TransektCount 4.2

1. Introduction

TransektCount is an Android app to support transect counters in nature preserving projects according to the Butterfly Monitoring Scheme methodology in Europe (Fig. 1). It allows a species-specific recording of individuals in all stages per transect section. It can substitute your field book and pencil, and if applicable a camera for documentary pictures of interesting species.

The integrated database is organized according to a transect inspection. That means, a new database instance will be used per inspection.
Databases can be individually created and adapted regarding transect sections and expected butterfly species. The recorded data (meta data, counts and notes) may either be read on the results page or exported into a spreadsheet and transferred to a PC for more comfortable reading or your own processing.

The app is published on https://github.com/wistein/TransektCount with source code and documentation. It is open source and has no tracking or advertising functions, but demands for permits which are needed for the app's serviceability: Import of DB files, export of results in DB or CSV files and Wakelock to hinder the app from dimming or switching off.

Fig. 1: Starting page

2. Setting Up

For installation hints refer to chapter 5.

Before initial use you should adapt the settings to your liking (see chapter 4).

Then adapt the preliminary species list of the 1. transect section to the expected species in your transect.
For this click on the Starting page "**Counting**" and then on "**SECT 01**" (Fig. 2) .

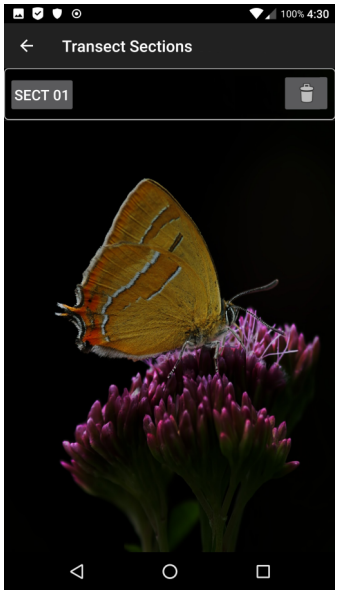


Fig. 2: "Transect Sections" initial list

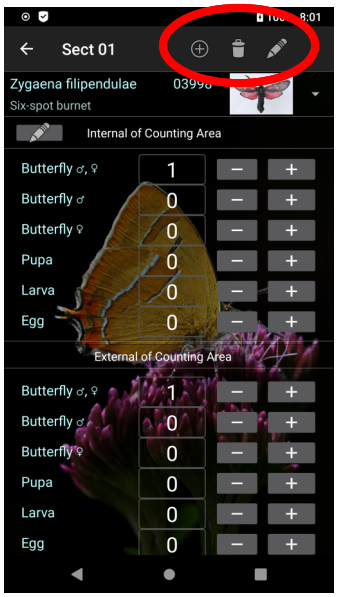


Fig. 3: Counting page

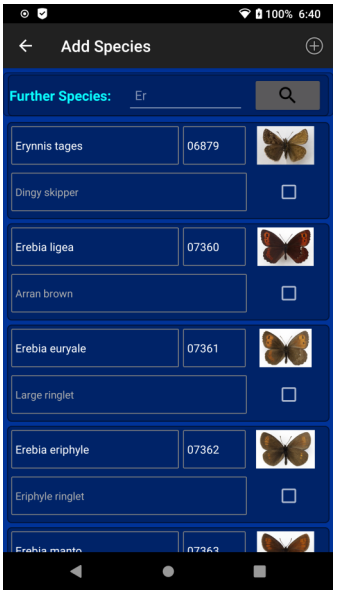


Fig. 4: "Add Species" page

Here (Fig. 3), use the editing icons in the app bar of the counting page:

- ⊕ (**Add Species**) to the counting list from the integrated large list of European species (Fig. 4),
- 🗑 (**Remove Species**) from the counting list or
- ✎ (**Edit Terms**) of section or species of the counting list.

All 3 editing pages offer a **preselection** to ease the selection of a distinguished species. Enter 2 initial letters of the genus name and then click the 🔍 button to limit the shown list.

On the **"Add Species"** page select species from the blue scroll-down list of not yet selected species. Changes take effect by the ⊕ **button** in the head line (notice that the selected species disappear from the add-list).

At the end of this scroll-down list you may select a placeholder for a not determined species (N/A). This may later be edited by entering its scientific name, common name and code.

On the **"Remove Species**" page select species to remove on the red scroll-down list and tip on the 🗑 button. The back button returns to the counting page.

On the **"Edit Terms**" page you may edit the current section name and the terms of each species. But be **careful**, changing the species code to a wrong one will show a "N/A" or a wrong picture.
(Scientific and local species names, codes generally five digits with leading zeros, as you can see in the following table). For that you may consult the "**List of coded Butterflies.pdf**" on https://github.com/wistein/TransektCount/tree/master/docs.

The counting list can be changed or supplemented anytime. Changes of species always affect all sections to maintain consistency. However, the section name is only changed for the current section.

Alternatively you can import and adapt a self-created Basic DB for your transect. Examples for downloading are provided on https://github.com/wistein/TransektCount/tree/master/docs. Copy them to the public directory **Documents/TransektCount** and import and edit them in TransektCount suitably. The app data directory is created during the first app call. When uninstalling TransektCount you will not loose your data as this directory remains untouched.

The codes will be used as an option to sort the list and as a reference to show corresponding butterfly icons. The codes derive from the numbering scheme of Karsholt/Razowski, as used e.g. in the German Lepiforum (https://lepiforum.org/).

```
Sect 01
----------------------------
...
Pieris rapae            06998
Small White
Pieris napi             07000
Green-veined white
Pieris na./ra.-compl.   07000*
Small whites complex
...
```

Detail of species list "Sect 01"

The appended *-symbol at code 07000 marks a species complex whose code advisably should be the largest code of its members.
In the next step, you should enter the permanent meta data like transect-No. or inspectors name. Click on "**PREPARE INSPECTION**" and save the input by clicking the save icon.

Once this list is complete, you can copy it for all remaining transect sections by the counting page menu function: "**Add a further section**", and name each section appropriately, if possible in the order you will walk the transect, e.g.: Sect 02, Sect 03,… (s. Fig. 5, next page).

Once the lists have been set up for all transect sections and the permanent metadata entered, the database is ready and should now be exported as a "Basic Database". To do this, use the function "**Export as Basic DB**" in the main menu of the starting page. By that you have a copy of the prepared empty database saved as "Basic Database" (transektcount0.db) within the Apps "**Documents/TransektCount"** directory.

The Basic DB does not contain any inspection related data and serves as a template for future inspections. It can also be exported again later, e.g. after changes of lists. Exporting as Basic DB ignores all counts, notes and inspection-related meta data. To prepare a certain monitoring inspection you will only need to enter the inspection-specific meta data (temperature, wind, clouds, date and time.

3. Usage

Start with “**Edit Meta Data**”. Fill in the relevant meta data for the specific transect inspection. You may enter the current date and time by clicking the related field or enter any date and time by long pressing the related field. Finish with the 🖫 button.

Then use “**Counting**”. The transect sections list appears (Fig. 5). Select the relevant transect section. The counting page for the first species in the sorted section list appears (Fig. 6). After clicking the butterfly icon select the respective species from the scroll list (Fig. 7).

As counting of butterflies ought to be distinguished between those within the standardized, imaginary counting range (a cubus with edges of 5 m length in front of you) and those that are sighted outside the counting range, you have 2 separate sets of counters (Internal and External of Counting Range).

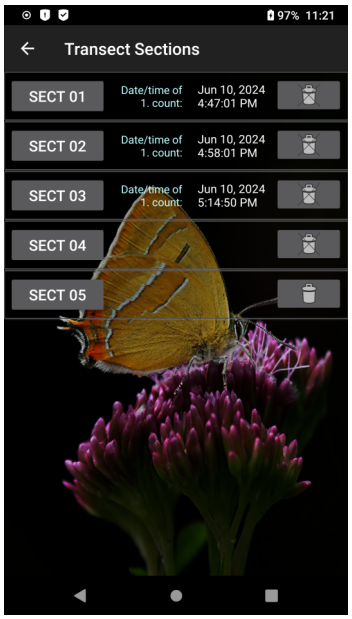


Fig. 5: “Transect Sections” page

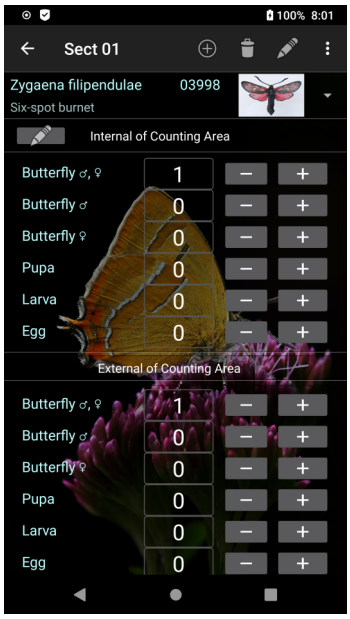


Fig. 6: Counting page

To count just select the species in the scroll list, and tip on the appropriate (**+**)-Button of the corresponding species category (♂♀, ♂, ♀, pupa, larva or egg). The (**-**)-buttons allow for corrections.

Each count is stored immediately. While storing the first count in a section the current date and time will be stored for the section either.
The date will then be shown in the list of sections and also indicates a successful inspection of that section. To select another species just tip on the butterfly icon of the scroll down list on top of the counting page (Fig. 5). The time can be helpful later when assigning document photos.

The 🖉 **button** underneath the species name row of the counting page opens the section specific species editing page (Fig. 8) that lets you add a note for the species and set its counters to any value (e.g. for estimated mass occurrences).

Here you may also set pop-up alerts which show up while reaching a set number of butterflies on the corresponding internal counters (sum of all ♂ and ♀) e.g. to realize already on site if a certain species is more abundant than on a previous inspection.

Fig. 7: Scroll-list to select species

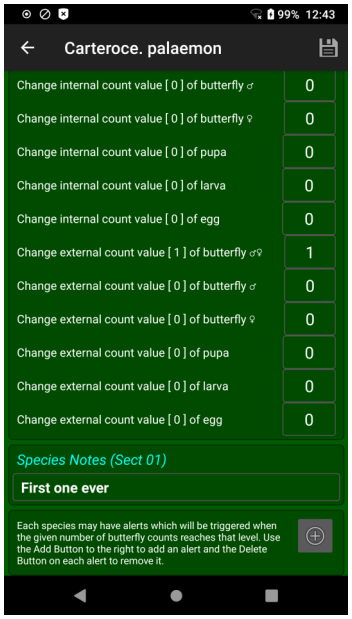


Fig. 8: Page “Edit species”

The species related note (e. g. “Has photo”) will be shown on the counting page in an extra line beneath the counting field and on the results page.

Finally, there is a page showing your results sorted either by species or sections according to the selected Output option (Fig. 9 and 10) . Here, in a scroll view you see beneath the meta data of the inspection the totals per category and all the species which got counts. You can enter this page from the Starting page with the "**Show Results**" button or the 👁 icon in the app bar. It may take a second to show up.

When you have large lists or have collected big amounts of data the app may delay the start of pages, especially the results page, as this needs heavy calculations. This will be indicated by a short popup message “View gets calculated...”. If the system message “TransektCount not responding” appears, please reply with “Wait”.

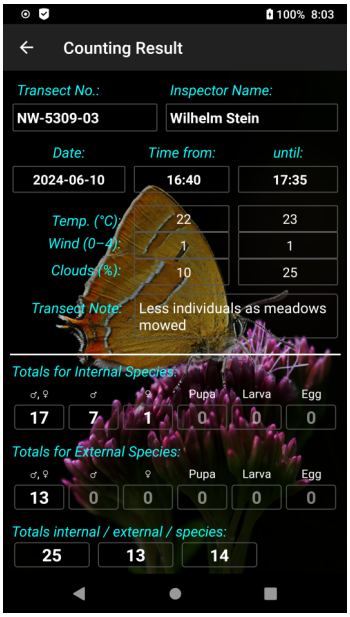


Fig. 9: Results page (head)

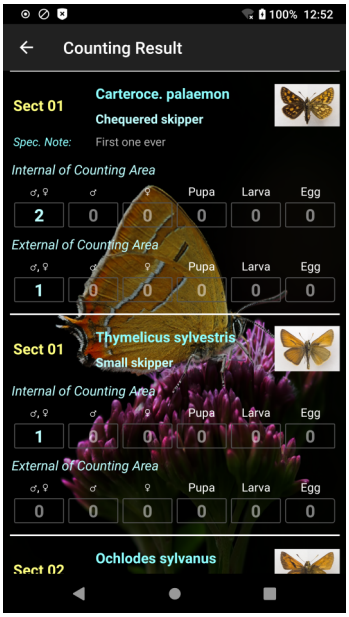


Fig. 10: Results page (continued)

4. Further Functions

The system menu on the starting page (Fig. 11) has Settings, Reset, Import, Export, Info and Help functions.

In "**Settings**" (Fig. 12) you may adapt the look an feel in some aspects to your wishes, e.g. sounds, alerts, sorting order of lists and output or left-/right-hand counting page

To prepare for a new inspection, the inspection-specific metadata and all counting data can be deleted using “**Reset Counting Data**”. All other transect-specific data remains untouched.

Android-specifically, TransektCount stores the data always in a single, equally named SQLite DB file in the app’s own internal storage area. As this file cannot be read or changed directly by the user, importing and exporting the data to files in a user readable storage area is necessary.

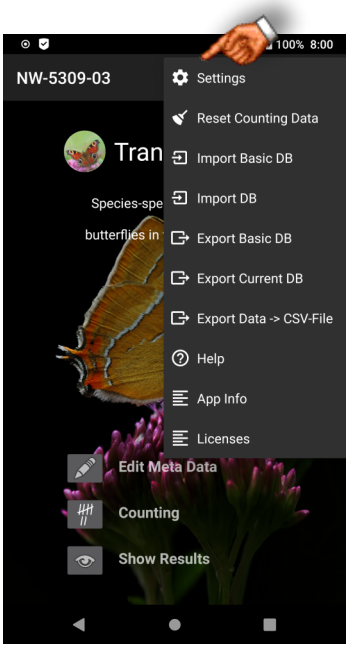


Fig. 11: Main Menu

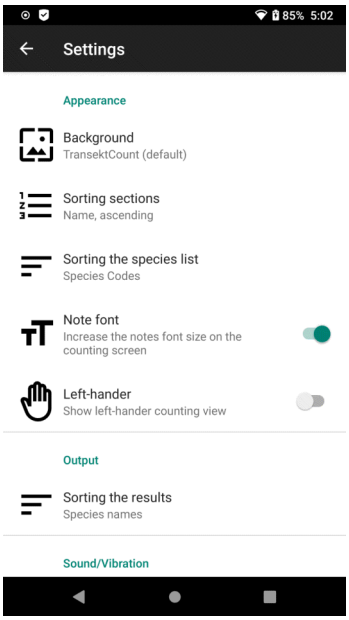


Fig. 12:Settings page (excerpt)

By “**Export Basic DB**” you may export the internal DB without any inspection-specific data into a "Basic DB" file **transektcount0.db** to **Documents/TransektCount**. This is reasonable if permanent changes have been made to the transect structure or if new species have been removed or added (see "**2. Setting Up**").

"Import Basic DB" always reloads the **transektcount0.db** file into the internal DB in case you have erroneously entered e. g. wrong structural data.

“Export Current DB” writes a copy of the internal DB to **Documents/TransekCount/transektcount_LL-nnnn-nn_YYYY-MM-DD_hhmmss.db** with **LL-nnnn-nn** being the transect No, **YYYY-MM-DD** the date and **hhmmss** the time of storage.

For your own purpose you can rename the exported TransektCount DB files by a file manager into e.g. transektcount1.db, transektcount2.db, etc.
(**Mind**: The .db file name must start with the string “**transektcount**”, otherwise it cannot be imported).

The **import** (Fig. 13) of a previously prepared, exported and appropriately named TransektCount DB is useful if several transects with different sections and butterfly occurrences are to be surveyed.

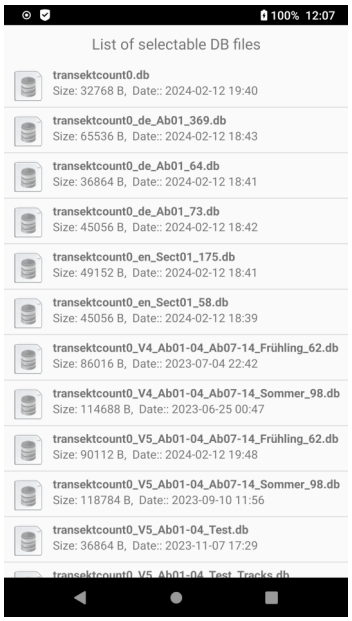


Fig. 13: Import File Selection

IT-affine users may transfer the exported "**transektcount_LL-nnnn-nn_YYYY-MM-DD_hhmmss.db**" file to a PC (siehe **6.1 Tips**). With a free tool like "**SQLiteBrowser**" (http://sqlitebrowser.org) you may examine and edit a DB file manually or per SQL script. Some useful example SQL scripts are published in the docs directory of the GitHub TransektCount project site https://github.com/wistein/TransektCount/tree/master/docs.

The function "**Export Data -> CSV File**" (CSV = Comma Separated Values) writes the meta data and the counting results into a pre-formatted spreadsheet-readable CSV file "transektcount_YYYY-MM-DD_hhmmss.csv" to "Documents/TransektCount".

This directory allows accessing the files by spreadsheet apps, like Collabora (Open Source, obtainable free of charge from Collabora Office F-Droid Repo)

The .csv file may be imported into a spreadsheet program for further processing as a comma-delimited text file ensuring that

- file origin is "Unicode UTF-8",
- quotation marks ("") for text field recognition are set
- and all columns get imported as text.

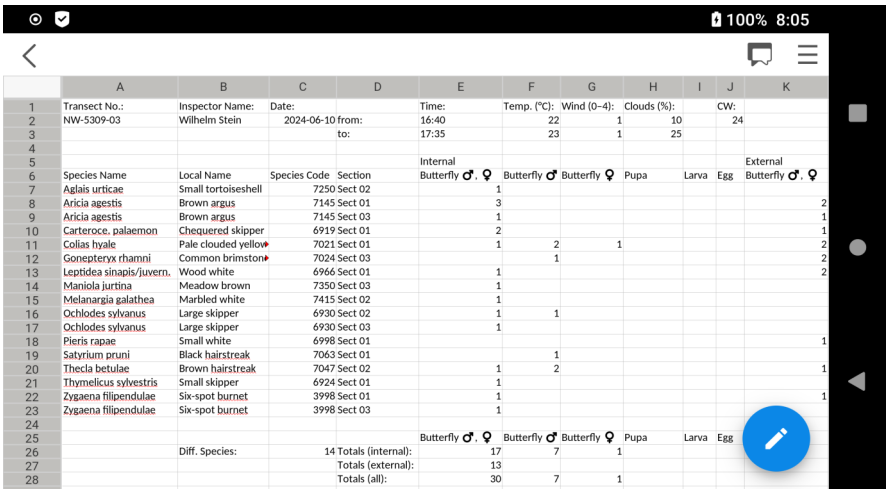
The exported table can be adapted by a sort option (sort by species or section) for an easy data entry of the results into a Monitoring web page like

https://www.tmd-daten.de/platform-tmd/tmd/tmd-top/index.do

or

https://web.app.ufz.de/tagfalter-monitoring/

Fig. 14 shows a part of the CSV table imported into the Collabora app.



	A	B	C	D	E	F	G	H	I	J	K
1	Transect No.:	Inspector Name:	Date:		Time:	Temp. (°C):	Wind (0–4):	Clouds (%):		CW:	
2	NW-5309-03	Wilhelm Stein	2024-06-10	from:	16:40	22	1	10		24	
3				to:	17:35	23	1	25			
4											
5					Internal						External
6	Species Name	Local Name	Species Code	Section	Butterfly ♂, ♀	Butterfly ♂	Butterfly ♀	Pupa	Larva	Egg	Butterfly ♂, ♀
7	Aglais urticae	Small tortoiseshell	7250	Sect 02	1						
8	Aricia agestis	Brown argus	7145	Sect 01	3						2
9	Aricia agestis	Brown argus	7145	Sect 03	1						1
10	Carteroce. palaemon	Chequered skipper	6919	Sect 01	2						1
11	Colias hyale	Pale clouded yellow	7021	Sect 01	1	2	1				2
12	Gonepteryx rhamni	Common brimston	7024	Sect 03		1					2
13	Leptidea sinapis/juvern.	Wood white	6966	Sect 01	1						2
14	Maniola jurtina	Meadow brown	7350	Sect 03	1						
15	Melanargia galathea	Marbled white	7415	Sect 02	1						
16	Ochlodes sylvanus	Large skipper	6930	Sect 02	1	1					
17	Ochlodes sylvanus	Large skipper	6930	Sect 03	1						
18	Pieris rapae	Small white	6998	Sect 01							1
19	Satyrium pruni	Black hairstreak	7063	Sect 01		1					
20	Thecla betulae	Brown hairstreak	7047	Sect 02	1	2					1
21	Thymelicus sylvestris	Small skipper	6924	Sect 01	1						
22	Zygaena filipendulae	Six-spot burnet	3998	Sect 01	1						1
23	Zygaena filipendulae	Six-spot burnet	3998	Sect 03	1						
24											
25					Butterfly ♂, ♀	Butterfly ♂	Butterfly ♀	Pupa	Larva	Egg	
26		Diff. Species:	14	Totals (internal):	17	7	1				
27				Totals (external):	13						
28				Totals (all):	30	7	1				

Fig. 14: In Collabora imported CSV table

Under "**App Info**" you may find the email address of the author, license notes, the history and further info.

Under **"Licenses"** you find the license notes.

The menu of the counting page provides a "**Share**" function for sending TransektCount related notes using a standard app like SMS or email.

The counting page is temporarily switched off by means of the **proximity sensor** when the phone is pocketed or closely held to the body. This saves energy, prohibits unwanted input and recalls the app into its current state immediately.

5. Installation hints

1. From F-Droid store (released versions)

Get TransektCount without docs or example Basic-DBs but with updates by the F-Droid app store:

https://f-droid.org/en/packages/com.wmstein.transektcount

After installation via the F-Droid store, the documentation and basic DB (and, if applicable, regional or seasonal sample DBs from the author's GitHub pages (see below).
Copy these into the Documents/TransektCount directory, which is created at the 1st start of the app.

2. From the author's GitHub project pages

Docs and sample Basic-DBs:

https://github.com/wistein/TransektCount/tree/master/docs

Copy the Basic-DB and relevant sample DBs from the download folder into the APP data directory (Documents/TransektCount) that ist created by the first start of the app.

Note on F-Droid:
Getting apps from F-Droid is at least as secure as getting them from the Google Play Store.
In contrast to the Play Store, all apps are also checked for data protection and compiled by F-Droid itself.

If an app does not meet all of F-Droid's requirements with regard to undesirable features, it is noted.

The source codes of the F-Droid apps are published and licensed as Open Source.

Note on updates:
In the case of major version jumps with functional additions, structural changes may have been made in the internal database of an app. After such a change, the database version is incremented. This is recognized by the app and the currently used DB is adapted internally.

However, the currently adapted DB version cannot be used after a downgrade to a previous app which uses a previous DB version.

All sample DBs are written and published in the current structure.

6. Annex

6.1 Tips

Transferring data between smartphone and PC

Connect the smartphone to the PC using a USB cable. In the smartphone settings, select data transfer under Connected devices for USB.

The smartphone is now displayed with its technical ID in Windows Explorer. In the "Internal shared memory" area, the "Documents/TransektCount" directory can be read and written to for data exchange.

6.2 Messages

When attempting to delete a section with a crossed-out delete symbol from the section list:

Section nn: To prevent DB corruption it is not possible to delete this section. Only the last section may be deleted. If this is the last section then your device has unfortunately not enough free RAM to execute the function.

Normally, the last transect section can be deleted (delete symbol is not crossed out). This effect occurs depending on the technical equipment of the device. With current models, however, this restriction should only occur with very many transect sections. Other functions of the app are not affected by this restriction.

Possible solutions:

1. Reverse the sorting of the section list under Settings and try again.

2. Reduce the DB by one section with "SqliteBrowser"
   Copy the exported DB to a PC and reduce it by one section using the "SqliteBrowser" tool.
   - Load the DB in SqliteBrowser.
   - Delete all entries with the highest "section_id" in the "counts" table.
   - Delete all rows in the "alerts" table.
   - Then note the name of the last entry in the "sections" table and delete the line.
   - Finally, in the "tracks" table, delete all rows with this name in the "tsection" column.
   - Save the changes.

   Copy the modified DB back to the Android device. Repeat the process if necessary.

3. Reduce the DB by one section with second Android device with more RAM
   Either connect the two devices directly via USB or WLAN or connect both to a PC and copy the DB from there to the "Documents/TransektCount" directory of the other device.
   - Import into TransektCount there,
   - delete the last section,
   - export the DB and copy it back.
   - Repeat the process if necessary.

4. Set up the DB again
   - Create the species list in section 1 and fill it with the desired species.
   - Duplicate section and name new section accordingly.
   - Export DB.
   - Check the section list to see whether the last section can be deleted.
   - If yes, create another section by duplicating, test and export if ok.
   - If not, the DB can use a maximum of one section less.
   - Repeat until the maximum number of sections is reached.

5. Use the DB with this flaw. There are no other known functional limitations.

6.3 Glossary

Counting range:
The counting rangearea corresponds to a cube of 5 m edge length in front of the observation point within a transect section. Individuals sighted are recorded separately inside and outside this imaginary cube.
Due to its Germany-wide standardization (also applies to various European countries), recording in the internal counting range is decisive for comparative evaluations.

CSV file:
Comma-separated values file. Text-based file format for exchanging data in tabular form (e.g. for importing TransektCount result data into spreadsheet programs).

File directories of TransektCount:
The public app-specific files directory (for DB files and exported CSV files) is:

"**Documents/TransektCount"**

Data stored here can also be read by other apps. The data is not automatically deleted when the app is uninstalled.

The previous app-specific directory for the DB files:

"**Android/data/com.wmstein.transektcount/files/**"

is no longer used from TransektCount version 4.0.0 on, as data stored here cannot be read by other apps in newer Android versions and was deleted when the app got uninstalled.

GitHub:
Is a file hosting site for software development projects including version control. It is free of charge for Open Source Projects. It was named after the version control and source code management system Git. Run by GitHub, Inc. from San Francisco, USA. Since Dezember 2018 the company belongs to Microsoft. According to Microsoft GitHub will remain an independent platform.

Numbering scheme according to Karsholt/Razowski:
The entomologists O. Karsholt and J. Razowski developed a numbering scheme for European butterfly species, which is used in the German Lepiforum and elsewhere. According to this numbering scheme, codes are used in TransektCount to identify the species. However, this restricts the use of TransektCount to European faunal areas, as there is no comparable scheme that is valid worldwide.

Open Source:
Source code of software, which can be edited and used publicly. Open Source software can mostly be used free of charge and does not contain propriately licensed or closed source elements.

Transect:
A predetermined route along which someone counts and notes the occurrence of certain species. This route is divided into sections of approx. 50 m in length that are as homogeneous as possible in terms of vegetation. In particular, the individuals within a defined → **counting range** are counted.

6.4 References

TransektCount project:
The repository of the TransektCount project is situated on https://github.com/wistein/TransektCount. It contains all published files with source code, configuration of the Android Studio Development platform, documentation and installable APK files.

Documents:
You find documents, example databases, SQL scripts for manipulating TransektCount DBs and other information under https://github.com/wistein/TransektCount/tree/master/docs.