

The Werner Rauh Heritage Project

43.000 collections — documentation not revealed ... until now

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Heidelberg Botanic Gardens and Herbarium (HEID)



Heidelberg Botanic Gardens build up living collections with more than 10,000 taxa in the short space of time between Second World War and the 1990s. This is mostly down to the tireless efforts of professor Dr. Werner Rauh, who was the director of the garden from 1960 to 1982. These living collections are focused on orchids and bromeliads, but also numerous other succulent plant species primarily from Africa/Madagascar and South and Central America are cultivated.

Most of these plants originate from wild origin making them a unique resource of scientific purposes. Among them are for exam-

le several hundred species representing the original plant material which served as type material. These living collections are complemented by important collections deposited in our herbarium (HEID). Countless vouchers correspond directly to material from the living collections.

Starting in 2007 with AFRICAN PLANT INITIATIVE (API) and providing digital resources for African type material, we continued to build up a knowledge database with cross-referenced information of all of our collections (type material, living collections, herbarium vouchers, collection data, plant images, ...). An important start of departure was the digital imaging of the field books of Werner Rauh providing endless plant collection information, environmental and historical data.

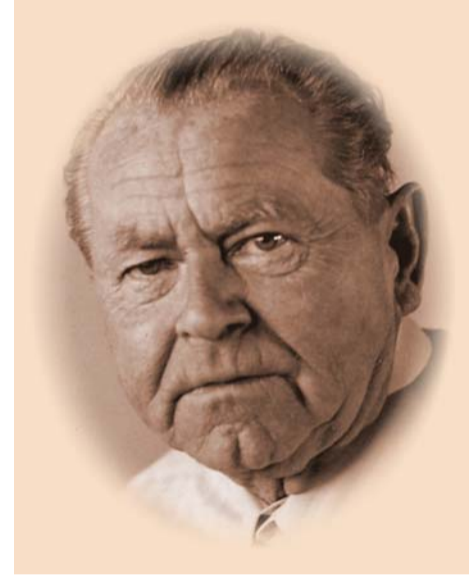
Project time table



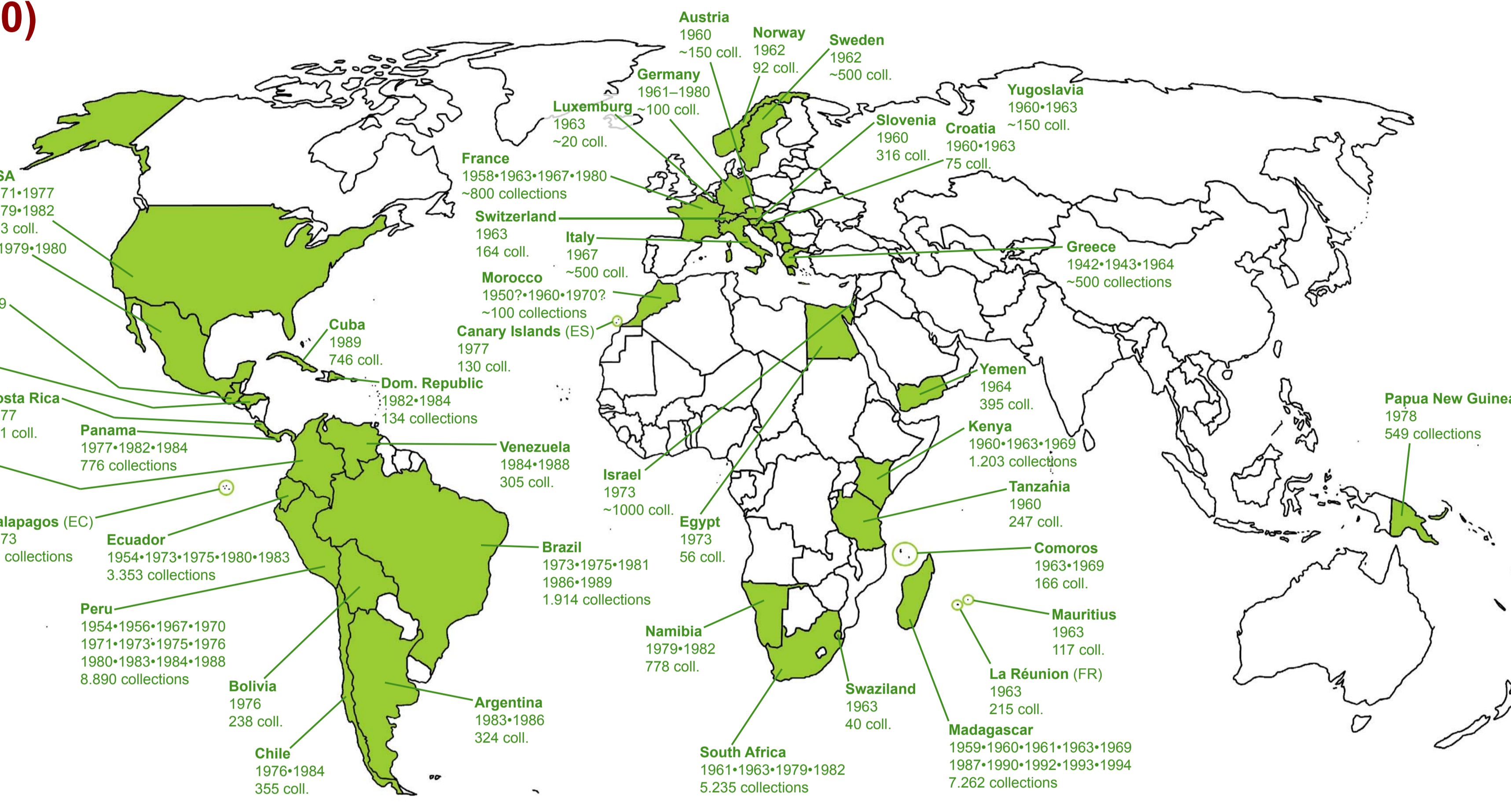
- 90 hand written fieldbooks with 8,776 pages scanned 2008/2009.
- digitizing herbarium sheets with type material: 1,200 sheets digitized in 2009 (JSTOR / GPI), work in progress.
- creating relational MySQL database: done December 2009 until June 2010.

- creating GUI: done April 2010, new version is in preparation.
- storing data to database: Chile 1984 & Madagascar 1994 completely stored in March 2010; Peru 1954 & 1956 stored August to December 2010, going on until ...
- linking entries to today's taxonomy and nomenclature.
- identifying type collections.
- taking images of living plants (~1,000 images stored so far).
- etc.

Werner Rauh (1913–2000)



- studied Botany, Zoology, Chemistry and Geology at Leipzig, Innsbruck and Halle (Saale).
- 1956: associate Professor of Botany at Heidelberg University.
- 1960: full Professor and Director of «Institut für systematische Botanik und Pflanzengeographie».
- 1982: Retirement.
- approximately 43,000 collections with field numbers.
- mainly Cactaceae (~1,500 accessions), Bromeliaceae (~7,000), Euphorbiaceae (~1,100), Orchidaceae (~1,600) and succulent plants from Madagascar (~1.500).



Countries visited by Werner Rauh

Within the years 1938 to 1994 Rauh travelled widely in at least 44 countries and made more than 61 expeditions, from four days (Mauritius 1963) over two weeks (e.g. La Réunion 1963, Canary Islands 1977) up to five months (Madagascar 1959/1960) and eight months (Peru 1954). A number of countries were visited just once, but a lot of countries Rauh travelled several times.

The countries most often visited were Mexico (7 exp.), Madagascar (10) and — top of the list — Peru (12). The number of items collected per expedition varied widely. For example Rauh collected «only» 2.440 items during eight months in Peru 1954 (305/month), containing at least 300 type-collections, 1.790 items during five months in Madagascar 1959/60 (358/month) but only 88 items within four weeks in Madagascar 1993!

URCI = «Uniform Rauh Collection Identifier»

A concept to work with Rauh's chaotic numbering of collections

54 001 20083 06 = Rauh K 83f (Peru 1954), FDB 0A
Tephrocactus sp.

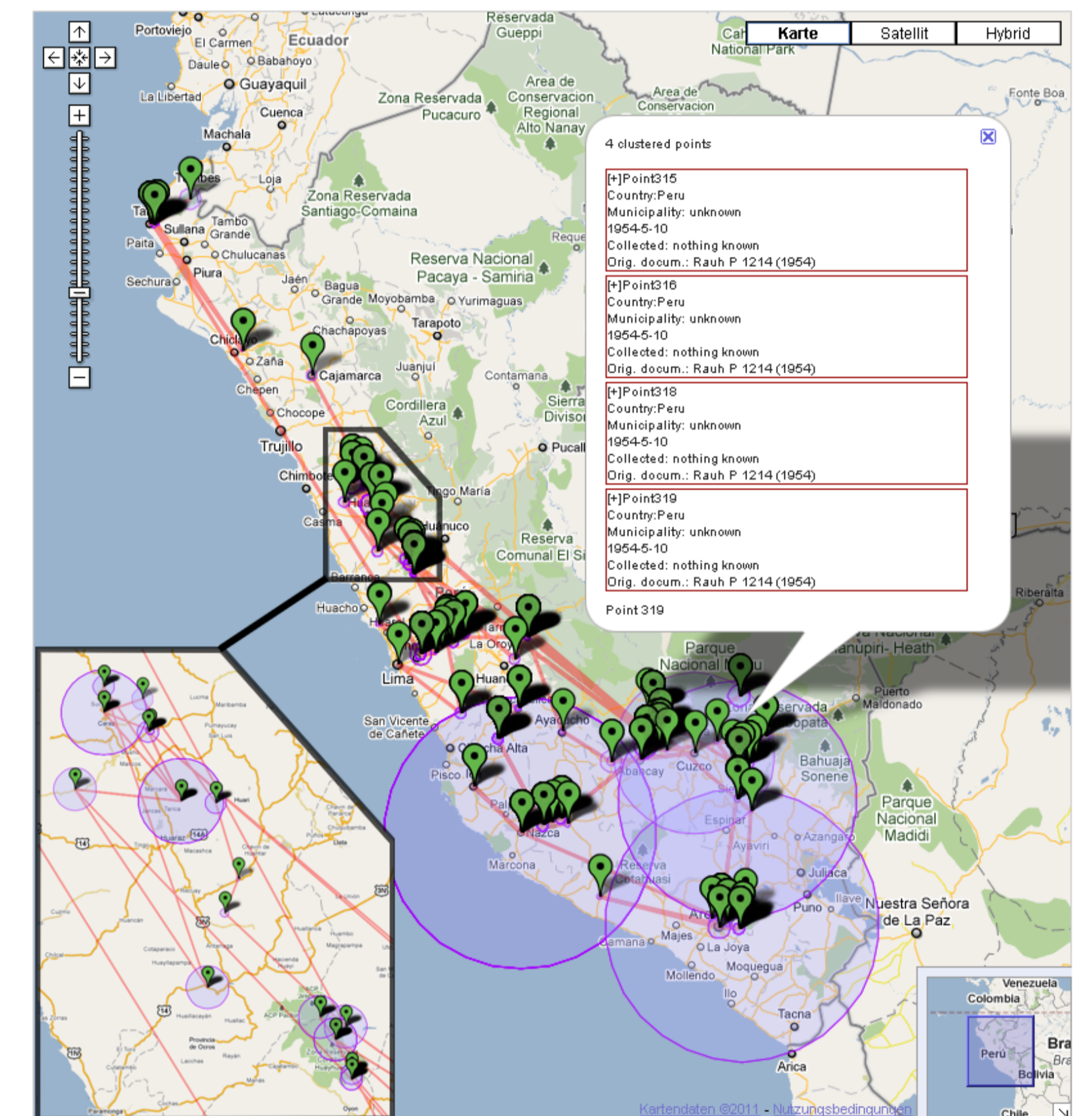
89 820 70890 00 = Rauh 70890 (Honduras 1989), FDB 82
Tillandsia ionantha var. *ionantha*

Collection Sub-Nr: a→01, b→02, XVII→17 etc.
Collection-Nr: if starting with letter(s) first digit: E→1, K→2, Kal→3 etc.
FDB-Nr two digits for vol-Nr, one digit for letter: no letter→0, A→1, B→2, etc.
Year only last two digits of year: 1954→54, 1989→89 etc.)

P-Collections Peru 1954: «Plants excluding Cactaceae»

Maps indicating the provenance of collections or observations can be created from the database. One marker may represent more than one collection. Precision of coordinates (stored in «km») is represented by a circle. Markers are linked together with red lines in chronological order.

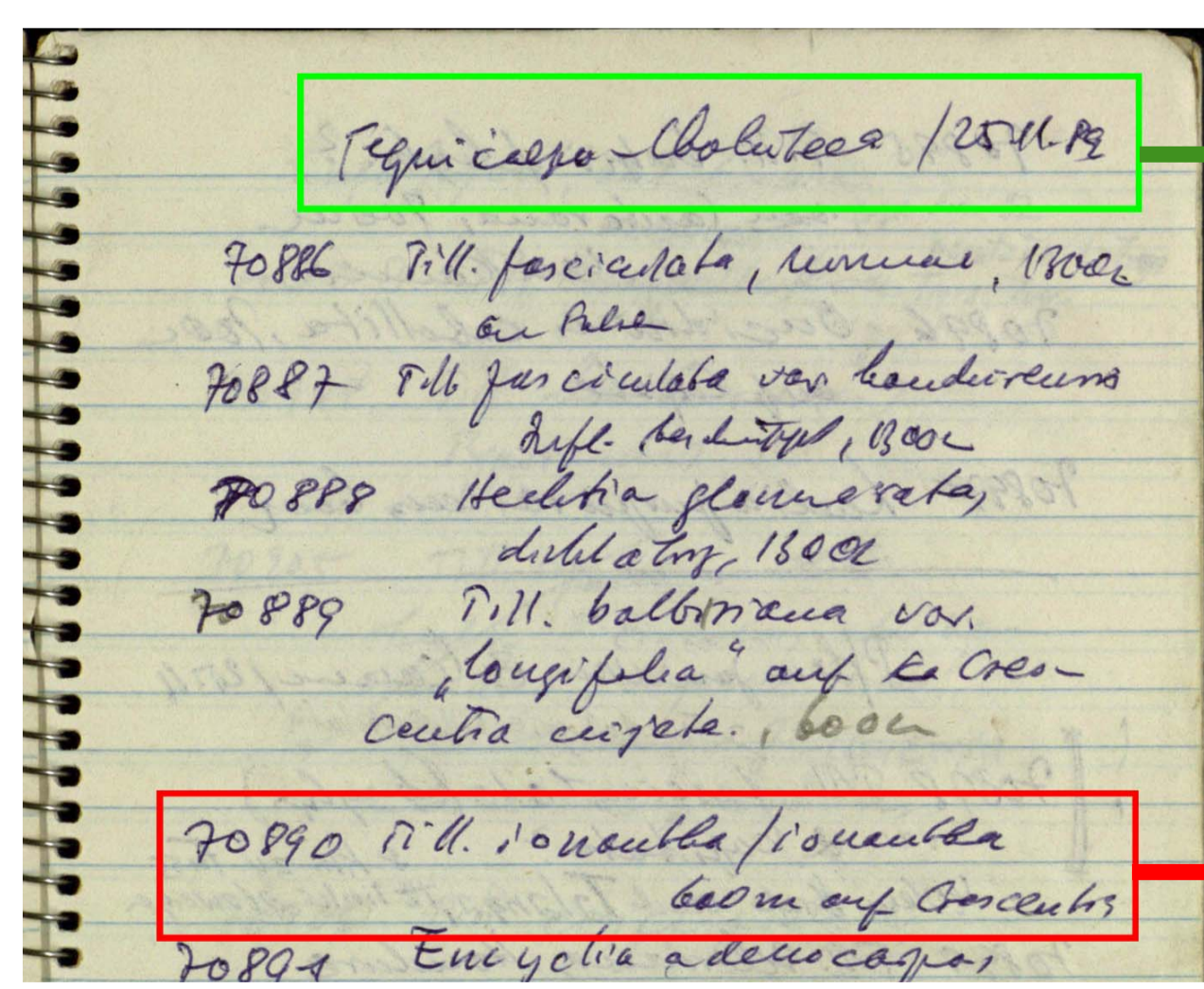
The map on the right shows «P-collections» = «plants collected in Peru in 1954 excluding Cactaceae». Collected Cacti were numbered with «K-Numbers».



Typical Fieldbook Entry

Rauh's entries usually consist of at least a *collection number* (very heterogeneous) and a *plant name* (family, genus, for the most part a species or infraspecific taxon). *Collection date, location, elevation, environment, plant society* etc. are given more or less regularly. Often they have to be found out from the context, like Sherlock Holmes had to find out the murderer...

Example Fieldbookpage **HEIDRAUHFDB082_026:**



```
INSERT INTO tb_itinerary SET location='Tegucigalpa-Choluteca', date_y=1989, date_m=11, date_d=25, country_ISO='HN', country='Honduras', scanl='HEIDRAUHFDB082_026';
```

tb_itinerary
Table with locations (=itinerary points), defined by geographical names, coordinates, elevation etc., where Rauh observed or collected taxa.

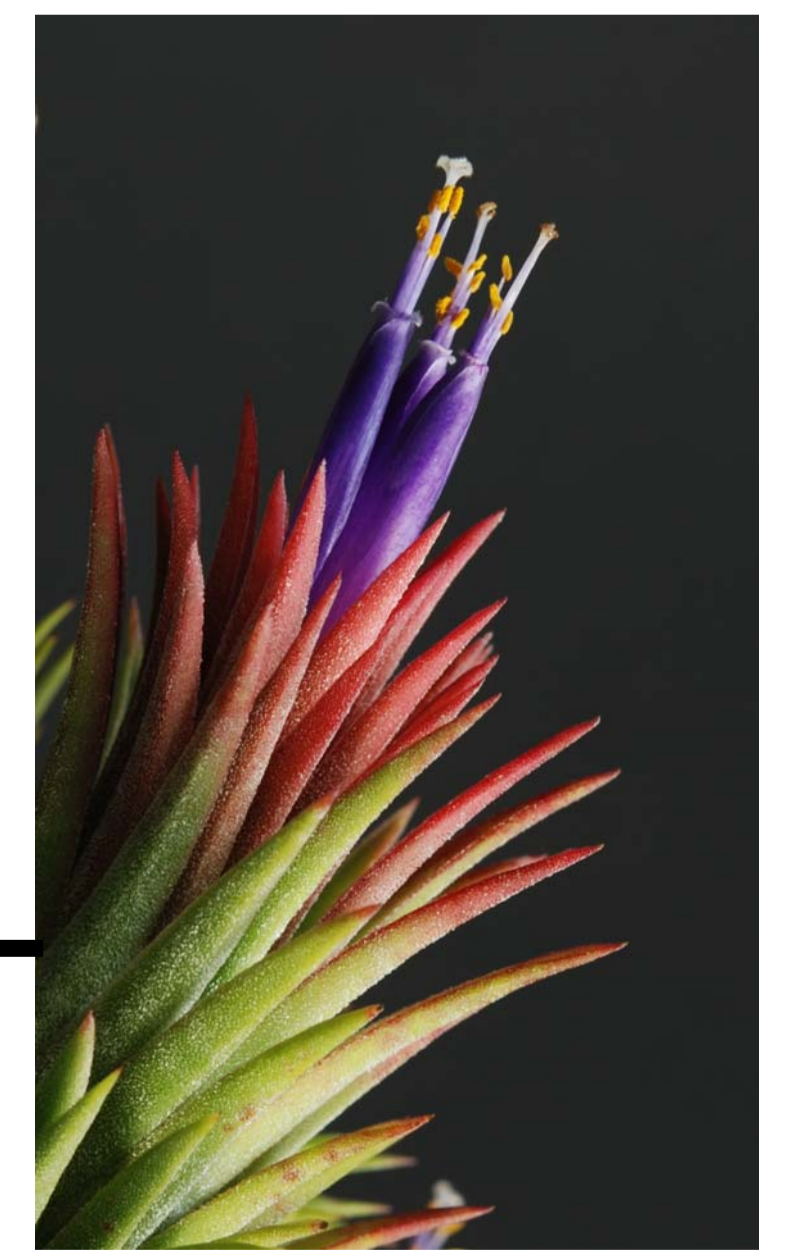
tb_synonym

tb_taxon

tb_entry
Table with all entries from the fieldbooks (FDB) with collection number, collected taxon, date, environment etc.

tb_images
Table with images of plants collected by Werner Rauh, from the Heidelberg Botanic Garden's collection

```
INSERT INTO tb_entry SET legname='Rauh', legnumber='70890', collected_as_name='Till. ionantha/ionantha', entry_environment='auf Crescentia (on Crescentia)', entry_elevation=600, link_to_fdb='HEIDRAUHFDB082_026', legdate_y=1989, legdate_m=11, legdate_d=25;
```



Werauhia div. sp. Ceratostema rauhii Tillandsia rauhii Opuntia rauhii Rauhococcus riosianensis Rauhella brasiliensis Aloe rauhii Masdevallia rauhii Armatocereus rauhii Oeceoclades rauhii