

# TransekCount 4.2.4

## 1. Introduction

TransekCount is an Android app to support transect counters in nature preserving projects according to the Butterfly Monitoring Scheme methodology in Europe (**Fig. 1**). It can be used to record individuals per transect section on a species-specific basis and separately by sex and developmental stages. It can substitute your field book and pencil, and if applicable a camera for documentary pictures and offers prepared data outputs.

Databases can be created individually for transect sections and expected butterfly species. The internal database is survey-related, i.e. a new database instance is used for each survey. The recorded data (meta data, counts and annotations) can either be read from the results page for input into the butterfly monitoring system or transferred to a PC for your own processing, where they can be better read or edited.

The app is published with source code and documentation on <https://github.com/wistein/TransekCount>. It is open source, has no tracking or advertising functions and does not make use of Google Play Services, but demands for permits which are needed for the app's serviceability: Storage access for import and export of data files and Wakelock to hinder the app from dimming or switching off.

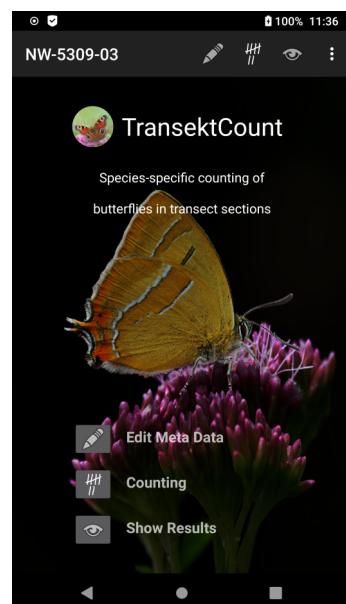


Fig. 1: Starting page

## 2. Setting Up

For installation hints refer to **chapter 5**.

Before initial use you should adapt the app 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 with the species list editing functions (Add, Remove or Edit). For this click on the Starting page

**"Counting"** and then on "**SECT 01**" (**Fig. 2**).

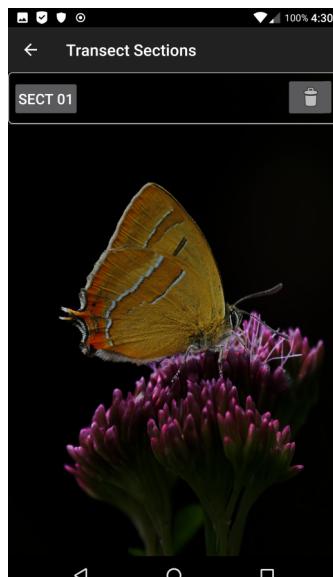


Fig. 2: "Transect Sections" initial list

Sect 01	
Zygaena filipendulae	03998
Six-spot burnet	
Internal of Counting Area	
Butterfly ♂, ♀	1
Butterfly ♂	0
Butterfly ♀	0
Pupa	0
Larva	0
Egg	0
External of Counting Area	
Butterfly ♂, ♀	1
Butterfly ♂	0
Butterfly ♀	0
Pupa	0
Larva	0
Egg	0

Fig. 3: Counting page

Add Species	
Further Species:	<input type="text" value="Er"/>
Erynnis tages	06879
Dingy skipper	<input type="checkbox"/>
Erebia ligea	07360
Arran brown	<input type="checkbox"/>
Erebia euryale	07361
Large ringlet	<input type="checkbox"/>
Erebia eriphyle	07362
Eriphyle ringlet	<input type="checkbox"/>
Erebia manto	07363

Fig. 4: "Add Species" page

Here on the counting page (**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 current 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 scroll-down list).

At the end of the scroll-down list, a placeholder for an indeterminate species (NN) can be adopted and edited later, if necessary after determination.

On the “**Remove Species**” page select species to remove on the red scroll-down list and tip on the **⊖-button**.

On the “**Edit Terms**” page you may edit the current section name and the terms of each species. (Scientific and local species names, codes generally five digits with leading zeros, as you can see in the following species list table excerpt).

**Caution:** A wrong code will show a “N/A” or a wrong picture. If necessary, see the “**List of coded Butterflies.pdf**” on <https://github.com/wistein/TransekCount/tree/master/docs>.

Changes are applied using the function buttons **⊕**, **⊖** or **💾**.

### 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 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/>).

The \*-sign attached to code 07000 indicates a complex of species that are difficult to distinguish. For sorting purposes, the larger code within the group should be used for such groups.

In the next step, you should enter the permanent meta data like transect-No. or inspectors name. Click on “**Edit Meta Data**” 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).

When you have created the section lists for all your transect sections and entered the general meta data, the database is ready for export 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” (**transekcount0\_Tr-No.db**) with ‘Tr-No’ as Transect No. within the app’s data directory “**Documents/TransekCount**”.

The file names of the Basic DBs always start with the string “**transekcount0**”.

The data directory is created during the first app call. When uninstalling TransekCount you will not loose your data as this directory remains untouched.

Exporting as Basic DB ignores all counts, notes and inspection-related meta data. The Basic DB serves as a template for future inspections. To prepare a future monitoring inspection you will only need to enter the inspection-specific meta data (date, start time, temperature, wind and clouds).

The Basic DB can be changed, supplemented and exported 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, some from other European countries, are provided on <https://github.com/wistein/TransekCount/tree/master/docs>.

Copy them to the app’s data directory **Documents/TransekCount** and import and edit them in TransekCount suitably.

### 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).

To count just select the species in the scroll list, and tip on the appropriate (+)-Button of the corresponding species category ( $\delta\varphi$ ,  $\delta$ ,  $\varphi$ , 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 indicates a successful inspection of that section. 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 in that section and set its counters to any value (e.g. for estimated mass occurrences).

The species related note (e.g.: “Photo”) will be shown on the counting page in an extra line beneath the counting field and is inserted into the results table.

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 imagines) e.g. to realize already on site if a certain species is more abundant than on a previous inspection.

Before closing TransekCount after an inspection, you should complete the meta data with the ending values for time, temperature, wind and clouds. Then **export** the current inspection data as .db (database) or .csv (comma delimited values text) file. It will be named as **transekcount\_Tr-No\_YYYYMMDD\_hhmmss.db** oder **.csv** in the directory **Documents/TransekCount** with 'Tr-No' for transect No., 'YYYYMMDD' for date and 'hhmmss' for the time of storage.



Fig. 5: “Transect Sections” page

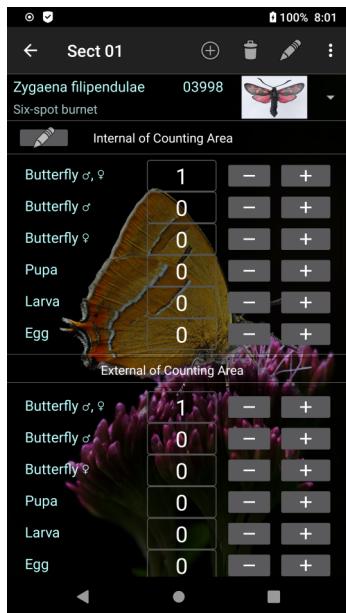


Fig. 6: Counting page



Fig. 7: Scroll-list to select species

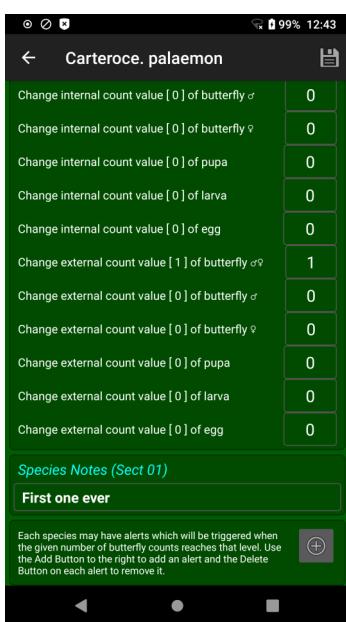


Fig. 8: Page “Edit species”

Finally, there is a page showing your results sorted either by species or sections according to the selected Output sort 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.

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 "TransekCount not responding" appears, please reply with "Wait".

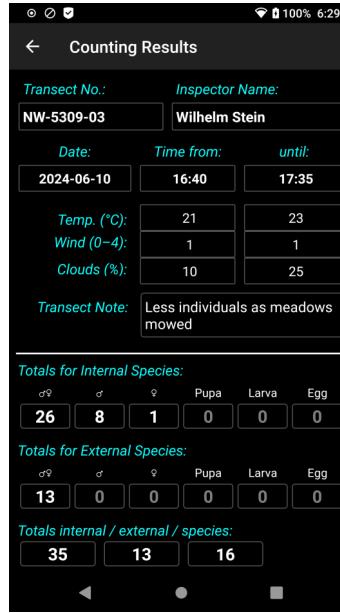


Fig. 9: Results page (head)

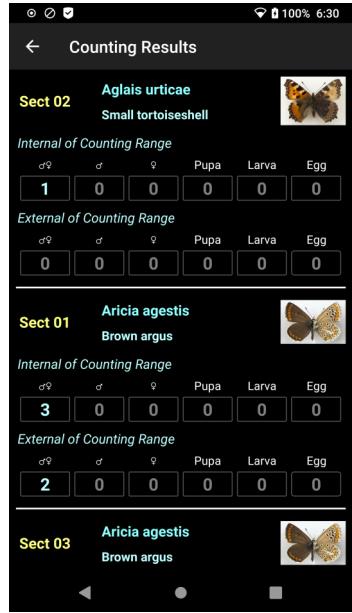


Fig. 10: Results page (continued)

## 4. Further Functions

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

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

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

Android-specifically, TransekCount stores the data in an internal SQLite DB within a storage area that is not accessible by the user. Therefore, it is necessary to export/import data to/from files in a user accessible storage area.

By "**Export Basic DB**" you may export the internal DB without any inspection-specific data into a "Basic DB" file **transekcount0.db** to **Documents/TransekCount**. 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").

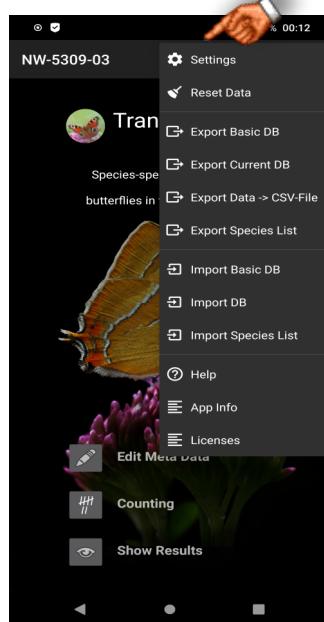


Fig. 11: Main Menu

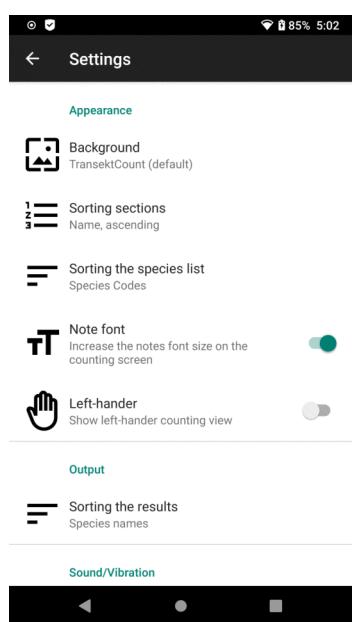


Fig. 12: Settings page (excerpt)

The "**Import Basic DB**" function reads in a DB file that begins with "**transekcount0**".

**"Export Current DB"** writes a copy of the complete DB to **Documents/TransekCount/transekcount\_TR-No\_YYYYMMDD\_hhmmss.db** with **Tr-No** being the transect No., **YYYYMMDD** the date and **hhmmss** the time of storage.

With “**Import DB**” (Fig. 13) a appropriately named TransekCount DB containing counting data can be selected and read into TransekCount.

**Mind:** The file name of a TransekCount-DB with counting data must always begin with “**transekcount\_**”, otherwise the list cannot be imported.

With “**Export Species List**” the current **species list** (without any other data) can be exported as a CSV file (CSV = Comma Separated Values text file) “**species\_Transect\_Tr-No\_YYYYMMDD\_hhmmss.csv**”. With a file manager you may rename the file as required.

The function “**Import Species List**” lets you select and import an available species list. If the TourCount app (see “6.4 References”) is installed, the exported species lists can be imported mutually.

**Mind:** The file name of a species list must always begin with “**species\_**”, otherwise the list cannot be imported.

The function “**Export Data → CSV File**” writes the meta data and the counting results into a pre-formatted spreadsheet-readable CSV file **Transect\_Tr-No\_YYYYMMDD\_hhmmss.csv** into the directory **Documents/TransekCount**. This file could be imported or edited by a spreadsheet app like **Collabora** (Open Source, obtainable free of charge from e.g. the Collabora Office F-Droid Repo).

IT-affine users may transfer the exported “**.db**” or “**.csv**” files from “Documents/TransekCount” to a PC (siehe **6.1 Tips**).

With a free tool like “**DB Browser for SQLite**” (<https://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 TransekCount project site <https://github.com/wistein/TransekCount/tree/master/docs>.

The exported .csv files (comma delimited text files) may be imported into a spreadsheet program on a PC for further processing ensuring that

- file origin is “Unicode UTF-8”,
- delimiter is comma,
- quotation marks (“”) for text field recognition and
- all columns get imported as text.

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

The export of the table can be adapted by a sort option (sort by species or section) for a more easy data entry of the results into a Monitoring web page like <https://web.app.ufz.de/tagfalter-monitoring/>

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

Fig. 14: In Collabora imported CSV table

Under “**App Info**” you may find general app info, the email address of the author and the history.

Under “**Licenses**” you find the license notes for code and figures.

The option menu of the counting page provides a “**Photo**” function to quickly take a photo and a “**Share**” function for sending notes using a standard app, like SMS or email.

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

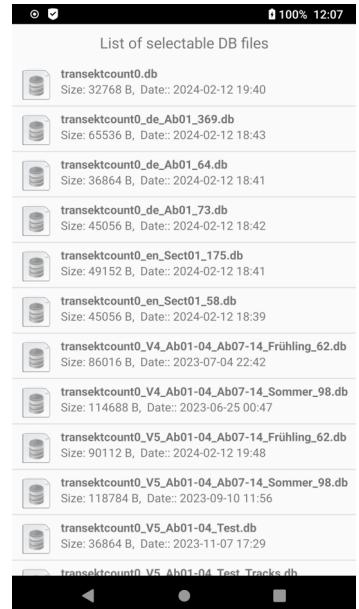


Fig. 13: Import File Selection

## 5. Installation hints

### 1. From F-Droid store (released versions)

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

<https://f-droid.org/en/packages/com.wmstein.transektdcount>

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/TransektdCount directory, which is created at the 1<sup>st</sup> start of the app.

### 2. From the author's GitHub project pages

Docs and sample Basic-DBs:

<https://github.com/wistein/TransektdCount/tree/master/docs>

Copy the Basic-DB and relevant sample DBs from the download folder into the APP data directory (Documents/TransektdCount) that is 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/TransekCount" 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/TransekCount" directory of the other device.

- Import into TransekCount 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 range area 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 TransektdCount result data into spreadsheet programs).

### **F-Droid:**

F-Droid is a repository of Free and Open Source Software (FOSS) applications Android. The F-Droid client makes it easy to browse, install, and keep track of updates on your device.

### **File directories of TransektdCount:**

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

#### **"Documents/TransektdCount"**

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.transektdCount/files/"**

is no longer used from TransektdCount 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 December 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 TransektdCount to identify the species. However, this restricts the use of TransektdCount 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 propriety 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

### **TransektdCount project:**

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

### **TransektdCount Documents:**

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

### **TransektdCount-App:**

The released version can be installed from

<https://f-droid.org/en/packages/com.wmstein.transektdcount/>.

### **TourCount**

TourCount is the complementary Android app to support you when recording butterflies in nature. It allows to register individuals species-specific, separated by sexus and metamorphic stages as well as individually localized in the field.

### **TourCount project:**

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

### **TourCount Documents:**

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

### **TourCount-App:**

The released version can be installed from

<https://f-droid.org/en/packages/com.wmstein.tourcount/>.