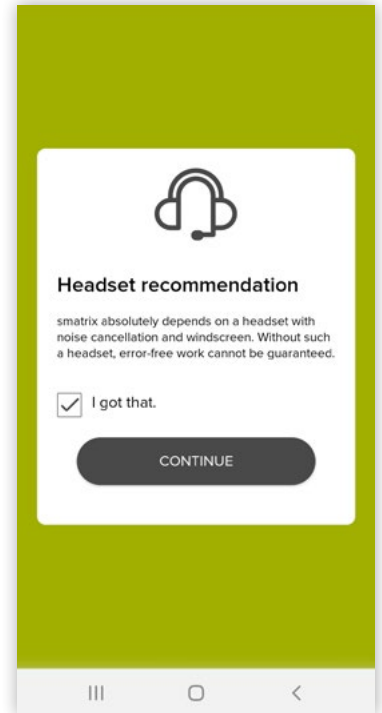
## HEADSET

It is **essential to have a headset with noise cancellation** and **wind protection** when using smatrix.

If you **use the onboard microphone** or any headset without adequate noise cancellation or wind protection, the quality of speech recognition **will usually be insufficient**.

We recommend using a wired USB A headset because jack plugs tend to rotate in the socket, which may reduce speech recognition. An in-line button comes in handy, too.

**Plantronics Blackwire 3200 series headsets have been found to work fairly well.**

**I**

*Please also read the information on the next page!*

## Bluetooth

We recommend using a wired headset because the voice audio quality of Bluetooth headsets is subject to large fluctuations depending on the combination of headset and device used and the respective codecs.

In theory, most Android 8.0 and higher devices support **Bluetooth codecs** with a sufficiently high sampling rate and sampling depth. In practice however, not every headset device combination selects the best codec for a Bluetooth connection. The resulting loss of data can lead to the **voice audio quality being insufficient for smatrix**.

**Please make sure that your Bluetooth headset device combination is adequate for smatrix by doing a test trial.**

Samsung Galaxy S9 works quite well in combination with the Sennheiser MB Pro 1 Bluetooth headset.



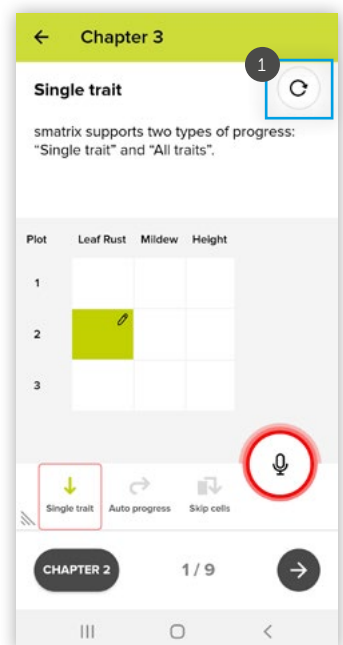
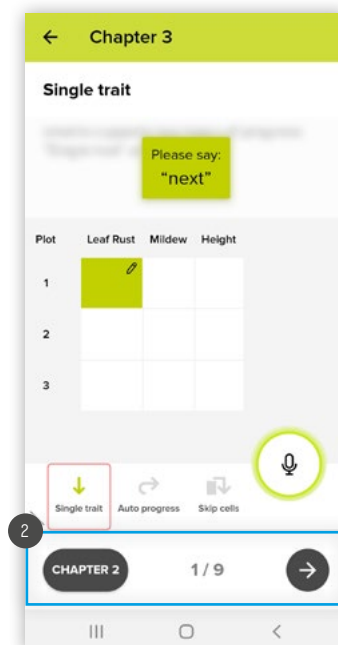
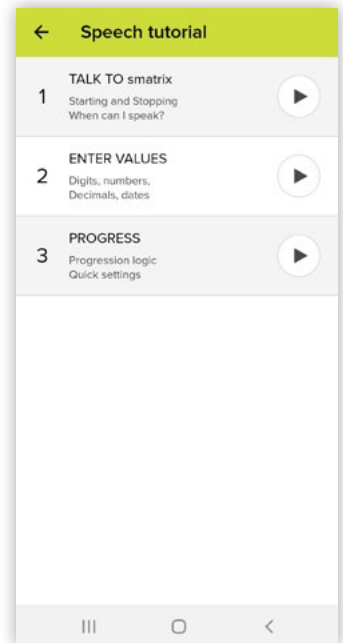
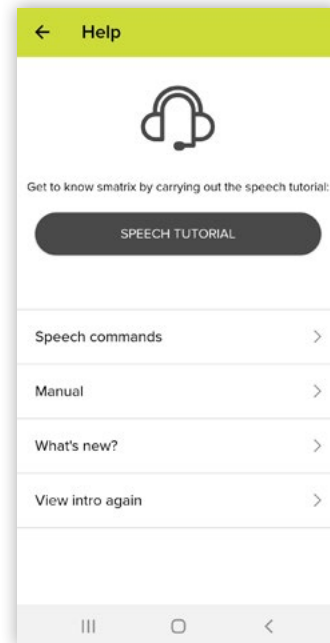
## SPEECH TUTORIAL

The speech recognition in smatrix supports **fixed commands that can be used in the assessment**. The best way to familiarize yourself with these commands is to carry out the Speech Tutorial. The functionality of the individual commands is illustrated using brief explanations and voice interactions.

The Speech Tutorial can be found under **Settings > Help > Speech Tutorial**.

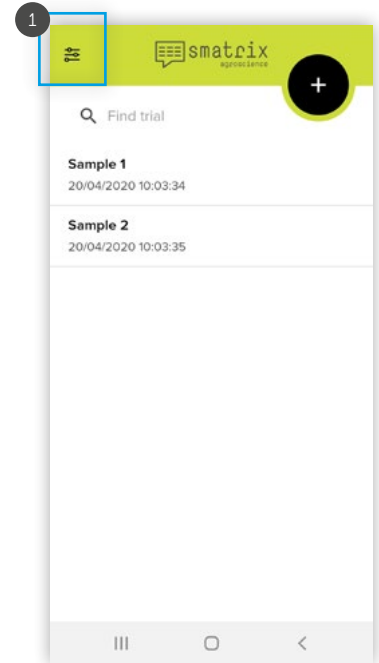
We recommend all users to complete the entire Speech Tutorial once. If you only want to repeat a single chapter later on, you can select it directly from the overview.

Individual lessons in a chapter can be repeated <sup>1</sup> or skipped <sup>2</sup>.



## SETTINGS

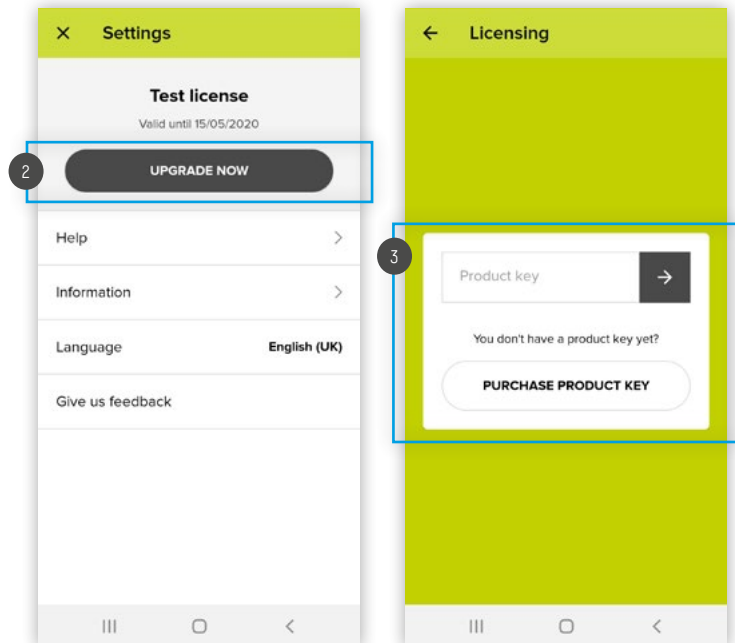
When you are in the trial list screen, the „Slider button“ <sup>1</sup> takes you to the settings menu.



### Upgrade trial license

With the „Upgrade Now-Button“ <sup>2</sup> you can enter a license key and convert the test license into a full version.

<sup>3</sup> Here you can purchase your license key or enter an existing one.

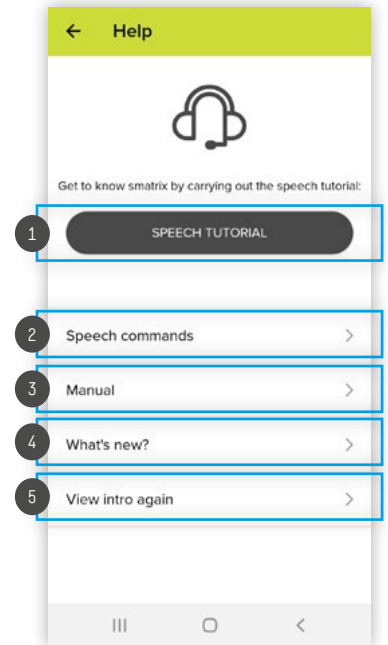


## 7.2

### Help

Under **Help** you will find:

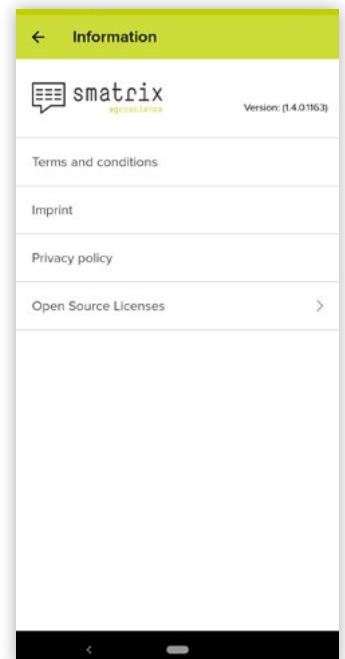
- the **Speech Tutorial** <sup>1</sup>,
- an overview of all **Voice Commands** <sup>2</sup>,
- the **Manual** <sup>3</sup>,
- information about the **latest renewals** <sup>4</sup>,
- as well as the opportunity to **watch the intro again** <sup>5</sup>.



## 7.3

### Information

Under **Information** you will find our [terms and conditions](#), the [imprint](#), information on [data protection](#) and **open source licenses**.

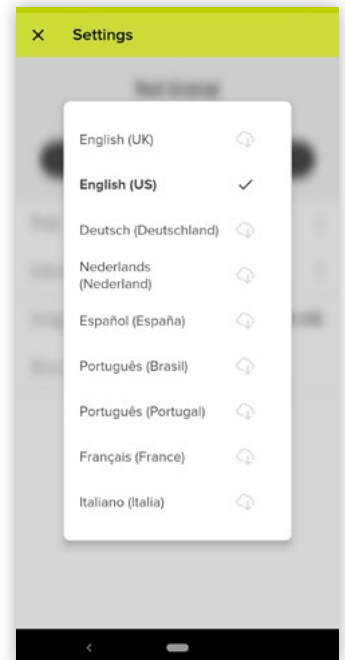


## Language

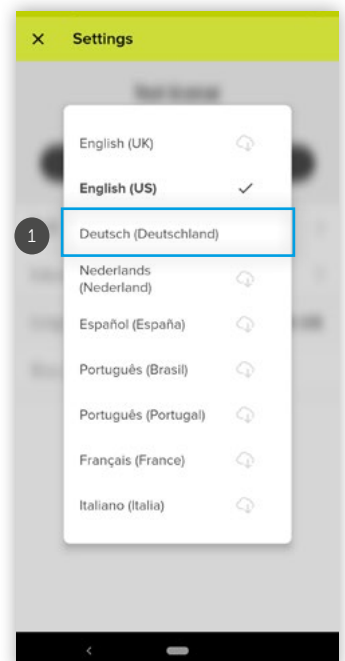
You can switch to another language by clicking on **Language**.

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**Please note** that a internet connection is required to download the languages. We recommend due to the size of the language packs to use a WiFi connection.



There is an icon next to each language, which indicates whether you have already downloaded the language. As soon as the language has been downloaded, the icon disappears <sup>1</sup>.

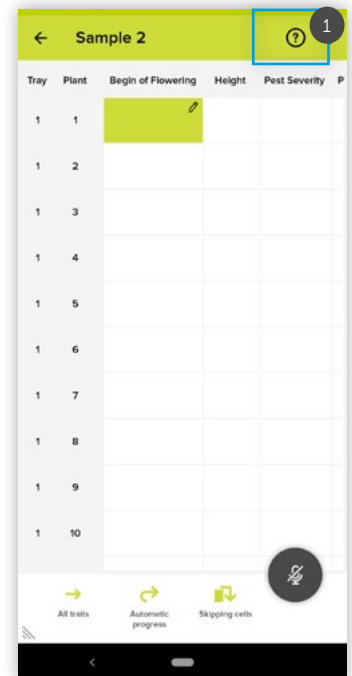


## SPEECH COMMANDS

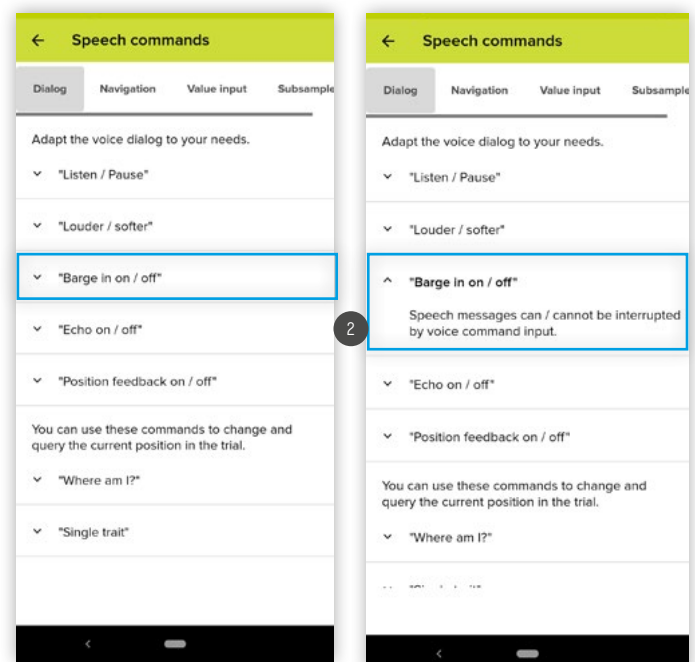
The list of voice commands can be opened via:

- **Settings > Help > Speech commands**

or in the trial list view **by clicking the question mark symbol** <sup>1</sup>.



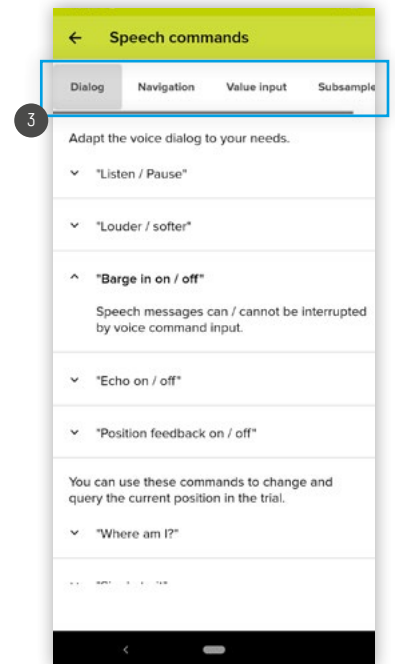
**Individual speech commands** can be <sup>2</sup> tapped to expand further information and details.



You can scroll through all the commands to get an overview. If you are looking for a specific **command**, you can use the links <sup>3</sup> to jump directly to the following sections:

- **Dialog**
- **Navigation**
- **Value input**
- **Subsamples**

and view the descriptions of the speech commands.

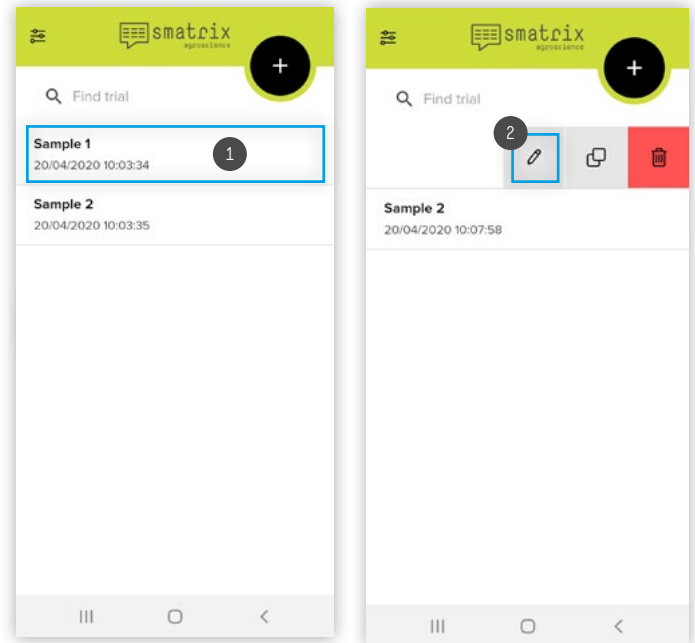




## TRIAL LIST

### Edit a trial

An existing trial can be edited by first **swiping it to the left** <sup>1</sup>, followed by tapping the „Pencil button“ <sup>2</sup>.

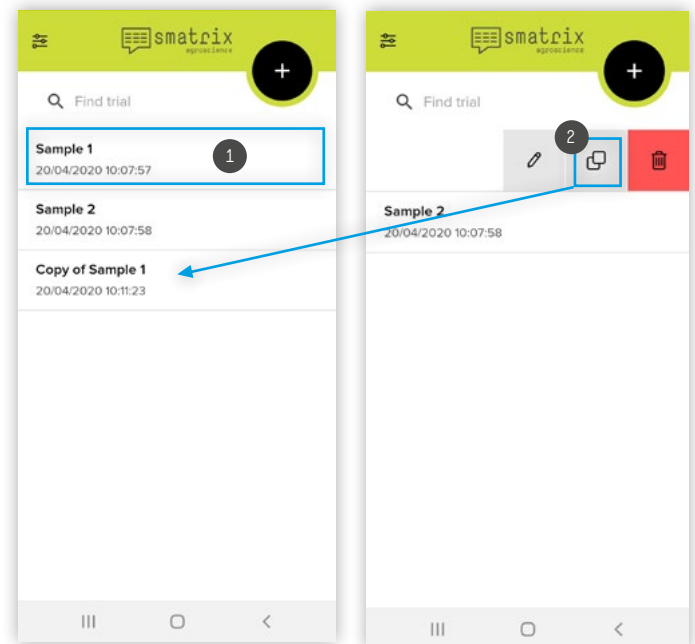


### Copy a trial

An existing trial can be copied by first swiping it to the left <sup>1</sup>, followed by tapping the „Copy button“ <sup>2</sup>.

A trial copy keeps the trial structure and traits of the original but discards any values or data.

**The name of the trial copy can be changed.** Trial structure and traits can also be edited.



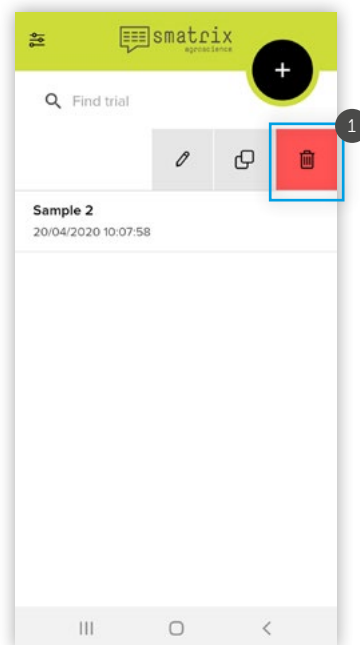
## 9.3

### Deleting a trial

An existing trial can **be edited** by first swiping it to the left, followed by tapping the „Trash Can button“ <sup>1</sup>.

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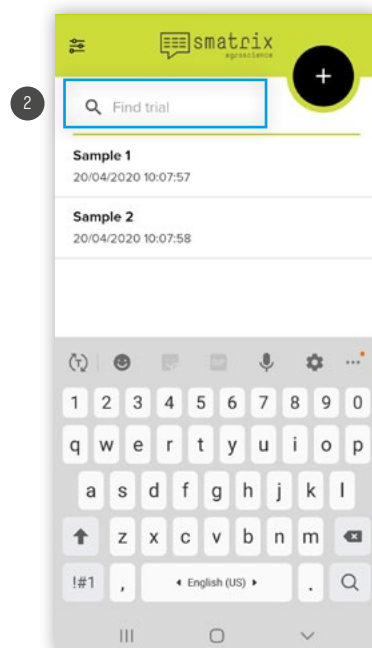
*Attention: A deleted trial cannot be restored!*



## 9.4

### Searching the trial list

You can search the trial list by entering a term into the „Find trial“ field <sup>2</sup>.



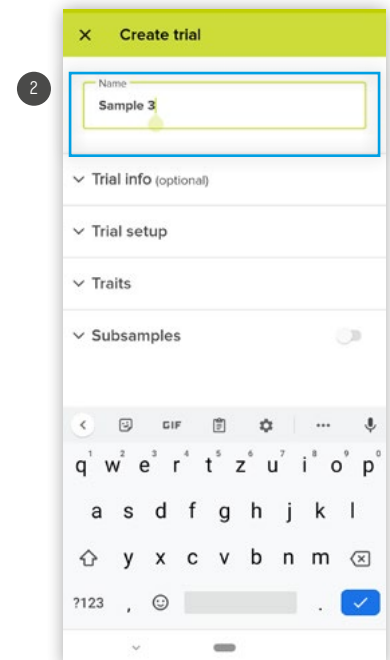
## CREATING A TRIAL

A new trial can be created by tapping the „**black Plus button**“ <sup>1</sup>.



### Name

**Names** <sup>2</sup> must not be duplicates of existing trials. You can only use letters and numbers in names, since emojis might cause errors when exporting the trial.



## Trial Info

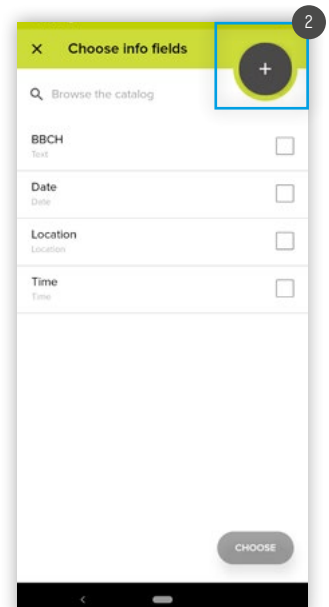
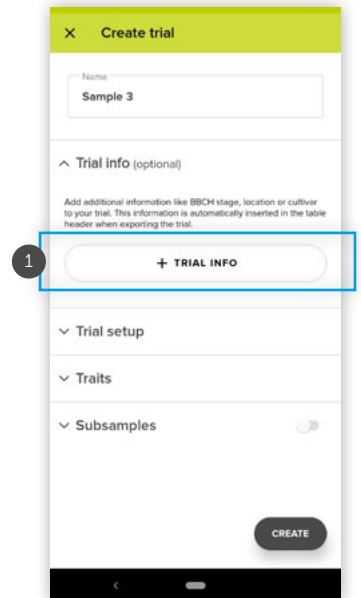
Information such as **BBCH stage**, the **location** or the **cultivar** may be added to the trial.

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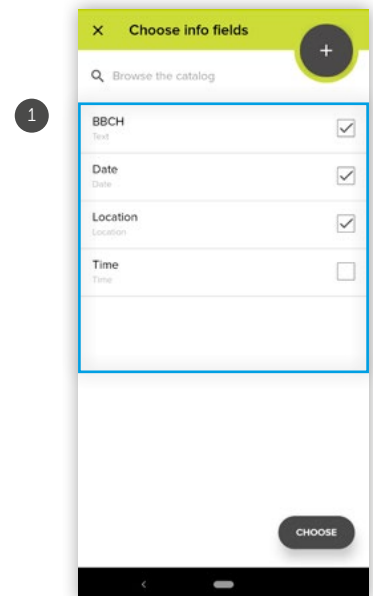
When exporting the trial as a PDF or XLSX file, the trial info will be inserted into the table's header. CSV export does not account for any trial info.

Tapping the “+ Trial Info” button <sup>1</sup> brings you into the **info field catalogue**, where existing info fields can be selected and/or new info fields can be created.

A new info field can be created by tapping the **black „Plus button“** <sup>2</sup>.

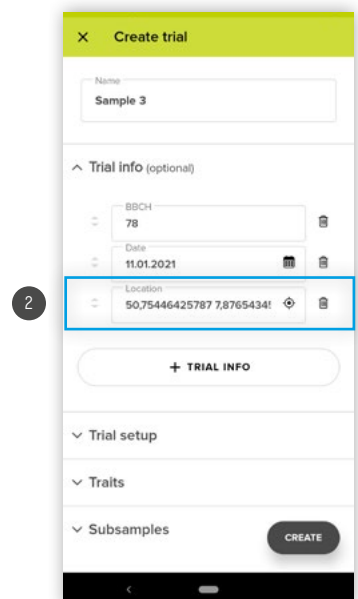


**Info fields** <sup>1</sup> can contain **text, time, dates** or your **current location**, all of which can be selected as value ranges.



The **info field “Location”** <sup>2</sup> uses your device’s location to add GPS coordinates to your trial.

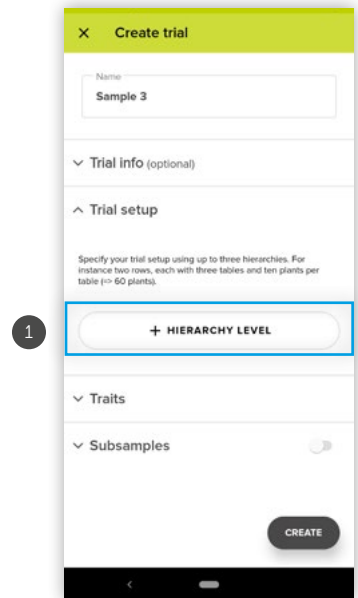
After selecting the desired **info fields** from the catalogue, they can be filled with data in the **“Create trial”** view.



## Trial set up (SEE ALSO EXAMPLES AT THE END)

The trial set up can consist of one to three hierarchically organised levels.

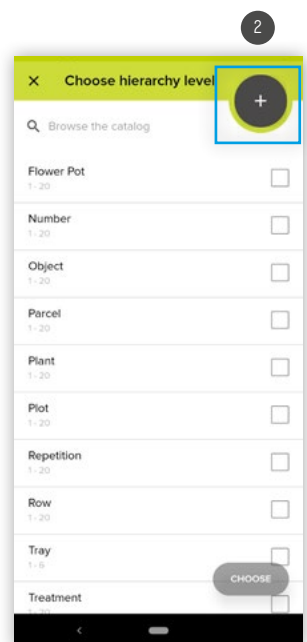
Tapping the „+ Hierarchy Level“ button <sup>1</sup> brings you into the catalogue where existing elements can be selected, or new ones created.



A new **hierarchy level** can be created by tapping the black „Plus button“ <sup>2</sup>. Each hierarchy level requires a name.

This **name** will be read out by smatrix during the trial and it will be used for navigating.

An **alternative name** may be set up if required. However, the alternative will not be read out. It may be used for navigation only.



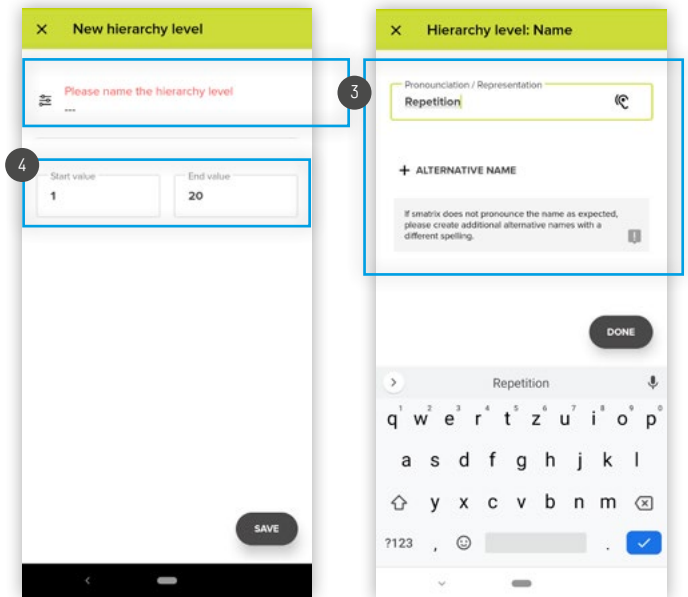


### 3 Create names:

The first step is to define the name of the trial unit. Here you can also create an alternative name.

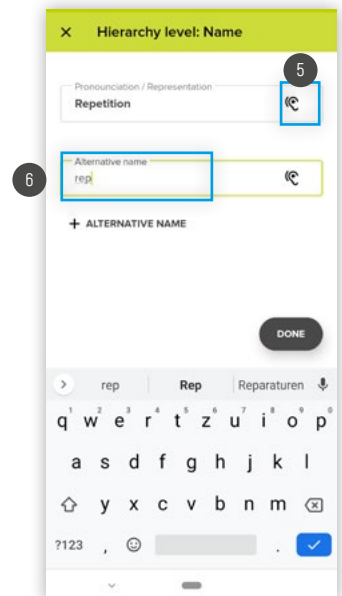
The **number of trial units** 4 per hierarchy level is defined by the start and end value.

The maximum is 10,000.



The „**Ear button**“ 5 can be used to check whether the name is read out correctly.

If that is not the case, the **name** 6 can be edited, disregarding correct spelling.



## 10.3

The order of the hierarchy levels can be changed using the „**Arrow buttons**“ <sup>1</sup>.

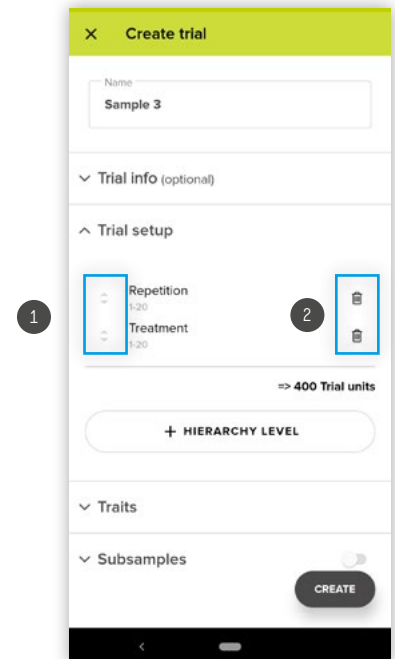
Hold down the Arrow button and move the hierarchy level to the desired position.

A hierarchy level can be deleted using the „**Trash button**“ <sup>2</sup>.

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**Attention:** It is not yet possible to import existing trial or randomisation structures. This feature is currently under development.

If the order of the trial units does not match the order in smatrix, you can navigate to the required trial unit by voice. Also trials using a randomization structure can be used with this approach.



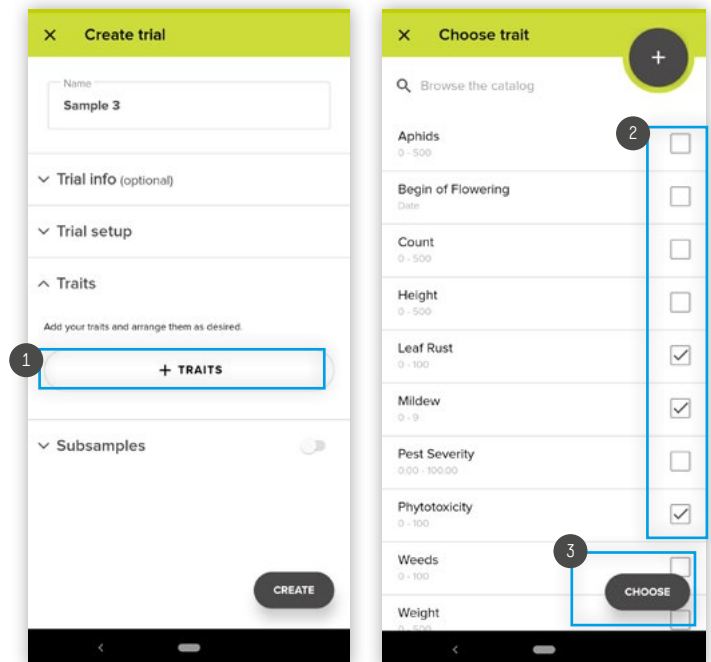
## Traits

The trait maximum is **30 for each trial**.

Tapping the „+ Traits“ button **1** brings you into the catalogue where existing traits can be selected, or new ones created.

Using the **check boxes** **2**, several traits can be selected to add them simultaneously.

Tapping the „Choose button“ **3** adds all selected traits to the trial set up.

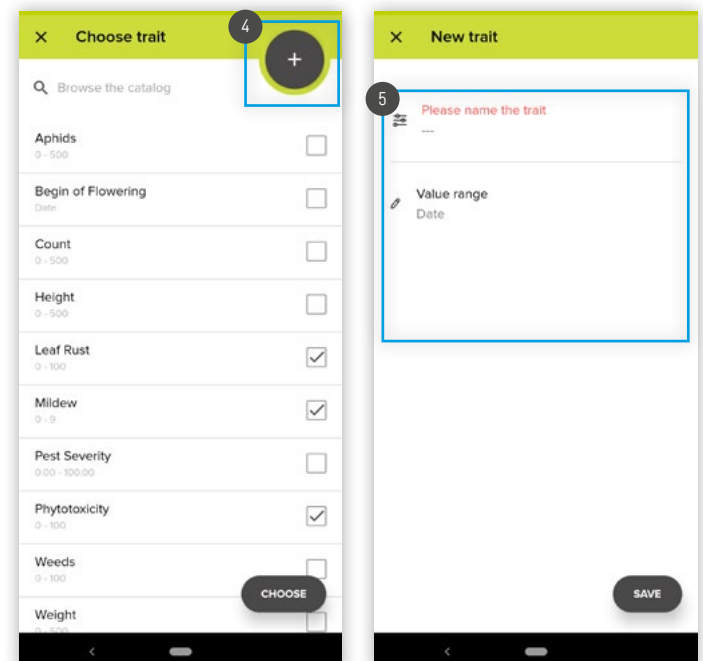


Existing traits can be edited by tapping on them in the catalogue.

Traits **can be deleted from the catalogue** by swiping left. Deleting a trait from the catalogue does not affect trials which contain the deleted trait.

New traits can be added to the catalogue using the black „Plus button“ **4**.

A trait requires a **name** and a **value range** **5**. Alternative names can be specified, if required.



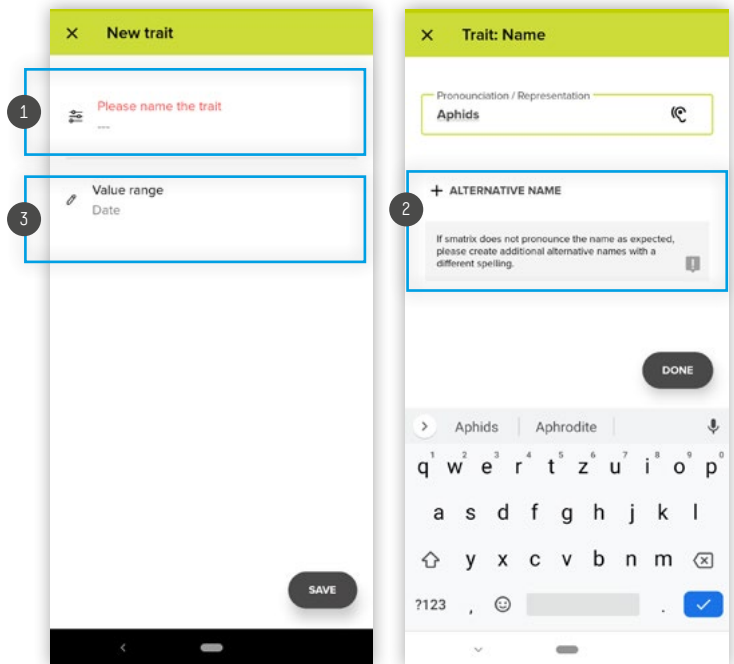
## 10.4.1

### Create trait

First of all, tapping on the upper area <sup>1</sup> again gives the feature a name.

You can also define **alternative names** <sup>2</sup> here.

Now you can define the value range <sup>3</sup>.



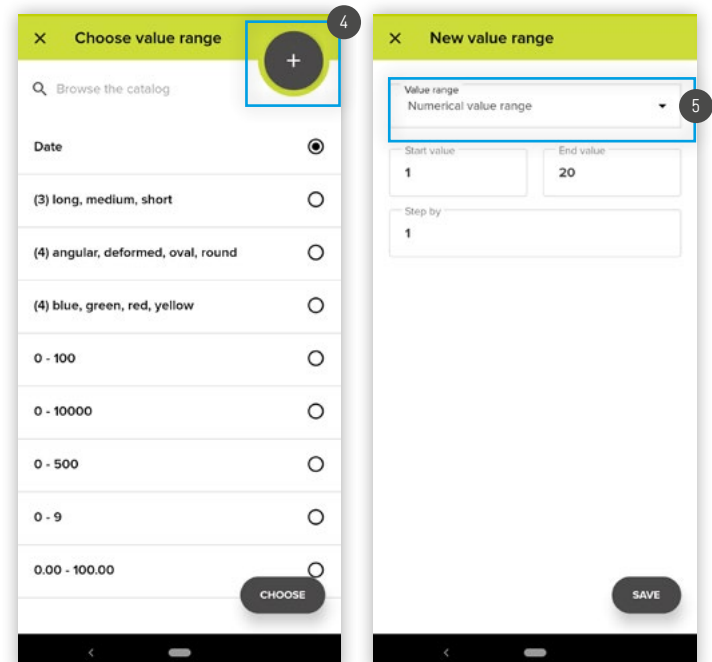
## 10.4.2

### Create value ranges

You can define numerical or word value ranges.

Select the appropriate value range from the predefined list or use the black **"Plus button"** <sup>4</sup> to create a new, freely defined, value range.

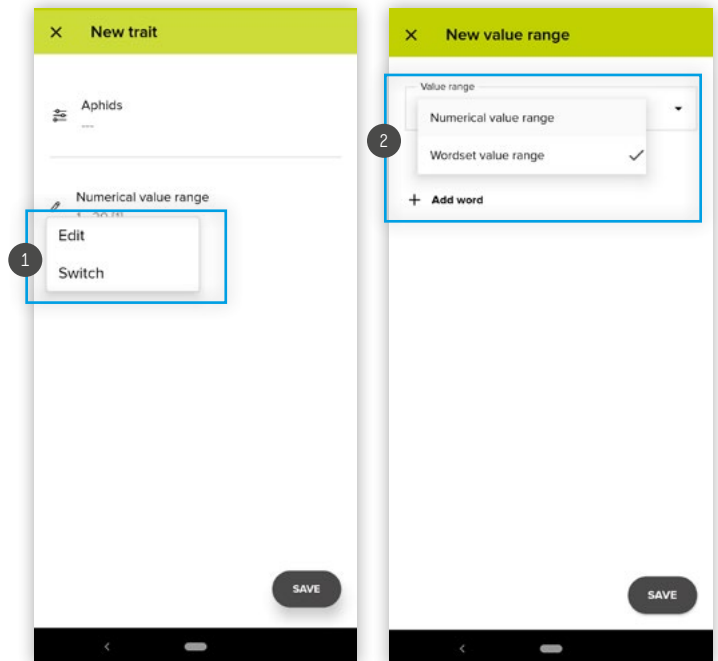
With the **"Dropdown button"** <sup>5</sup> you can choose between **"Numerical value range"** and **"Wordset value range"**.



## Switching/editing the value range

By tapping on an existing value range, you can **switch it or edit** <sup>1</sup>.

Using the **Dropdown menu** <sup>2</sup> you can select between **"Numerical value range"** and **"Wordset value range"**.

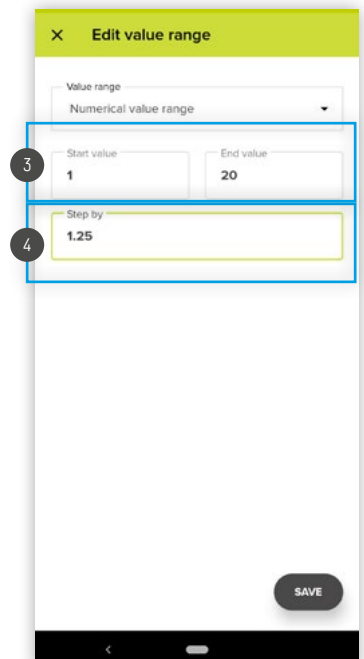


**When editing**, you can freely define the **"numerical value ranges"** with a **start and end value** <sup>3</sup> !

You can also determine the **"step size"** <sup>4</sup>.

The **step size** is the value that is added up from the **start value** until the **end value** is reached.

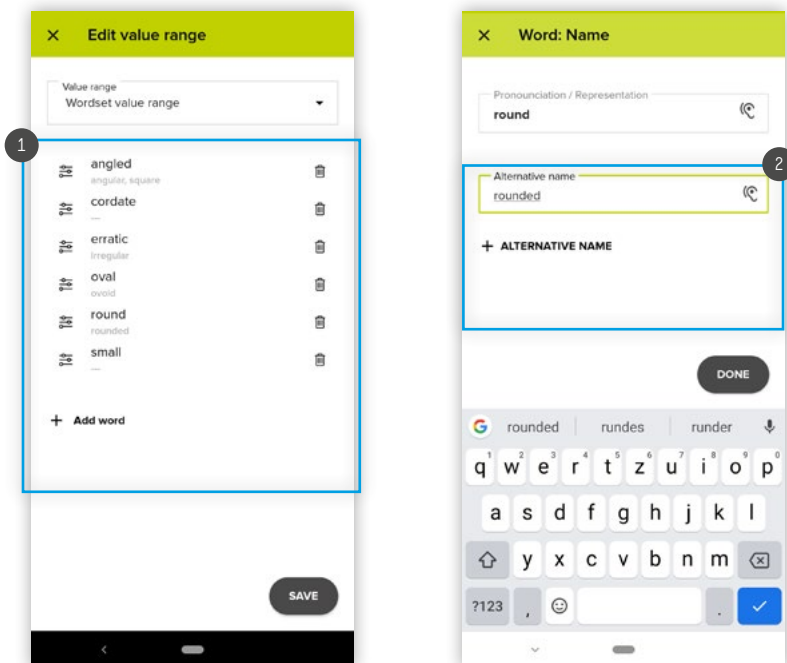
You can also enter **decimal numerical values** here, e.g. **1.25**. Then, for example, the following values would be permitted: **0; 1.25; 2.5; 3.75 ... 100**.



If you have selected a **wordset value range**, you can create a freely defined list of words to describe your trial <sup>1</sup>.

You can also define alternative names for each word, for example round/rounded <sup>2</sup>. To do this, click on one word in the list.

Via picker or voice you can collect these words in your trial.



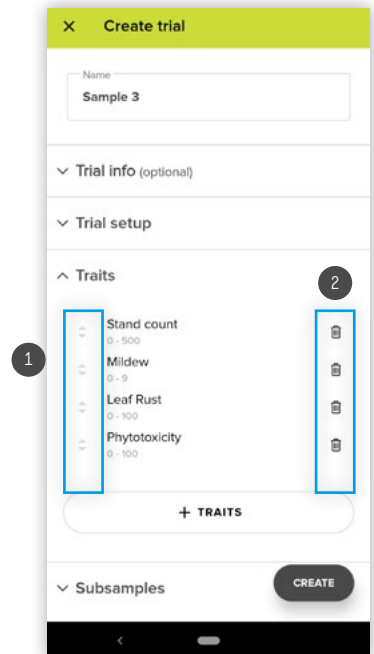


## Order of traits


The **order of the traits** can be changed by using the „**Arrow buttons**“ **1** .

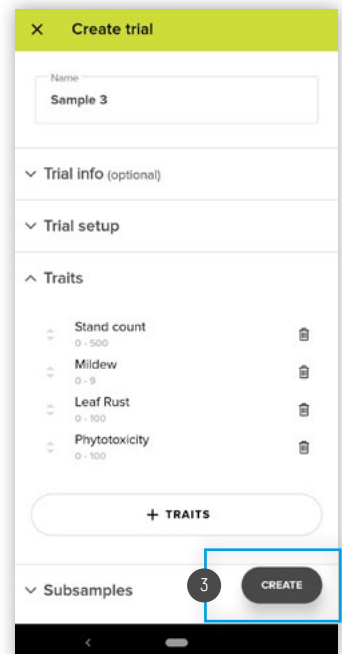
**Hold down the Arrow button** and move the trait to the desired position.

Traits can be removed **by swiping left** or by tapping the „**Trash Can buttons**“ **2** .



Tapping the „**Create button**“ **3** will create and open the trial.

If you do **not use subsamples**, you can directly create and open the report by clicking the "**Create button**". If you would like to use samples, you can read here how to configure them: "**[Trials with subsamples](#)**" on page 38 .

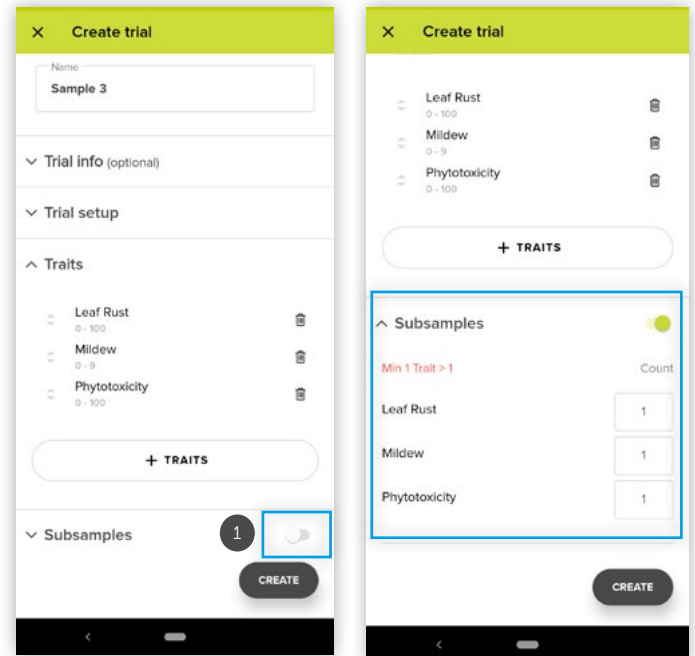


## Subsamples

If you would like to record more than one value per trial unit for some traits, you can set up subsamples.

To do this, use the **"Subsamples"** section, which is activated using the **button 1**.

When subsamples are activated, a separate section opens where you will see all the traits in your trial listed again. Behind each trait, there is an **input field** where you can change the **number of subsamples**.



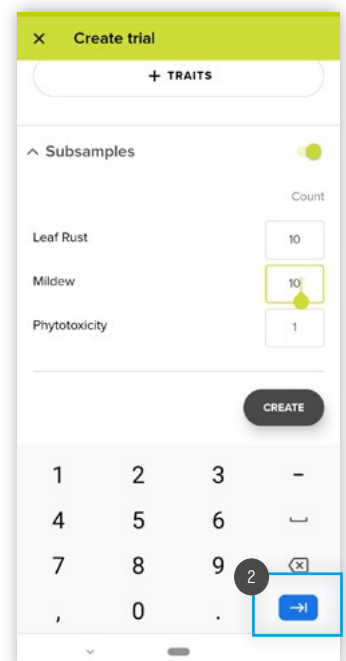
Select the relevant field and **use the keyboard to enter the number of subsamples** you want to use for this trait in the trial.

Depending on the type of keyboard used on your smartphone, press **"next" / a small arrow 2** to jump to the input field for the subsamples of the **next trait**. If you have activated subsamples, multiple subsamples must be activated for at least one trait. If you do not want to use subsamples, deactivate them using the same button **1**.

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**Important:** Adjacent traits with the same number of subsamples are automatically interpreted as a group. Using the settings in 11.3.1 you can set whether you wish to enter subsample data for each trait in turn within a group.

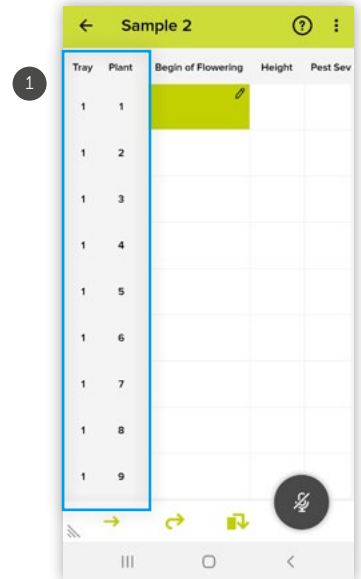
Once you have set up the subsamples as desired, you can save and open the trial via **"create"**.



## TRIAL VIEW

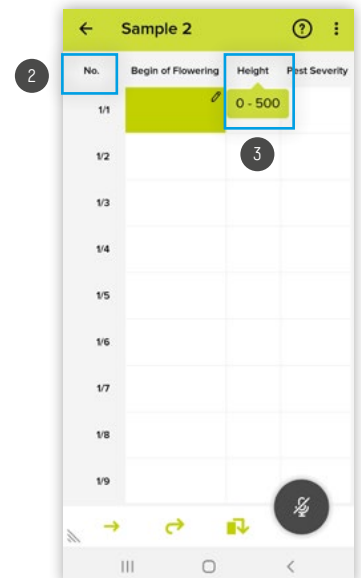
### ID column area (foldable)

The **grey area** ① on the left shows the name and numbering of the trial units.



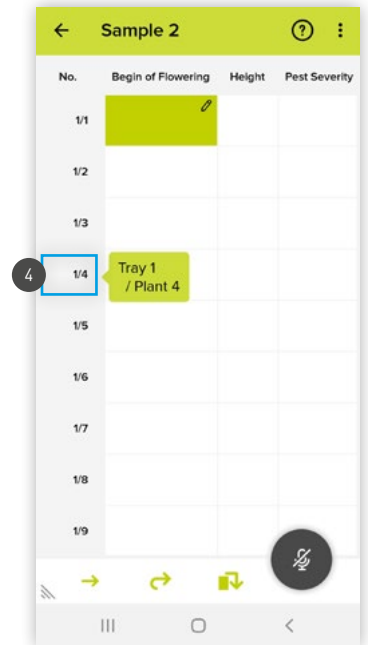
Tapping “No.” ② or the trial unit names (e.g. “Repetition” and “Treatment”), respectively, will enlarge and reduce the grey area.

Tapping the **name of trait** ③ will show its corresponding value range.



## 11.1

Tapping the trial unit numbering **4** while the ID column is minimized will show its full name (e.g. “**Repetition 2500 / Treatment 5**”).

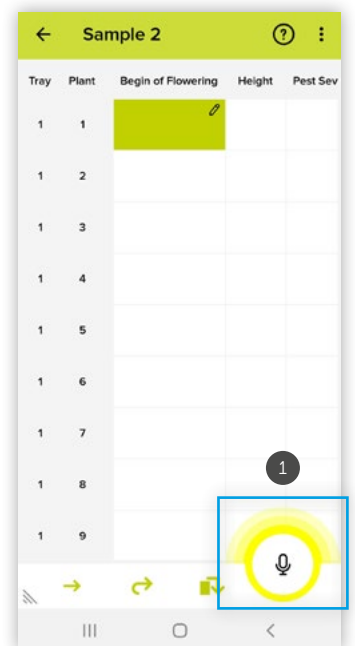


## 11.2

### Starting and pausing the speech control

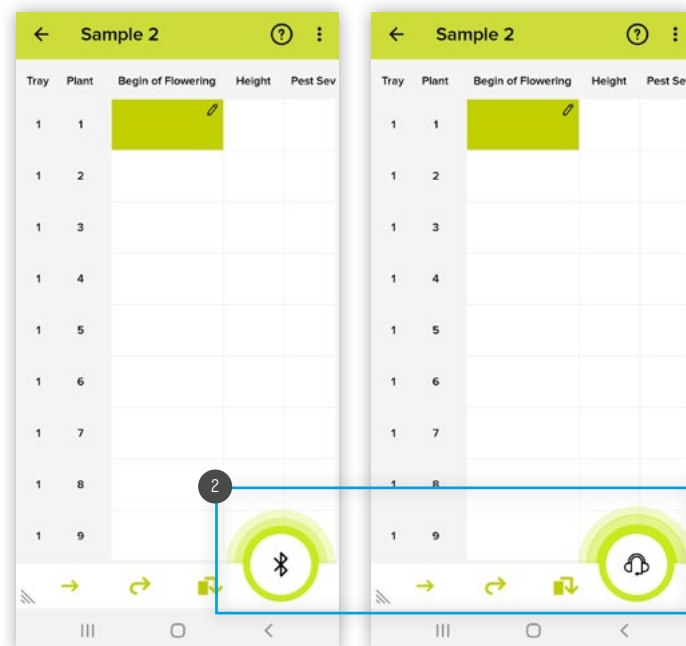
Start smatrix speech control by using the voice command “**Listen**” or tapping the „**Microphone button**“ **1**.

Tapping the button again or the voice command “**Pause**” terminates speech input.



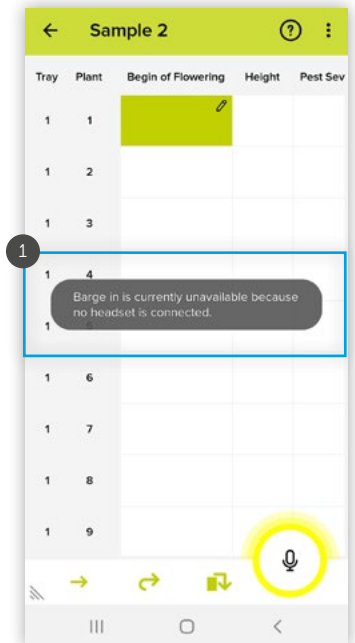
## 11.2

If a headset is connected, the **Microphone button** <sup>2</sup> is framed in green and “**Barge in**” is available.




If no headset is connected, the „Microphone button“ <sup>1</sup> is framed in yellow.

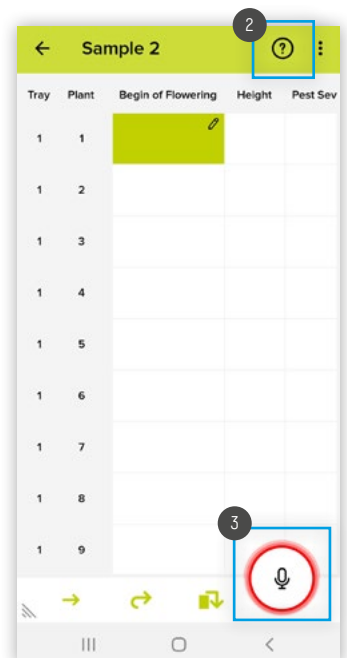
The option “Barge in” is not available.



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A list of all voice commands is available by tapping the "Question mark button" <sup>2</sup>. Please note that smatrix understands these commands „unambiguously“ and may be interrupted by natural pauses or filler words like “uhh” and “ohh” etc. We recommend training your pronunciation in advance with the „Speech Tutorial“  or sample trials.

If “Barge in” is **deactivated** or not available, the button is outlined in red <sup>3</sup> during speech playback. You can only speak a new voice command or a value when smatrix has finished speaking and the color changes back to yellow / green. If you start during the voice output (e.g. the “Echo” of the previous value, a “Position Feedback” or a prompt when deleting values), voice commands (or part of the command) cannot be recognized.





## Quick Settings bar

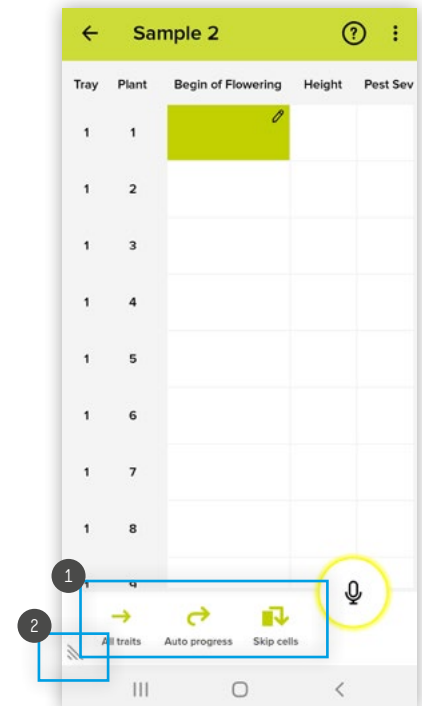
The **Quick Settings bar** is located at the bottom of the screen <sup>1</sup>.

It can be expanded by tapping the **triangle** <sup>2</sup>.

Each of the three settings can be activated at any time by **voice command** or tapping.

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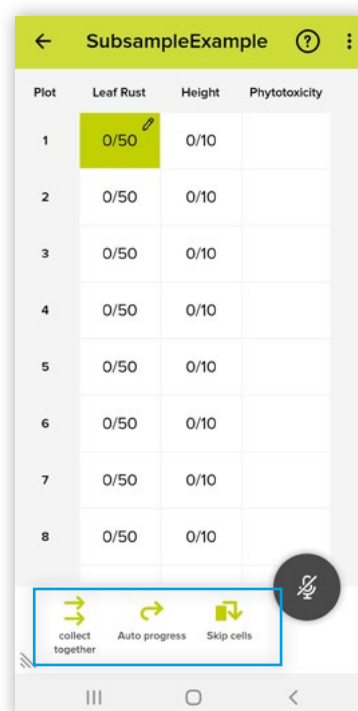
*The Quick Settings bar changes view depending on whether you are using subsamples or not. More on this in the following pages.*



### Quick Settings bar without subsamples



### Quick Settings bar with Subsamples



### All traits / single trait (TRIALS WITHOUT SUBSAMPLES):

If your **trial has subsamples configured**, you are presented with a different option here (see next point: **"Collect together / individually"**):

- If **"All traits"** is activated, smatrix switches to the next trait of the current trial unit, i.e. progress is row-wise.
- If **"Single trait"** is activated, smatrix switches to the next trial unit but stays within the current trait, i.e. progress is column-wise.

The **speech commands "All traits"** and **"Single trait"** can be used at any time to adjust this setting as needed.

### Collect together / individually (TRIALS WITH SUBSAMPLES):

**All traits of a trial unit are filled before proceeding to the next one (like the "All traits" option for trials without subsamples).**

- When **"Collect together"** is selected, you collect the subsample data within a group using a sequence of alternating traits.
- When **"Collect individually"** is selected, first you collect all the subsample data for one trait in your current trial unit, then you go through the subsamples again to enter data for the next trait. Groups are ignored.

This option can be changed at any time by using the **speech command "Collect together"** or **"Collect individually"**.

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*Trials with subsamples require an adapted view. Please see „**Trial View with subsamples**“ page 36 , for a detailed explanation.*

### **Automatic progress on / off**

If **“Automatic progress”** is activated, the next cell is automatically selected after entering a value.

If **“Automatic progress”** is deactivated, the user has to **say “Next”** to move the trial unit/trait or tap to switch to another cell.

The speech commands **“Automatic progress on”** and **“Automatic progress off”** can be used at any time to adjust this setting as needed.

### **Skipping cells on / off**

If **“Skipping cells”** is activated, cells already containing data are skipped.

If **“Skipping cells”** is deactivated, cells already containing data can be selected and any new value overwrites existing data.

The speech commands **“Skipping cells on”** and **“Skipping cells off”** can be used at any time to adjust this setting as needed.

## Entering values by voice

### Value ranges and pronunciation

The values that can be entered by voice depend on the defined value range of the trait at your current position.

**I**

*Tip: Complete the second chapter of the **speech tutorial** to learn how to enter values.*

**"Not available":** This special entry can be used in any cell, **regardless of the value range defined for the trait**. "Not available" can be used to indicate that there is no meaningful value to be entered in that cell.

**Numbers** can basically be spoken as a **whole number or as a sequence of digits**, so you can say "fifty-five" or "five five" to enter "55". This is especially useful for similar sounding numbers like 15 / 50 and 14 / 40.

**Decimal places** must be spoken **digit by digit**, e.g. "Zero point two six" → 0.26

Values for the value range **"Date"** can be entered in different ways:

- **Day, month, year**  
→ e.g. "Second of January two thousand ten"
- **Month, day, year**  
→ e.g. "January second, two thousand ten"
- **Day, month number, year (ONLY UK English)**  
→ e.g. "Eight nine two thousand ten" results in September eighth 2010  
If the year is not mentioned, the date will be completed with the current year.
- **Month number, day, year (ONLY US English)**  
→ e.g. "Eight nine two thousand ten" results in August nineth 2010  
If the year is not mentioned, the date will be completed with the current year.
- **"Day before yesterday" / "Yesterday" / "Today" / "Tomorrow" / "Day after tomorrow"**  
→ The corresponding date is saved in the trial.

**Wordset value range:** Words e.g. "angled", "cordate" can be spoken. Alternative names for a word (→ round, oral) can also be specified.

## Filling several cells at once

Sometimes it is useful to enter **the same value in several cells**. The following speech commands can be used for this purpose:

### "Fill with <value>"

The **current trait of the current trial unit** is filled with the spoken value. **If subsamples are configured** for the trait, this applies to all subsamples. **Only empty cells are filled; existing values remain unchanged.**

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**Important:** This command ignores the quick settings 11.3.1 **"All traits / single traits"** and 11.3.4 **"Skipping cells on / off"**!

### "Fill trial unit with <value>"

All traits for the current trial unit are filled with the specified value. Only empty cells are filled. For traits with subsamples, this applies to all subsamples.

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**Note:** This only makes sense **if the value is valid for all the traits**. If a value is not valid for a certain trait, the operation will terminate at this point.

### "Fill <trait> with <value>"

All empty cells of the specified trait for all trial units are filled with the specified value. This applies to all samples of the trait. Only empty cells are filled. → e.g. "Fill mildew with not available".

### "<Number> times <value>"

The spoken value is entered for the next <number> (between 1 and 999) cells. → e.g. "Ten times fifty-five"

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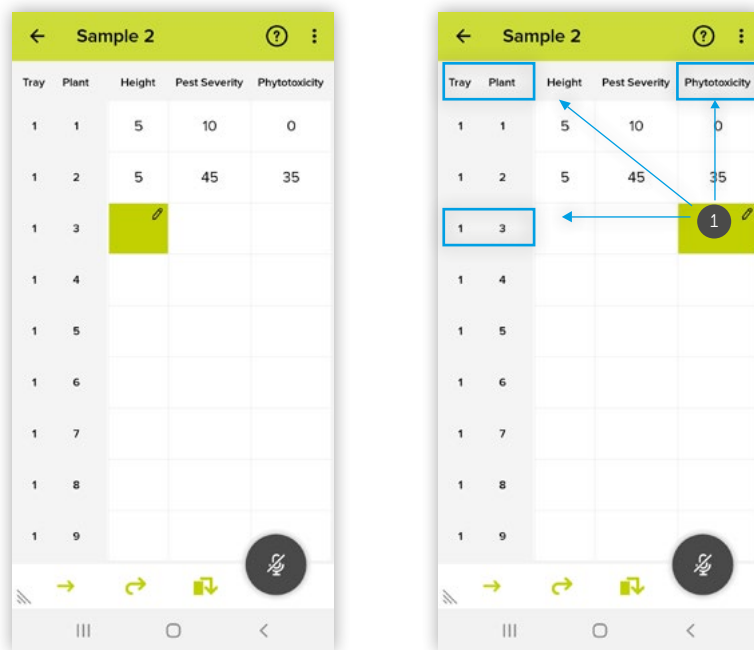
**Important:** This command uses **the following Quick Settings!**

- **"All traits / single trait:"** (page 31) 🚩
- **"Skipping cells on / off"** (page 32) 🚩: **If this option is turned off, existing values are overwritten.**

## Speech navigation during the trial

In addition to „**Automatic progress**“, a trait can be directly navigated to at any time by voice command by saying the trait name or, if available, the alternative name. The same applies to the control of any trial unit.

Any **cell can be directly navigated** to by using its combination of trial unit and trait (e.g. “Tray 1, Plant 3, Phytotoxicity”) ①.



Tray	Plant	Height	Pest Severity	Phytotoxicity
1	1	5	10	0
1	2	5	45	35
1	3			
1	4			
1	5			
1	6			
1	7			
1	8			
1	9			

### „Next/previous trial unit“

Jumps automatically to the next trial unit.

### „Next/previous subsample“

Only available if subsamples are configured. Jumps to the next/previous subsample of the current trait in the current trial unit.

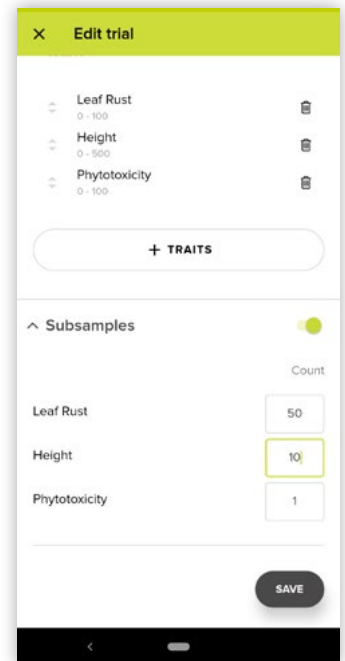
### Subsample <Number>

Only available if subsamples are configured. Jumps to the sample with the corresponding number.

## Trials with subsamples

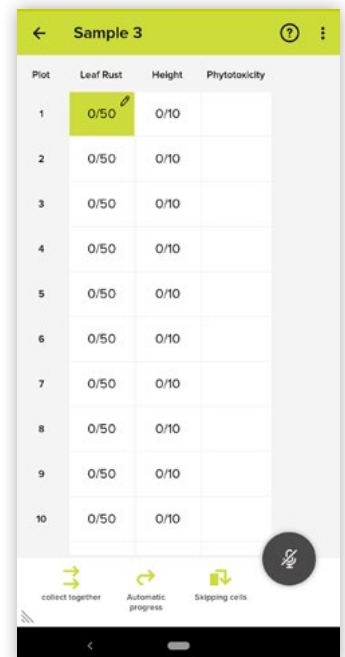
Trials containing subsamples require more space to display information on the collected subsamples. To keep things clear, we have therefore developed two different views that show more or less details of the trial.

Voice input is always possible, regardless of which view you are using.



### Trial View with subsamples

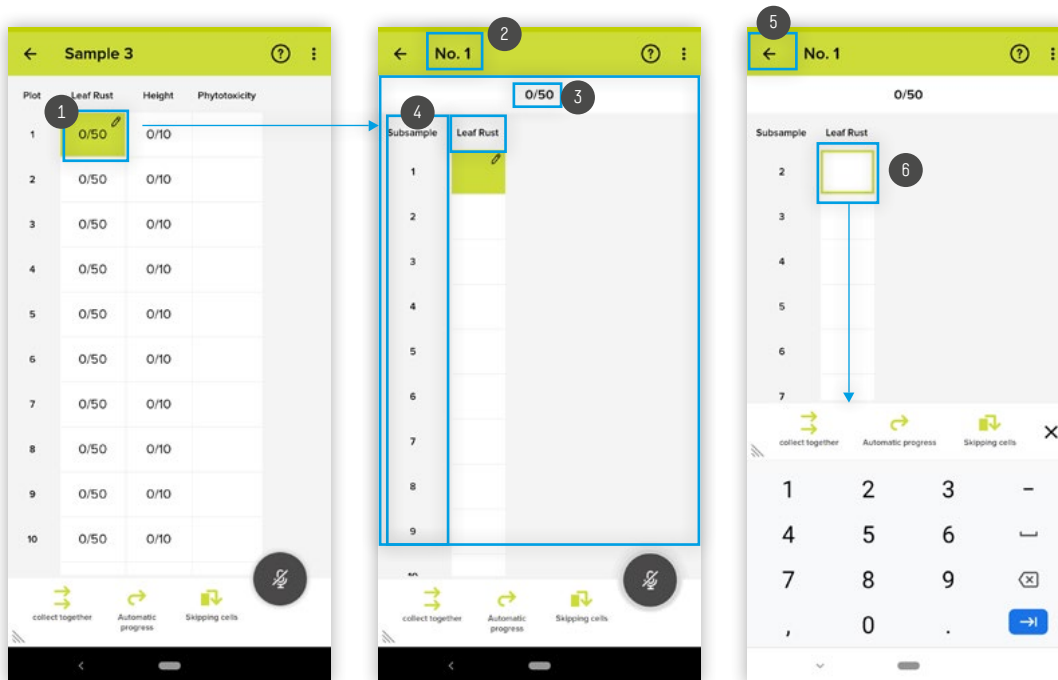
- This is the familiar view you know from trials without subsamples.
- In this view, a counter is displayed for traits with subsamples. It shows how many subsamples have been collected so far and the total number of subsamples to be collected. The individual values are not immediately visible.
- Use this view to get an overview of the current position if you are primarily using the voice interface.



## 11.6.2

### Subsamples View

- If you want to view **the values of the individual subsamples**, you can switch to Subsamples View by tapping the **current cell** ①.
- You can see the name of **the current trial unit** ②, the same **counter** ③ you see in Trial View, and all **individual subsamples of the trait** ④.
- To leave Subsamples View, use the **back arrow** ⑤ in the navigation bar.
- If you want to **enter a value using the keyboard**, tap the active cell again here ⑥.





## Progress

smatrix always proceeds through all traits of a trial unit before switching to the next trial unit (like "All traits" for trials without subsamples).

Adjacent traits with the same number of subsamples are automatically interpreted as a group. This can be used to change the sequence in which you proceed. See the following examples:

### → Without grouping

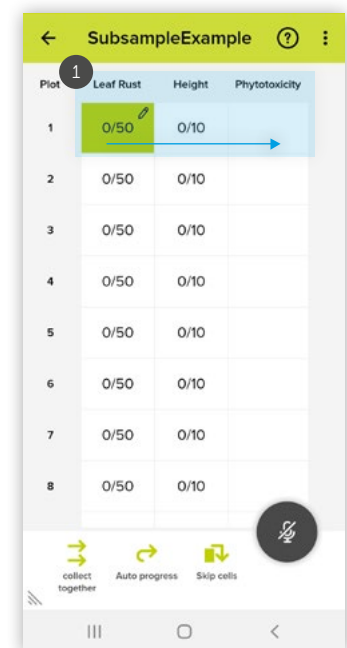
There are no adjacent traits with the same number of subsamples. You proceed in the same way from one trait to the next.

### Example: Progress without grouping

Leaf rust has 50 subsamples, growth height has 10 subsamples and phytotoxicity has just 1. smatrix proceeds from one trait to the next for **Plot 1** ①:

- **50 times** leaf rust
- **10 times** growth height
- **once** phytotoxicity

You then proceed in the same order for **Plot 2**.



### → With grouping

There are **adjacent traits with the same number of subsamples**, which automatically form a group.

The setting 11.3.1 "**Collect together / individually**" determines **whether the grouping should affect** your data collection sequence.

### Example: Progress with grouping

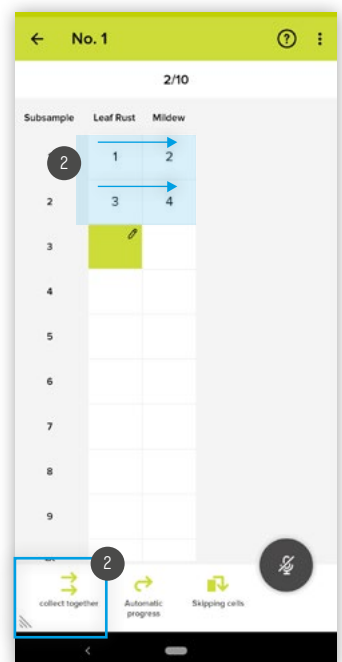
Leaf rust and mildew each have **10 subsamples**, **phytoxicity** has **1 subsample**.

→ When "**Collect individually**" <sup>1</sup> is selected, the sequence is exactly the same as in trials without grouping:

- **10 times** leaf rust
- **10 times** mildew
- **once** phytoxicity

→ When "**Collect together**" <sup>2</sup> is selected, first the subsamples that are grouped together are filled using a sequence of alternating traits. **ONLY THEN** are other traits filled that do not belong to the group (in this case phytoxicity):

- Leaf rust (**1/10**)
- Mildew (**1/10**)
- Leaf rust (**2/10**)
- Mildew (**2/10**)
- ...
- Leaf rust (**10/10**)
- Mildew (**10/10**)
- **Phytoxicity**



### Subsample countdown

If you use the **dialog setting "Position feedback on"**, smatrix always states **the subsample number** when it proceeds to the next subsample.

If you have many subsamples to fill, this can be rather time consuming. So many smatrix users select **"Position feedback off"** to speed up their work. To still keep you informed how many subsamples remain to be collected, **smatrix reads out a subsample countdown**.

smatrix lets you know the number of subsamples still to be filled and the number already collected:

smatrix makes an announcement

- **every 10 subsamples,**
  - **when just 5 subsamples remain to be filled,**
  - **when just 1 subsample remains to be filled.**
- |         |                         |
|---------|-------------------------|
| (10/50) | → „still 40 subsamples" |
| (20/50) | → „still 30 subsamples" |
| (30/50) | → „still 20 subsamples" |
| (40/50) | → „still 10 subsamples" |
| (45/50) | → „still 5 subsamples"  |
| (49/50) | → "still 1 subsample"   |

### Deleting a value / Correcting an entry

**"Clear"** clears the selected cell.

**"Clear trial unit"** clears all values of the selected row, after the prompt has been confirmed.

**"Clear <trait>"** (e.g. "Clear Phytotoxicity") clears all values for the specified trait, after the prompt has been confirmed.

**"Correction"** selects the cell in which a value has been previously entered. Any new value will overwrite the existing value.

**"Correction <value>"** (e.g. "Correction 50") replaces the value of the previous cell with the specified value.

11.7

**"Undo":** This reverses the last operation that changed any values. So you can **remove values you have entered** or **restore values you have deleted**. It also works for speech commands that **enter multiple values** (see „**Filling several cells at once**“ on page 37👉) and values you have **entered using the keyboard**.

**"Redo"** restores any operation you have reversed using the speech command **"Undo"**.

I

**Warning:** There are limits to the **"Undo"** and **"Redo"** commands:

- A **maximum of 100 operations** are temporarily stored in the undo history.
- The **undo history is only available as long as your trial is open**. If you exit and reopen a trial, you will not be able to undo previous operations!

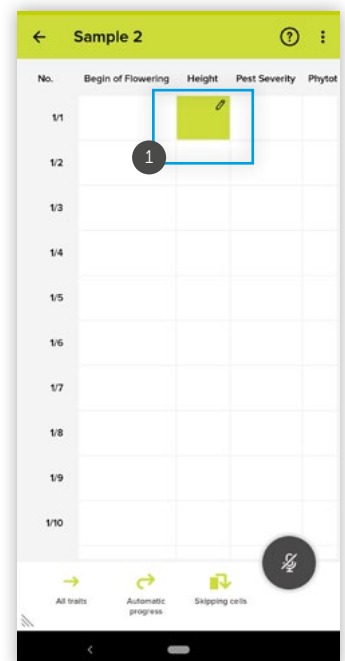
11.8

## Data entry via keyboard

Sometimes it's not possible to enter values by voice e.g. if the battery of headset is empty or your voice needs a break. In such a case you can enter a value using the keyboard. To do this, **tap the cell that is already active** ①.

I

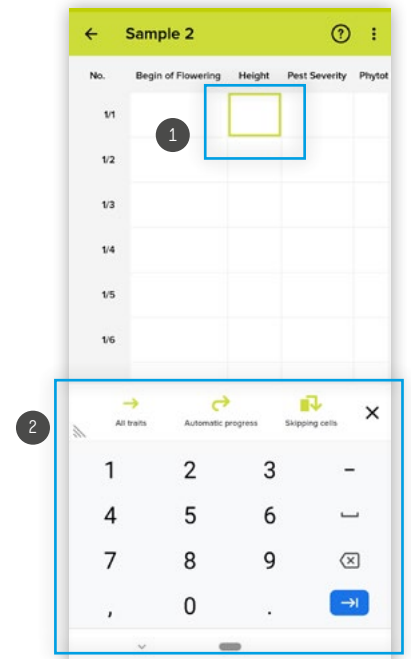
**Voice input is not possible while using the keyboard for data entry.** Also note, that data entry via keyboard is not available when your smartphone is in landscape format.



## 11.8

The cell then turns white (with a green border) <sup>1</sup> and contains a flashing cursor. The keyboard of your cell phone opens <sup>2</sup>.

If the current trait contains subsamples, tapping the current cell once opens Subsamples View. If you then tap the current cell again in Subsamples View, you can enter data for the subsample using the keyboard.

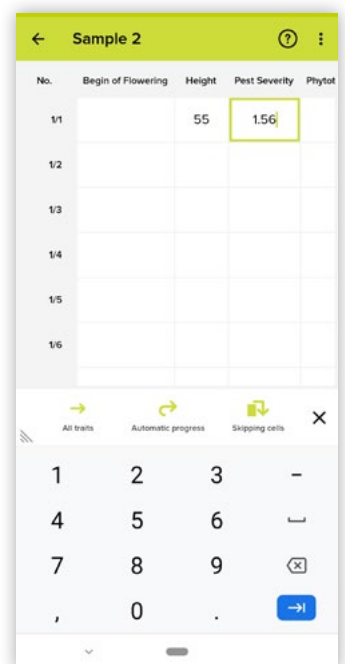


### 11.8.1

#### Enter values using the keyboard

Now you can enter the desired value with the keyboard. Depending on the **value range**, you can enter

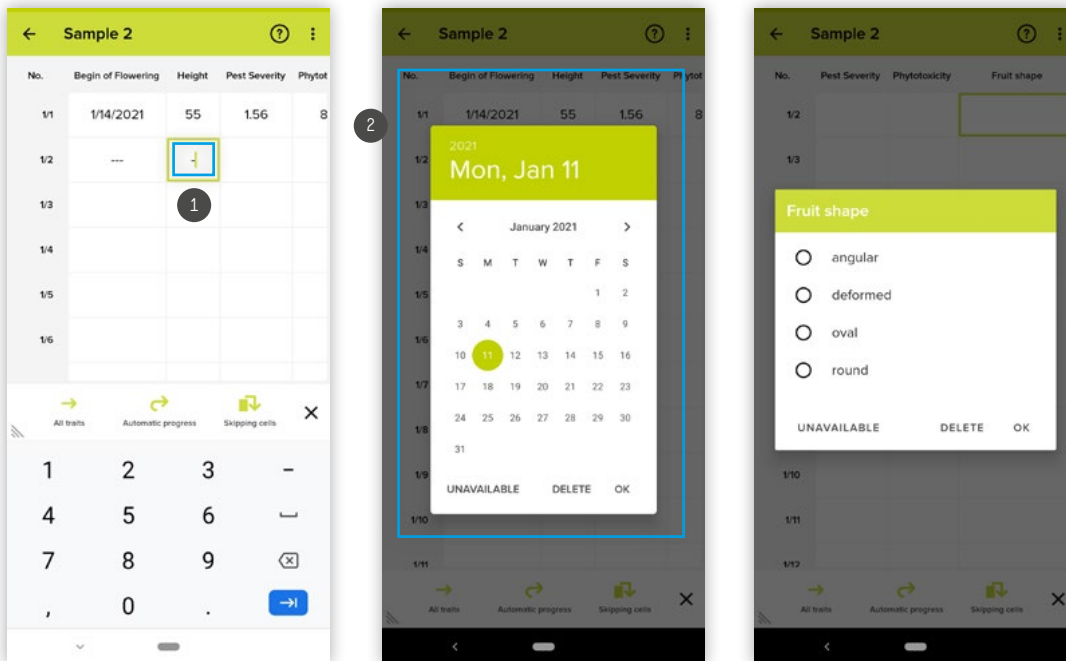
- whole numbers,
- floating point numbers,
- a **date** or
- **words**.



A **"unavailable" value** ① can be entered using one or more hyphens.

If the value range is a **date**, a **calendar** ② opens instead of the keyboard. You can select a **date**, **clear the current cell** or add the **"unavailable" value**.

With a **picker** you can select from a list of words, in the wordset value range.

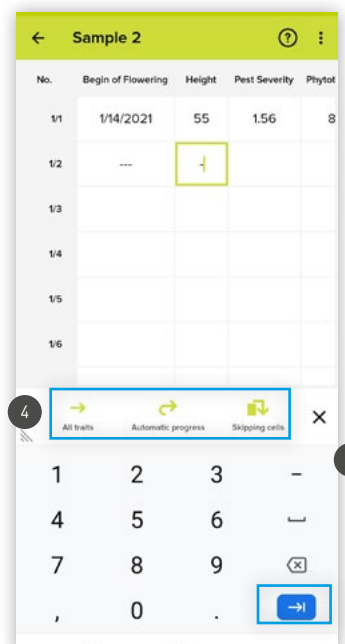


## Permanent keyboard input

If you also want to fill the next cell using the keyboard, use the **"Next" key** ③ on your keyboard. The next cell is selected depending on your selected settings in the **quick settings** ④ (single / all characteristics and skip cells on / off). This cell can then also be filled using the keyboard.

I

Your keyboard may look different depending on your phone. Instead of the word **"next"** e.g. **an arrow to the right** might be displayed.



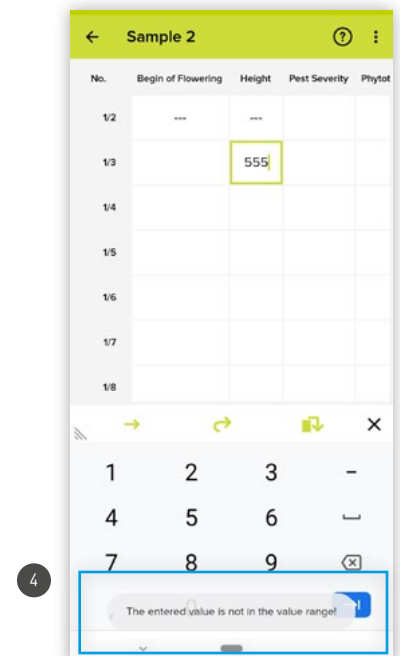
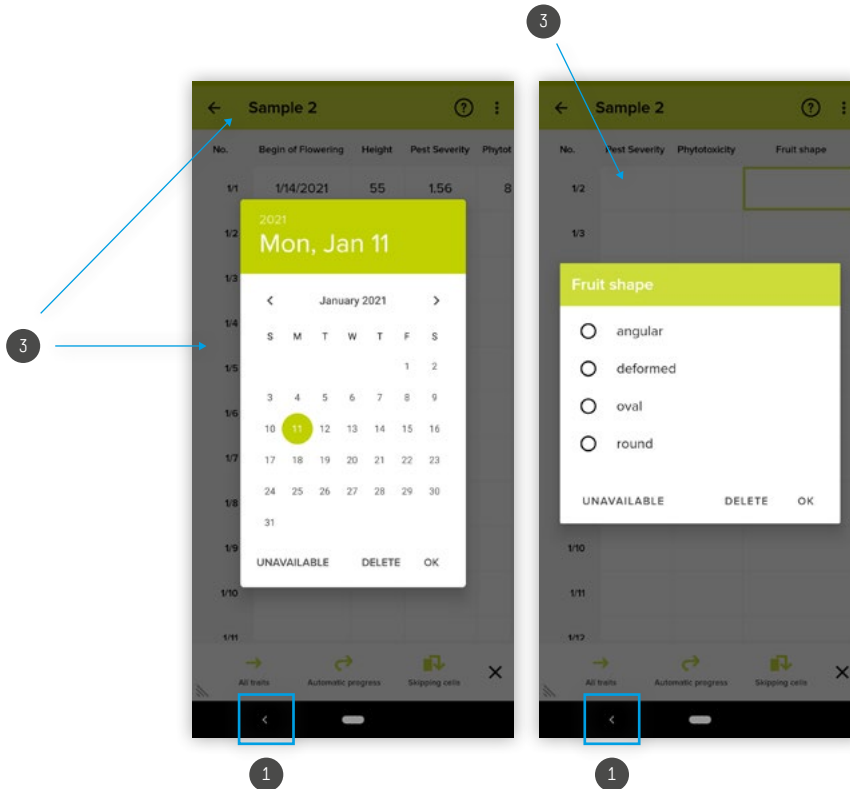
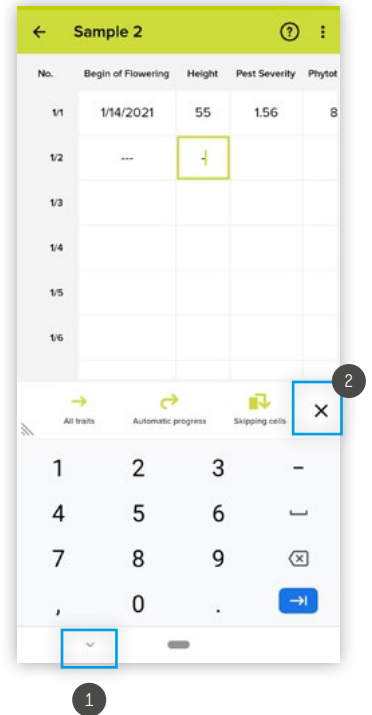
## Leaving the keyboard input

There are several ways to exit:

- 1 close the keyboard (**down arrow below the keyboard**),
- 2 press the "X" above the keyboard,
- 3 When the calendar is open, press the gray area outside the calendar to close it.

I

If the entered **value is not in the value range** 4, an error message appears and the keyboard remains open. Please correct the input. These value checks are also carried out when you press "Next".



## Switching off the screen during a trial

If smatrix is in “**Listen**” mode, the screen can be switched off. Speech input will continue running.

**I**

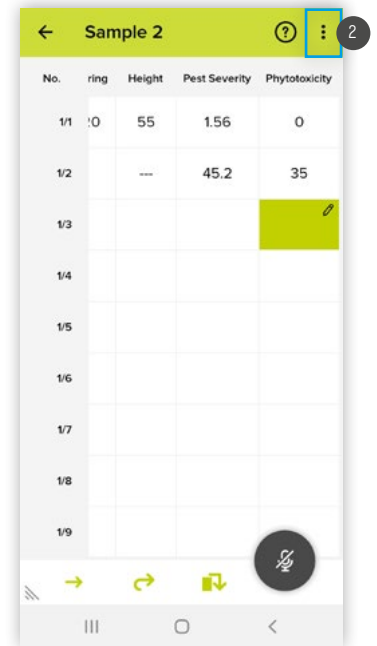
**Attention:** The speech recognition must be activated before turning off the screen. It can't be started once the screen is locked.

Activate “**Echo on / off**” 🌟 and “**Position feedback on / off**” 🌟 when using smatrix with the screen turned off so that you are receiving constant updates about your position and the values entered.



## Further settings and export

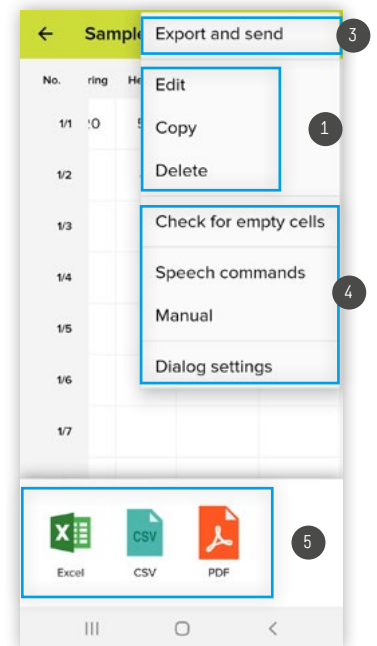
The trial can be **edited, copied or deleted** <sup>1</sup> when tapping the „Three Dot button“ <sup>2</sup>.



The current rating can also be **exported and sent** <sup>3</sup>.

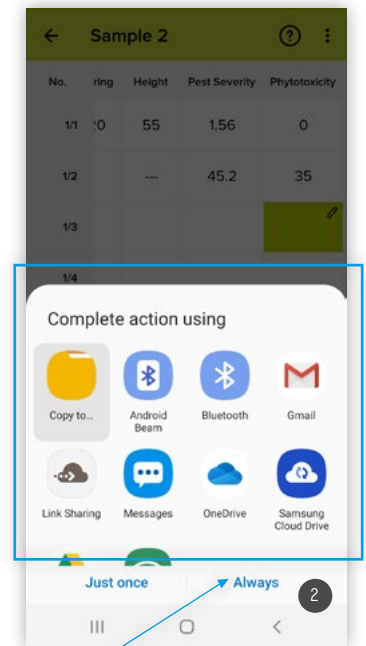
You can also check for **empty cells**, **view the voice commands**, **download the manual** and **view the "Dialog settings"** <sup>4</sup>.

**Excel (XLSX), CSV or PDF** are available as file formats <sup>5</sup>.



After choosing the desired format, an **app for further processing** the trial (e.g. sending or saving on the device) **can be selected** <sup>1</sup>.

For instance, the trial can be sent using an email app or saved on your device using a file manager app.



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**Attention:** If you do not get the option to pick an app for completing the export after choosing the file format, you might have selected **"Always"** <sup>2</sup> at an earlier point or set up a different app as your default app.

**To make this option available, you need to modify the system settings of Android. Note that the menu for this setting varies with different manufacturers and Android versions:**

Please go to **"Settings" > "Apps"** (or **"Apps and Notifications"**). Select **"Show all Apps"** or again **"Apps"**. From the list of Apps, select the App that was opening by default when you exported the trial - this must be an App other than smatrix (e.g. gmail,...)! On the app-screen select **"Set as default"** or **"Advanced" > "Set as default"**. By pressing **"Clear defaults"** you reset the hardwired link for export file format to this program. The next time you start smatrix and export the file in the same format, Android will ask you which program you want to use.

## 11.11

### Dialog settings

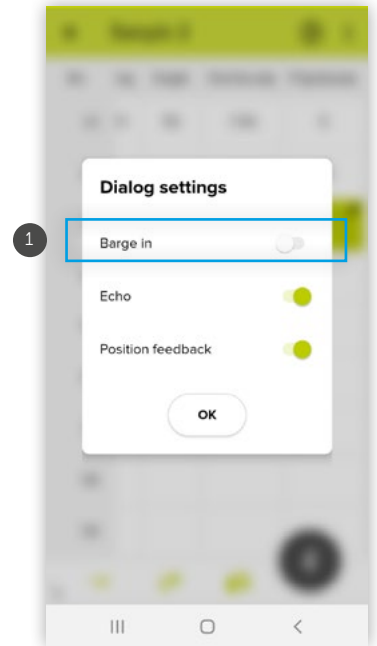
#### 11.11.1

#### Barge in on / off

If **“Barge in”** is **activated**, you can interrupt smatrix anytime.

If **“Barge in”** is **deactivated** <sup>1</sup>, you can speak only after smatrix finishes any readouts or prompts.

**“Barge in”** can be **switched on or off at any time** during a trial by the voice command **“Barge in on”** and **“Barge in off”**, respectively.



I

**Attention: “Barge in”** is available only after connecting a headset to your device. Without a headset, smatrix might listen to its own speech output and the resulting feedback loop will cause input errors. If no headset is connected, **“Barge in”** is automatically deactivated.

### 11.11.2

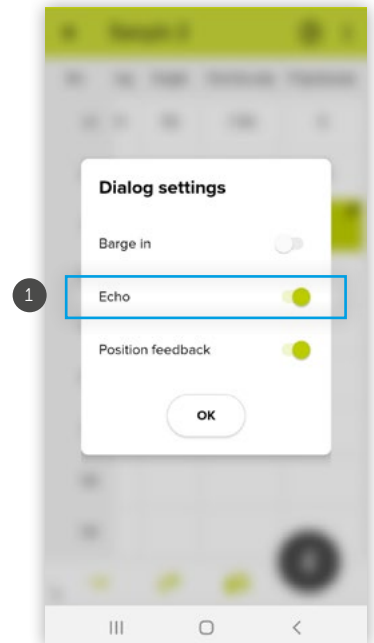
#### Echo on / off

If **“Echo”** is **activated** <sup>1</sup>, smatrix repeats any value entered. If **“Echo”** is **deactivated**, the value entered will not be repeated. Instead, a beep will be audible.

**“Echo”** can be **switched on or off at any time** during a trial by the voice command **“Echo on”** and **“Echo off”**, respectively.

I

**Attention:** If **“Barge in”** is **activated**, smatrix’ **“Echo”** and **“Position feedback”** can be interrupted at any time by entering a value or by giving a speech command. If **“Barge in”** is **switched off**, voice command will be accepted only after the **“Echo”** and/or the **“Position feedback”** has been read out completely.

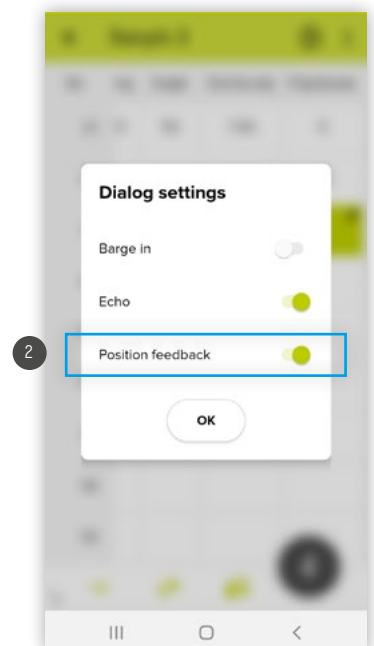


### 11.11.3

#### Position feedback on / off

If **“Position feedback”** is **activated** <sup>2</sup>, smatrix reads out any change in trial unit and/or trait when switching cells. If **“Position feedback”** is **deactivated**, trial unit and/or trait will not be read out.

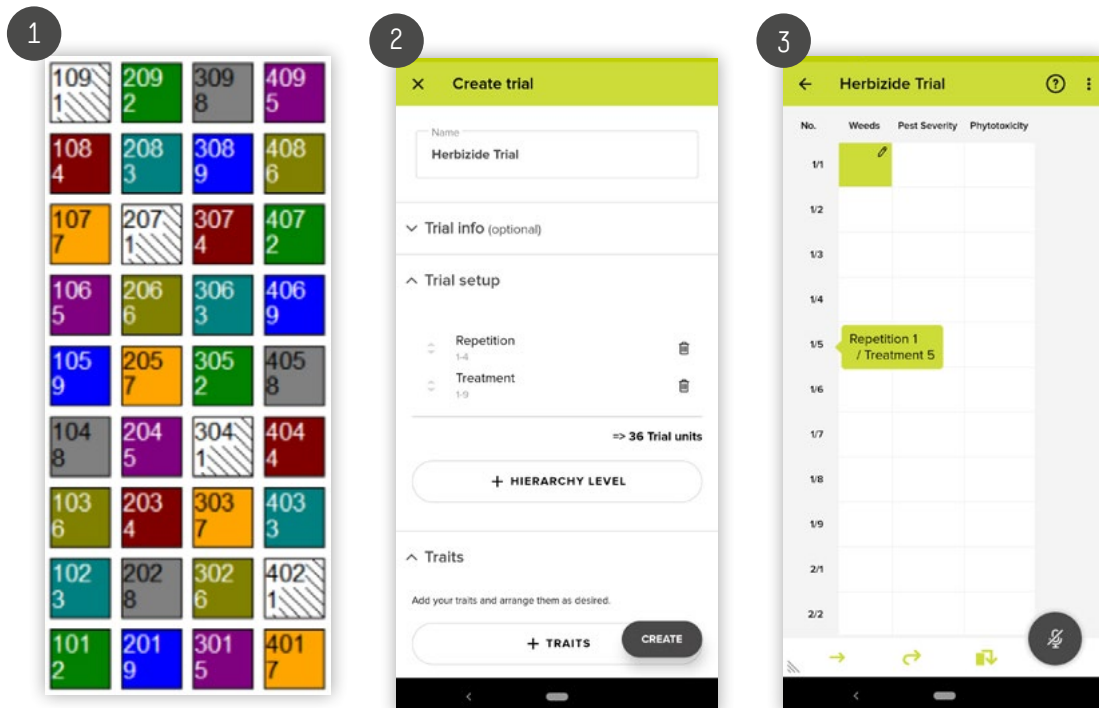
**“Position feedback”** can be **switched on or off at any time** during a trial **via the voice command “Position feedback on”** and **“Position feedback off”**, respectively.



## TRIAL STRUCTURE EXAMPLES

### Example 1 – Herbicide Trial

- 1 This trial consists of four repetitions (or blocks) which are split up into nine plots. Each plot has a unique three-digit number. The first digit corresponds to the repetition, the second and third digit to the plot number. For instance, No. 406 is plot 06 of repetition 4. Eight different treatments (red, orange, violet, blue, grey, olive-green and turquoise) and the control treatment (white) have been randomly distributed to the 36 plots.
- 2 To set this trial up with smatrix, add “Repetition” (Start value 1, End value 4) as the first and “Treatment” (Start value 1, End value 9) as the second hierarchy level. In this way, 36 trial units (4 Repetitions \* 9 Treatments = 36) are set up.
- 3 To account for the randomisation structure, every plot can be directly selected by speech command (e.g. “Repetition 1, Treatment 5”) or tapping.



Attention: Import or representation of randomised trial structures is not yet possible. This feature is currently being developed.

## TRIAL STRUCTURE EXAMPLES

### Example 2 – Variety Test

This trial consists of four repetitions with six varieties, which have been randomly allocated to each repetition. Additionally, the route/walkway corresponds to the plot numbers 1 to 24.

#### 4 Repetitions \* 6 Varieties

Kürzel	1	2	3	4	5	6
4	4	1	2	3	6	5
3	6	3	5	1	4	2
2	5	4	6	2	3	1
1	1	2	3	4	5	6

Route/Walkway = Plot number (1 to 24)

Kürzel	1	2	3	4	5	6
4	24	23	22	21	20	19
3	13	14	15	16	17	18
2	12	11	10	9	8	7
1	1	2	3	4	5	6

# I.2

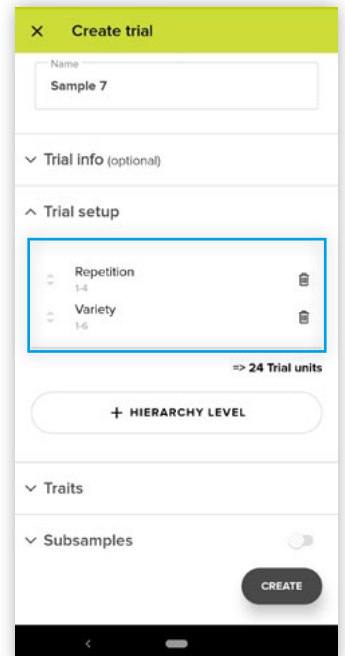
The following two options are available here:

- 1 Setting up **“Repetition”** (Start value 1, End value 4) as the first and **“Variety”** (Start value 1, End value 6) as the second hierarchy level.

**I** **Attention:** Import or representation of randomised trial structures is not yet possible. This feature is currently being developed.

- 2 If the plot number is used, **“Automatic Progress”** will account for the route/walkway in the field.

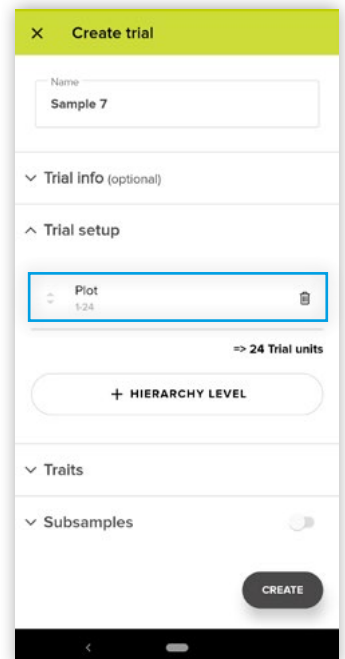
In that case, only **“Plot”** (Start value 1, End value 24) is set up.



The screenshot shows the 'Create trial' form with the following sections:

- Name:** Sample 7
- Trial info (optional):** (collapsed)
- Trial setup:** (expanded)
  - Repetition 1-4
  - Variety 1-6

=> 24 Trial units
- + HIERARCHY LEVEL** button
- Traits:** (collapsed)
- Subsamples:** (collapsed) with a toggle switch and a **CREATE** button.



The screenshot shows the 'Create trial' form with the following sections:

- Name:** Sample 7
- Trial info (optional):** (collapsed)
- Trial setup:** (expanded)
  - Plot 1-24

=> 24 Trial units
- + HIERARCHY LEVEL** button
- Traits:** (collapsed)
- Subsamples:** (collapsed) with a toggle switch and a **CREATE** button.

## TRIAL STRUCTURE EXAMPLES

### Example 3 – Fungicide Trial on Different Leaf Levels

This trial consists of four repetitions with ten plants each. Fungal pests are rated on three leaf levels (F; F-1; F-2).

Blattet:		F				F-1				F-2				.....			
W D H	Krankh.	Wdh	DTR	Sept	Wdh	DTR	Sept	Wdh	DTR	Sept	Wdh	DTR	Sept	Wdh	DTR	Sept	Wdh
1	Pfi01	5	0,5	0,3	45	1		65			95						
	Pfi02	2	/	/	40	1		100			100						
	Pfi03	3	/	/	4	0,1		75			75						
	Pfi04	4	0,2	/	40	0,5		85			85						
	Pfi05	5	0,3	/	70	0,5		100			100						
	Pfi06	0,7	0,1	/	15	0,3		98			98						
	Pfi07	2	0,1	/	65	0,3		100			100						
	Pfi08	0,5	/	/	6	0,2		30			30						
	Pfi09	0,5	/	/	8	0,8		30			30						
	Pfi10	3	/	/	7	0,5		40			40						
2	Bef.St:	8,57	0,4	0,03	27	0,5	0	0	87,3								
	Bef.Hf:	100	50	10	100	100	0	0	100								
	Pfi01	1	/	/	16	0,1		50			50						
	Pfi02	5	0,2		60	0,3		30			30						
	Pfi03	0,3	/		70	0,5		100			100						
	Pfi04	2	/		73	0,5		100			100						
	Pfi05	2	0,1		65	0,5		100			100						
	Pfi06	1	/		75	0,4		98			98						
	Pfi07	3	0,2		40	0,3		85			85						
	Pfi08	3	/		30	0,5		40			40						

The following two options are available here (see next page):



## Option 1:

Leaf levels are set up as the **lowest hierarchy level**. In that case, the trial set up is as follows:

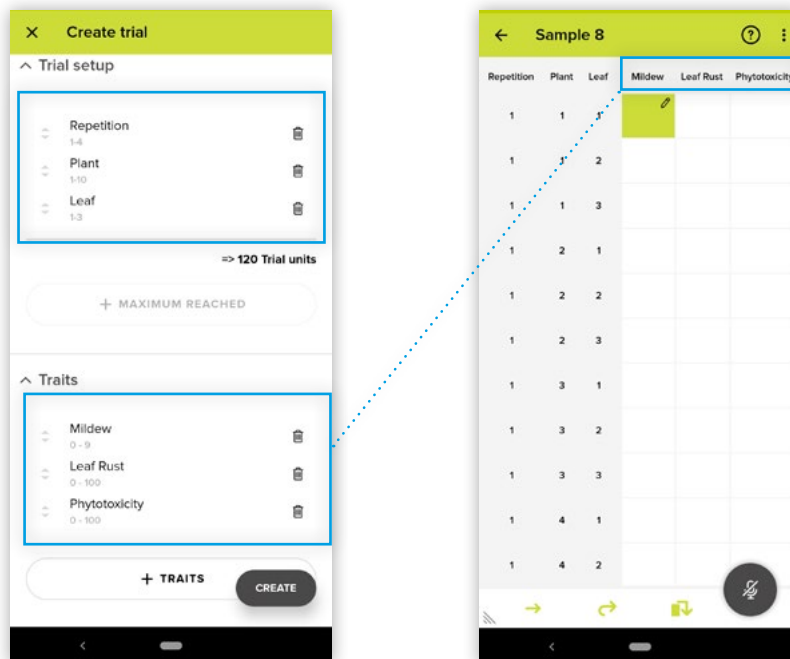
**1st level: “Repetition” (Start value 1, End value 4)**

**2nd level: “Plant” (Start value 1, End value 10)**

**3rd level: “Leaf” (Start value 1, End value 3)**

**Additional pests**, which have not been previously set up, can now be added without much effort if encountered in the field.

Leaf level option 1



## Option 2:

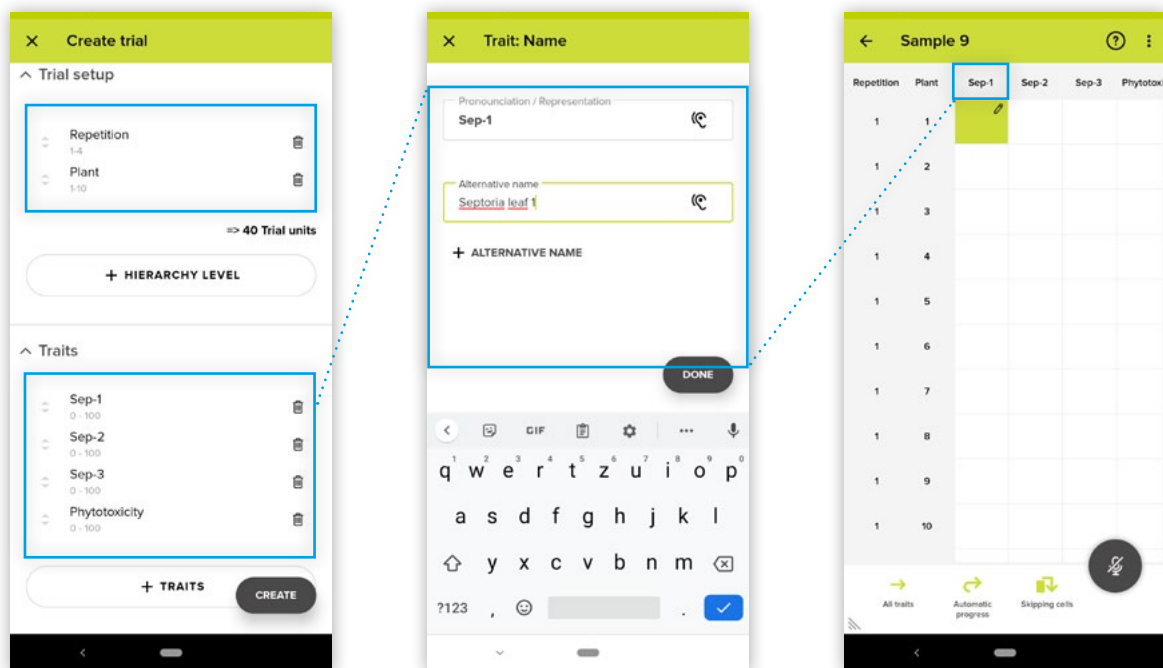
The leaf level is not set up as the hierarchy level (see above) but will be linked to each pest. Trial set up is as follows:

**1st level: “Repetition” (Start value 1, End value 4)**

**2nd level: “Plant” (Start value 1, End value 10)**

Each trait (pest) has to be set up for each leaf level, e.g. “Sep-1”, “Sep-2” and “Sep-3” for “Septoria” on leaves 1 to 3. Alternative trait names like “Septoria leaf 2” for “Sep-2” are useful.

Leaf level option 2



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dawin gmbh  
Belgische Allee 50  
D-53842 Troisdorf