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

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The screening strategy

The goal:

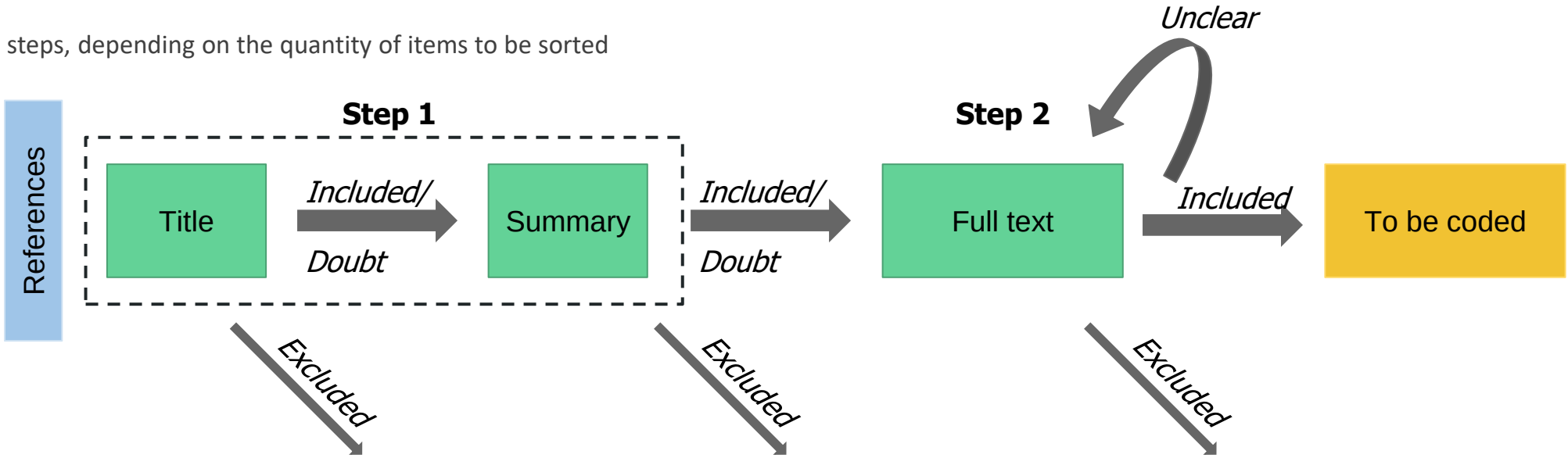
Selection of the relevant references in the corpus resulting from the search string

1. The different screening stages
2. Inclusion and exclusion criteria
3. Existing tools for managing screening
4. Statistical tests between raters (kappa test)

The screening strategy

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**

The screening strategy

1. The different screening stages

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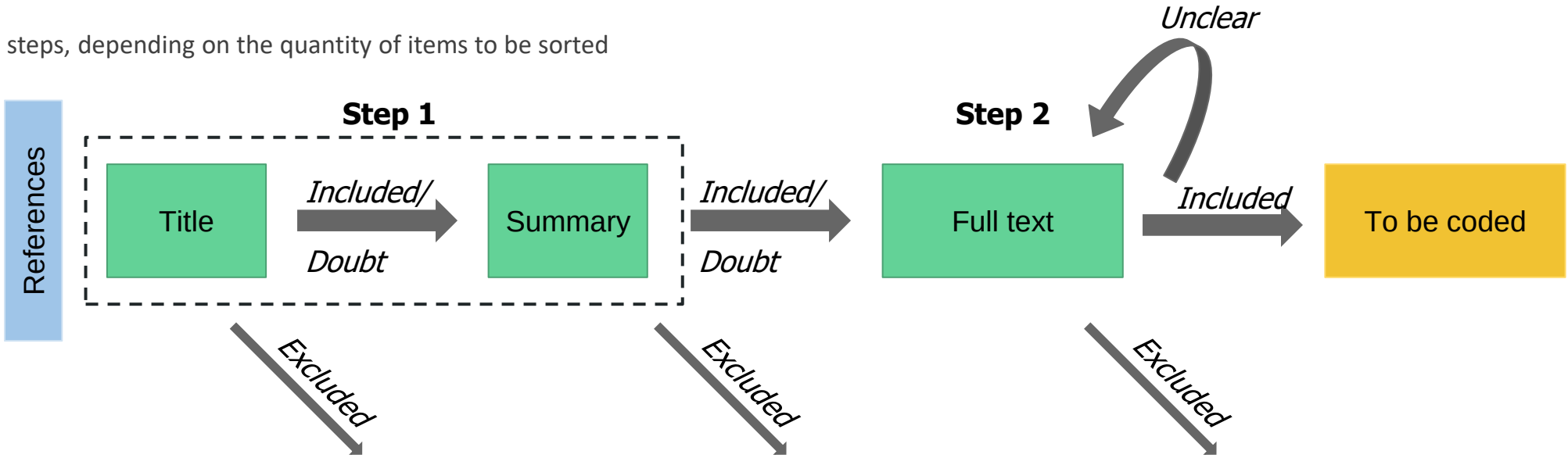


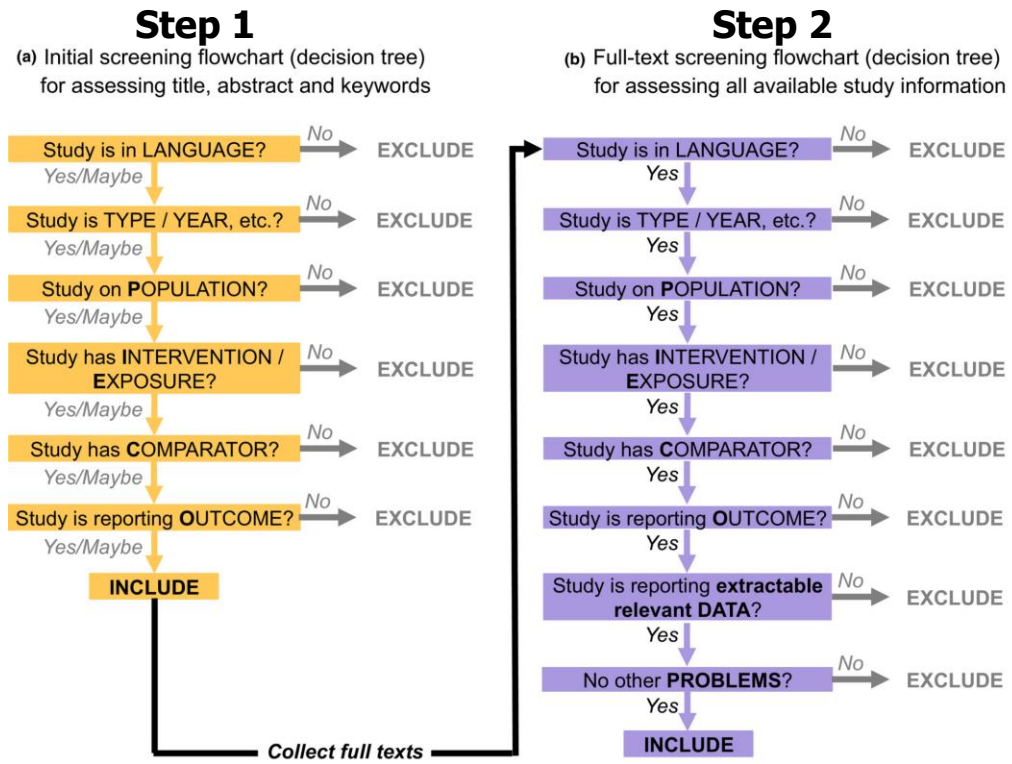
Each step requires the prior establishment of a **decision tree**

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

The screening strategy

2. Inclusion and exclusion criteria

Decision trees (Foo et al. 2021)



<u>Ideally, at each stage</u> :

→ 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

<u>SORTING</u>

The screening strategy

2. Inclusion and exclusion criteria

Decision trees (Campagne et al, 2023)

Criterion	Screening step	Inclusion criteria	Exclusion criteria
Population	**Title**	Articles whose title deals with biodiversity, i.e., species, habitats, and/or ecosystems in marine environments. Non-exhaustive examples may include open-ocean, continental shelf, coastal areas, seagrass meadows, estuaries, mangroves, coral reefs, etc.	Articles whose title explicitly only refers to terrestrial and/or freshwater biodiversity, species, habitats or ecosystems, i.e., articles regarding exclusively aquatic species and habitats (e.g., lakes, floodplains, rivers, subterranean habitats, etc.) or to terrestrial species and habitats (e.g., forest, agricultural ecosystems, etc.)
Outcomes	**Title**	Articles dealing with marine ecosystem services (as well as related terms such as "nature's contributions to people"). (e.g., marine blue sequestration, snorkelling, whale watching) Articles dealing with the marine ecosystem service of food supply in terms of indicators of stock or population size of commercial species (e.g., fishery stock)	Articles dealing solely with function or structure processes and not related to effects on ecosystem services (e.g., primary production, photosynthesis) Studies only addressing species criteria with indicators other than the stock or the population size of the species (e.g., species distribution)
Exposure	**Abstract**	Any article or study exposing marine biodiversity, i.e., species, habitats, and ecosystems, to a change in structure and/functioning over time caused by an agent of change, i.e., human activity (e.g., direct/overexploitation, land/sea use change, etc.) or a change caused by different spatial area studied	Articles presenting no exposure to a change
Comparator	**Abstract**	Articles studying changes in ecosystem services through time or space (i.e., temporal or spatial comparisons). This may mean a different study type as detailed in Table 4. Accepted with synchronic comparators (same time, different sites).	Articles only assessing ecosystem services at one time or in one site/area
Temporal period	**Abstract**	Articles analysing relevant outcomes with data covering periods of at least part of the 20th century and/or the 21st century	Articles analysing data covering periods ending before 1900 (e.g., palaeoecology analysis).
Outcomes	**Full text**	Articles analysing relevant outcomes containing qualitative or quantitative values of marine ecosystem services and disservices	Articles without qualitative or quantitative values of marine ecosystem services and disservices (e.g., narrative review, opinion paper, policy paper without new quantitative or qualitative values defined).

The importance of inclusion and exclusion criteria

- ✓ 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

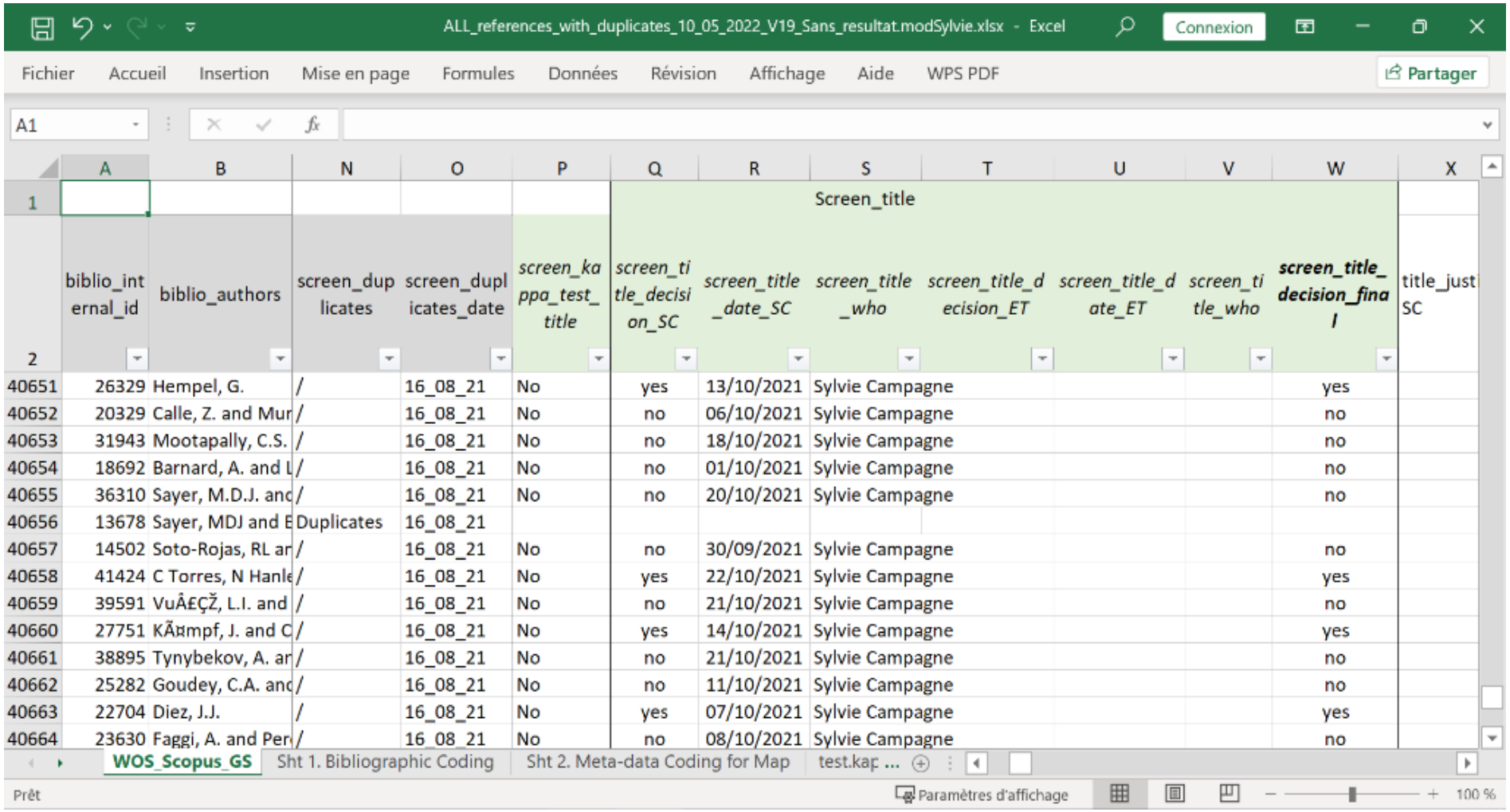
Excel Microsoft / WPI / Office - free

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



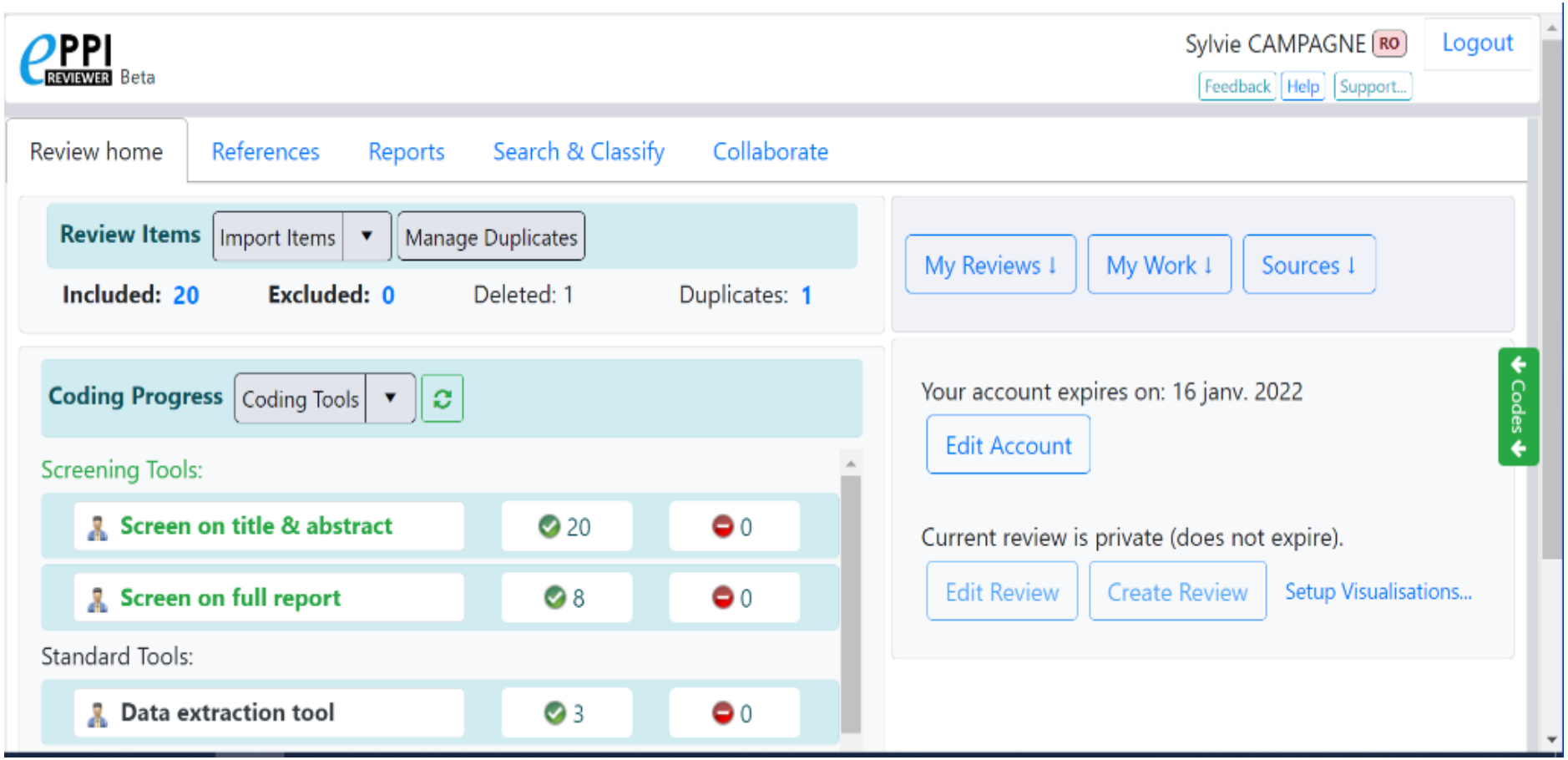
How?

3. **Existing tools for managing screening** – if several screeners

EPPI reviwer

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

= Free version CADIMA



Agreement between different evaluators

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

Agreement between different evaluators

Cohen's Kappa test for 2 raters

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

```r
# 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
```

→ Calculation of Kappa

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

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

Agreement between different evaluators

Cohen's Kappa test for 2 raters

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

→ 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

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

Thank you for your attention !!!

Sylvie Campagne
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sylviecampagne@gmail.com

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