La synthèse des connaissances sur la biodiversité : introduction aux méta-analyses et revues systématiques – 2024

Tri sur titre, résumé, et texte intégral.
Importance des critères d'éligibilité

Sylvie Campagne
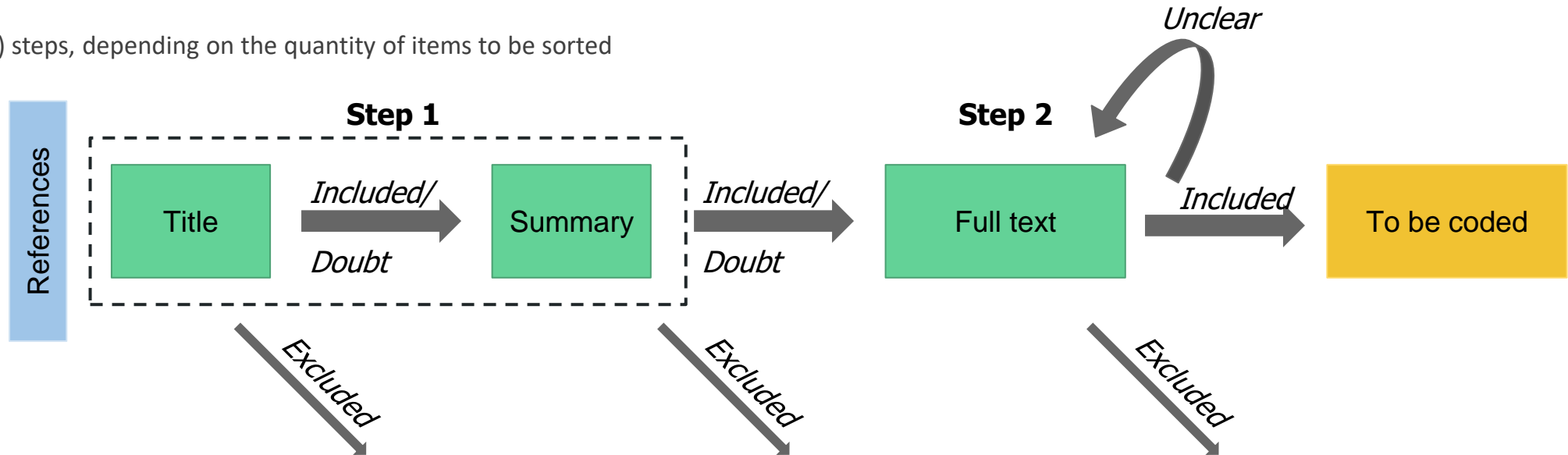Sorbonne Université – Station Biologique de Roscoff

The goal:

Selection of the relevant references in the corpus resulting from the search string

1. The different screening stages

2. Inclusion and exclusion criteria

3. Existing tools for managing screening

4. Statistical tests between raters (kappa test)

1. The different screening stages

In 2 (or 3) steps, depending on the quantity of items to be sorted

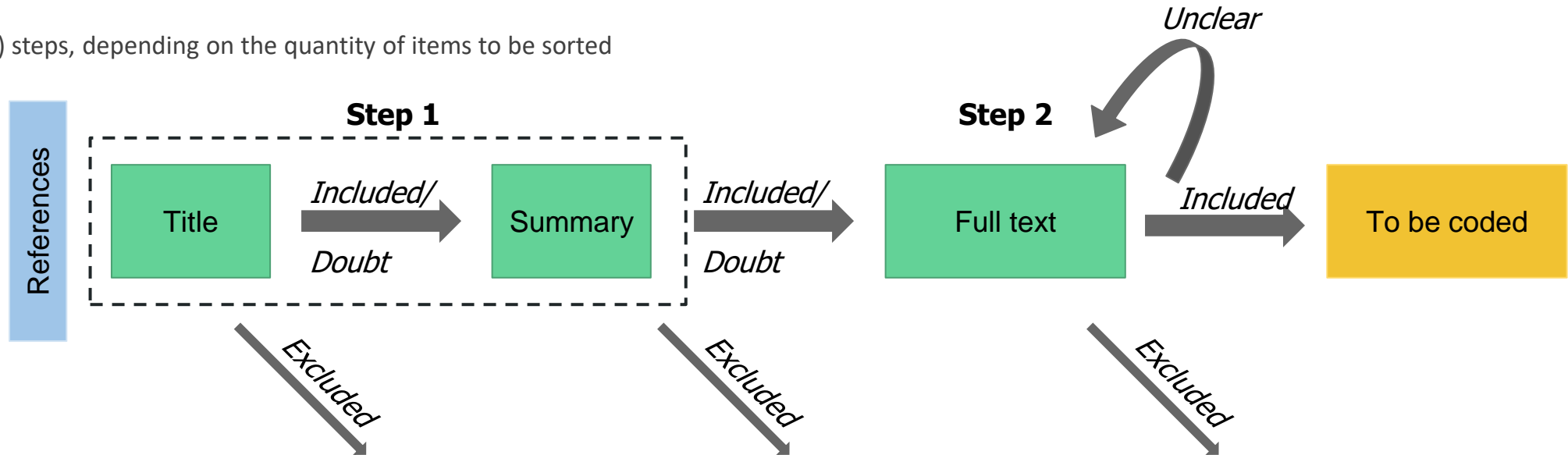

Each step requires the prior establishment of a **decision tree**

1. The different screening stages

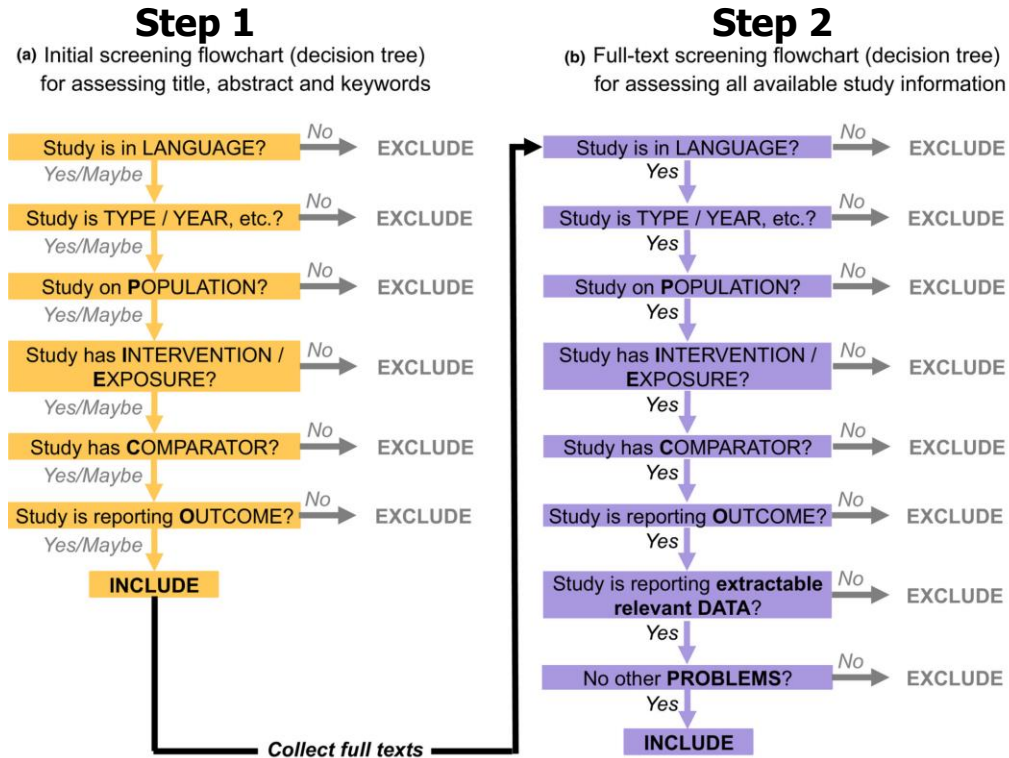In 2 (or 3) steps, depending on the quantity of items to be sorted

Each step requires the prior establishment of a **decision tree**

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Keep a record at each stage (list the included/doubtful, the excluded, with a justification for the decision)

2. Inclusion and exclusion criteria

Decision trees (Foo et al. 2021)

Step 1
(a) Initial screening flowchart (decision tree) for assessing title, abstract and keywords

- Study is in LANGUAGE? — No → EXCLUDE
  Yes/Maybe
- Study is TYPE / YEAR, etc.? — No → EXCLUDE
  Yes/Maybe
- Study on POPULATION? — No → EXCLUDE
  Yes/Maybe
- Study has INTERVENTION / EXPOSURE? — No → EXCLUDE
  Yes/Maybe
- Study has COMPARATOR? — No → EXCLUDE
  Yes/Maybe
- Study is reporting OUTCOME? — No → EXCLUDE
  Yes/Maybe
- INCLUDE

Collect full texts

Step 2
(b) Full-text screening flowchart (decision tree) for assessing all available study information

- Study is in LANGUAGE? — No → EXCLUDE
  Yes
- Study is TYPE / YEAR, etc.? — No → EXCLUDE
  Yes
- Study on POPULATION? — No → EXCLUDE
  Yes
- Study has INTERVENTION / EXPOSURE? — No → EXCLUDE
  Yes
- Study has COMPARATOR? — No → EXCLUDE
  Yes
- Study is reporting OUTCOME? — No → EXCLUDE
  Yes
- Study is reporting extractable relevant DATA? — No → EXCLUDE
  Yes
- No other PROBLEMS? — No → EXCLUDE
  Yes
- INCLUDE

Ideally, at each stage :

→ generate the decision tree using **PICO** and **IN/OUT criteria**

→ **discuss** the decision tree (with at least 1 other evaluator)

→ **benchmark** the decision tree (on a few articles, 2+ reviewers, compare results)

→ **refine** the decision tree

SORTING

✓ Increasingly precise criteria at each stage of sorting while maintaining previous criteria

✓ A priori criteria preserve transparency and repeatability and minimize bias.

✓ When uncertain, be inclusive

✓ Decisions to be made according to different situations and must be transcribed for transparency and repeatability

✓ There may be criteria not related to PECO, on the language of the article, the type of articles (eg review), the quality or the type of data

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Tips for efficient sorting

- Search the library for relevant keywords - filter these articles to sort them together

- Work in blocks of 30-45 minutes

- Work simultaneously with other people (facilitates quick consultation)

- BUT BE CAREFUL of any exclusion without a human reading the article!

3. Existing tools for managing screening

Excel Microsoft / WPI / Office - free

Need to be very organized - difficulty when evaluating with multiple reviewers.

No. of articles	Article title	Sort by title	Abstract sorting	Pdf found	Sort entire text
23	Evaluation of	Yes	NO	-	-
24	Ecosystem…	NO	-	-	-
2X	Mapping…	Yes	Yes	Yes	No

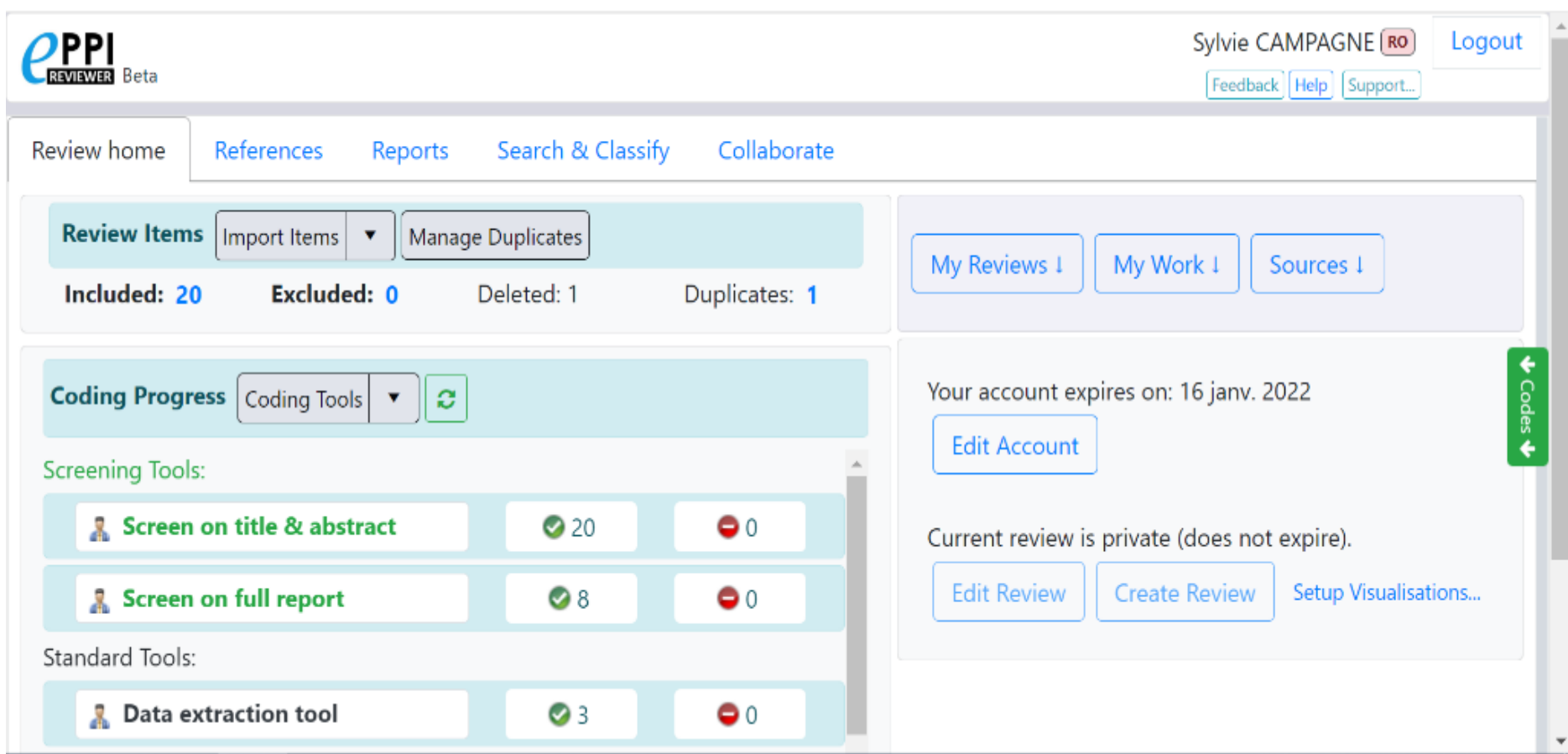# How?

3. Existing tools for managing screening

How?

3. Existing tools for managing screening

EPPI reviwer

- Online tool – not free
- Very practical if several reviewers
- One place for every data

= Free version CADIMA

Cohen's Kappa test for 2 raters

(see also Light's Kappa, Fleiss's Kappa)

→ Sorting results +/- disparate despite IN/OUT criteria

→ Perform assessment counts and gather them in a contingency table

Example: out of 110 articles

		Jon		
		YES	NO	DOUBT
	YES	15	2	3
Damien	NO	0	69	8
	DOUBT	0	4	9

Cohen's Kappa test for 2 raters

(see also Light's Kappa, Fleiss's Kappa)

```
# Tableau de contingence
xtab <- as.table(rbind(c(15, 2, 3), c(0, 69, 8), c(0, 4, 9)))
# Statistiques descriptives
diagonal.counts <- diag(xtab)
N <- sum(xtab)
row.marginal.props <- rowSums(xtab)/N
col.marginal.props <- colSums(xtab)/N
# Calculer kappa (k)
Po <- sum(diagonal.counts)/N
Pe <- sum(row.marginal.props*col.marginal.props)
k <- (Po - Pe)/(1 - Pe)
k
```

$$kappa(\kappa) = \frac{P_o - P_e}{1 - P_e}$$

→ Calculation of Kappa

N: the total sum of all cells in the table

Po: *proportion of observed agreement* , the sum of the diagonal proportions, which corresponds to the proportion of cases where the two raters assigned the same categories

Pe: *proportion of random agreement* , the sum of the products of the marginal proportions of the rows and columns

Example: Round 1 (Jon, Damien)

k = 0.68

Inter-Rater Reliability Essentials - A practical Guide in R(2019); {epiR} package

Cohen's Kappa test for 2 raters

(see also Light's Kappa, Fleiss's Kappa)

$\rightarrow$ Interpretation

Example: we had to discuss before a second round… :)

Less punitive: % agreement, in our case
93/110 = 85%

Value of k	Strength of the agreement
< 0	Poor
0.01 - 0.20	Light
0.21 - 0.40	Fair
0.41 - 0.60	Moderate
0.61 - 0.80	Substantial
0.81 - 1	Almost perfect

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Thank you for your attention !!!

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