



Patterns in detection rates of Swiss amphibians: Just how well can we believe our eyes… and what does this mean for amphibian species monitoring?

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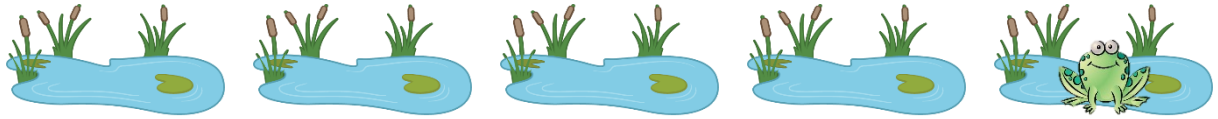
info fauna karch Herpetokolloquium 8.12.2019

The challenge

When do we believe what we see?

Observation History	Occupied?
1	✓



Observation History	Occupied?
0000**1**	✓

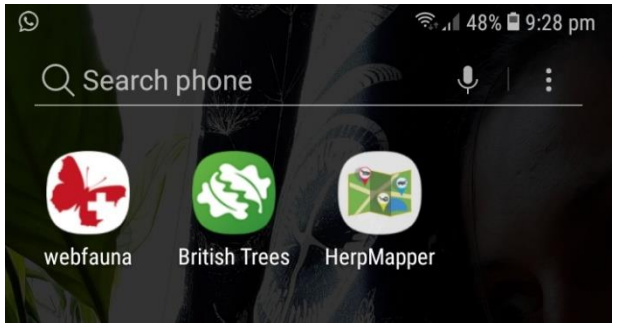
Knowledge of our efficiency is necessary to interpret what we see

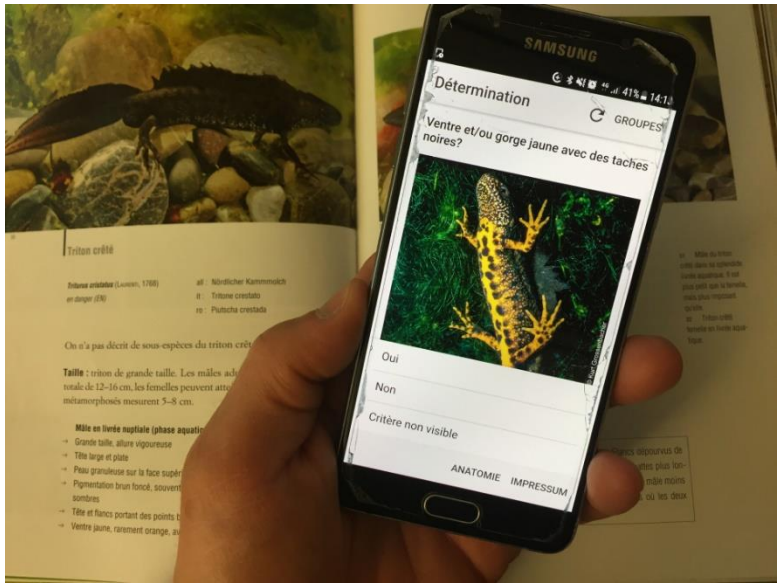
Solution: Repeat Visits
Occupancy Models

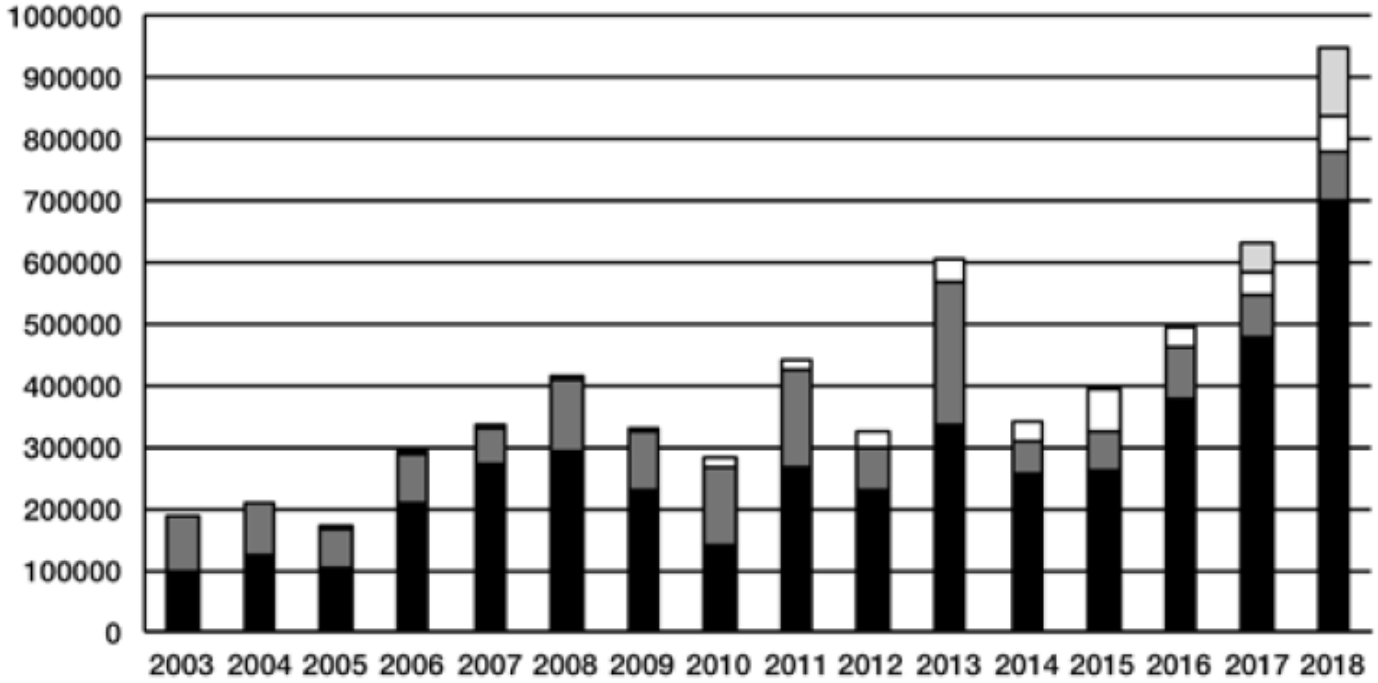
- Estimate detection probability
  - ➢ Unbiased estimated of occupancy rates

- Resource intensive

Species monitoring is changing…..







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How to assess data quality?

Measure……

Detection probability

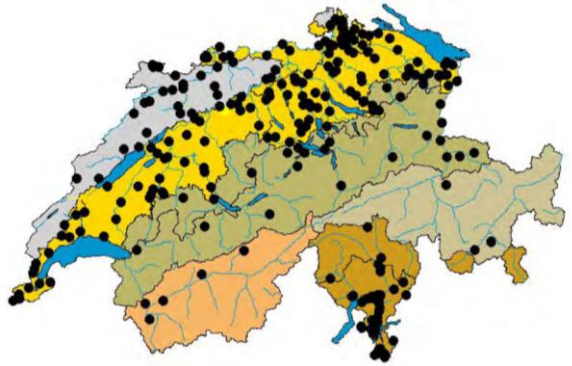
False-Positive Error Rate

Question: Do these differ between different types of surveyor?

WBS

- 50 Paid Surveyors
- 243 Sites
- 2.98 ± 0.6 visits per site

Red List

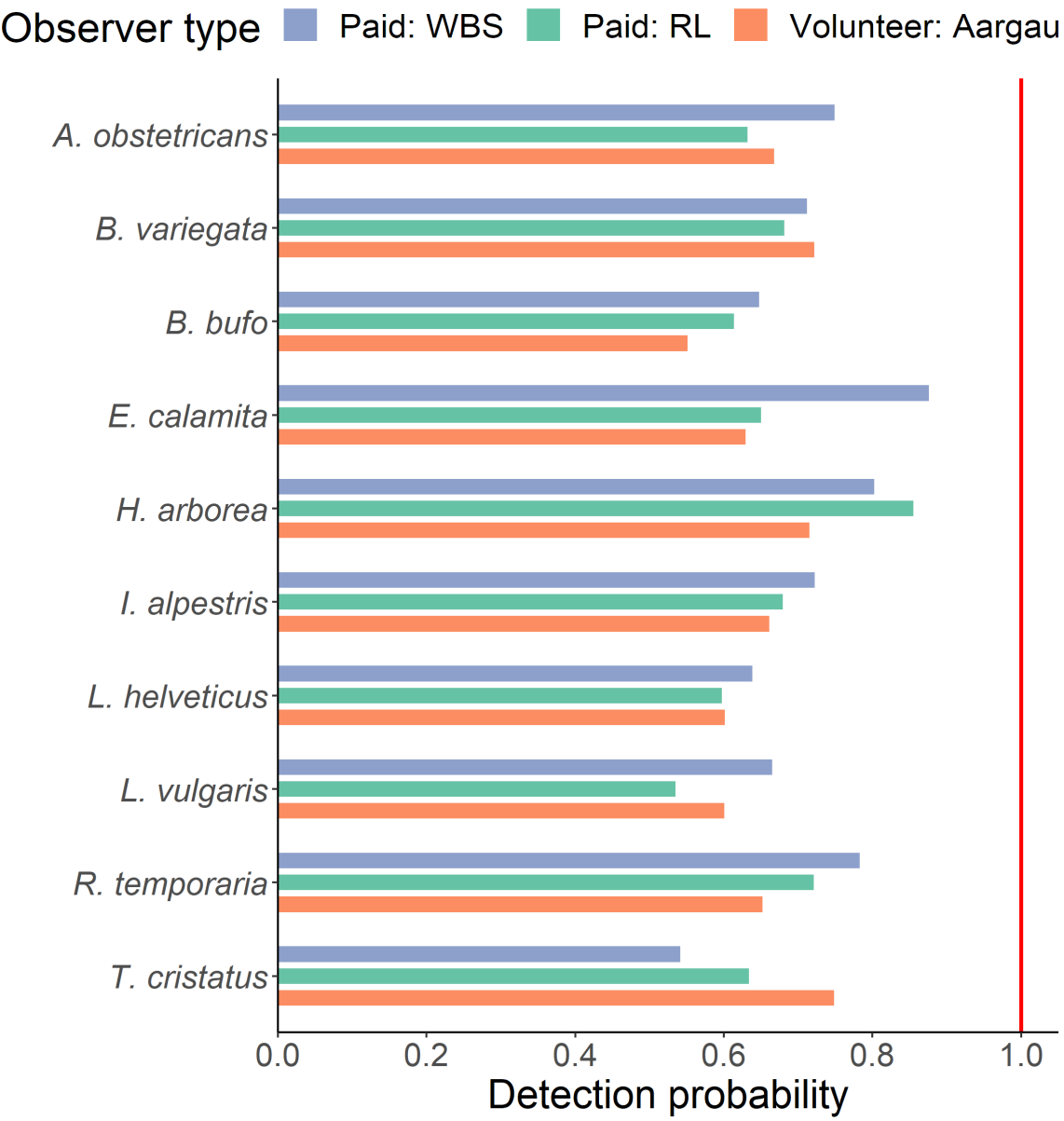


- 46 Paid Surveyors
- 283 Sites
- 2.75 ± 0.7 visits per site

Aargau

- 60 Volunteer Surveyors
- 378 Sites
- 2.51 ± 0.2 visits per site

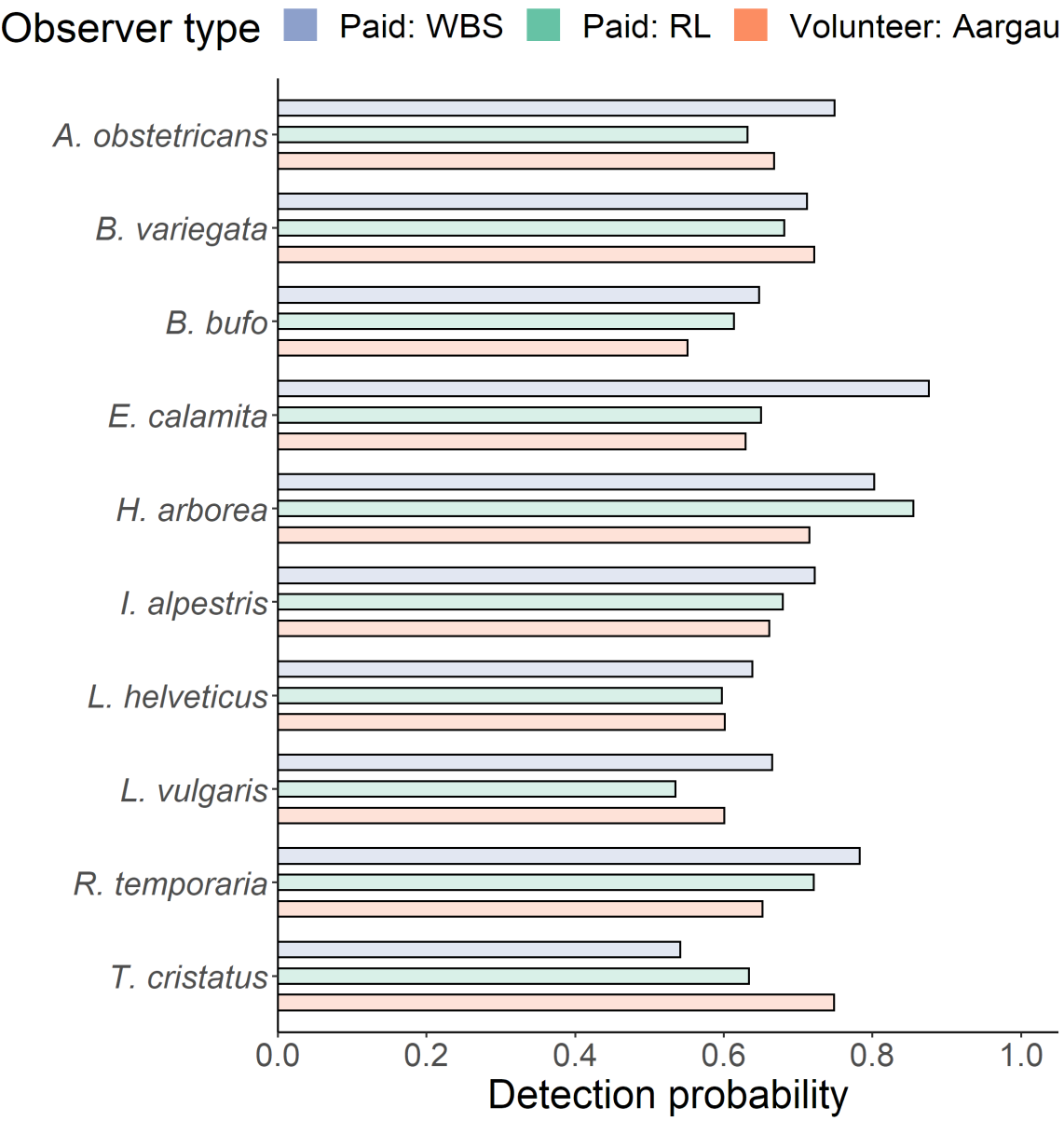
Per visit detection probability



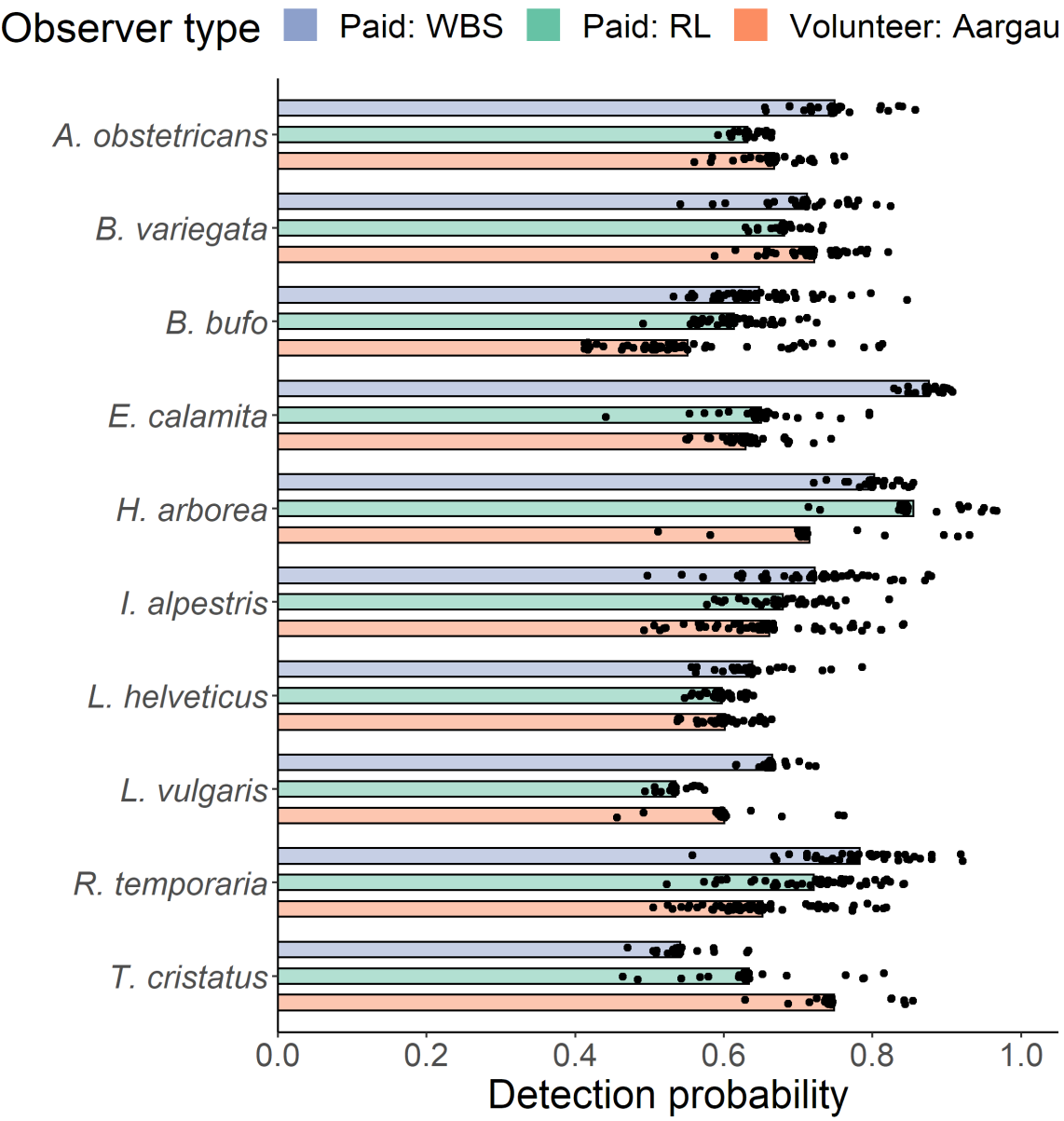
- Detection is far from perfect
- Probabilities range from 50-90%
- Rates are (mostly) comparable between groups

Average values don't tell the whole story….

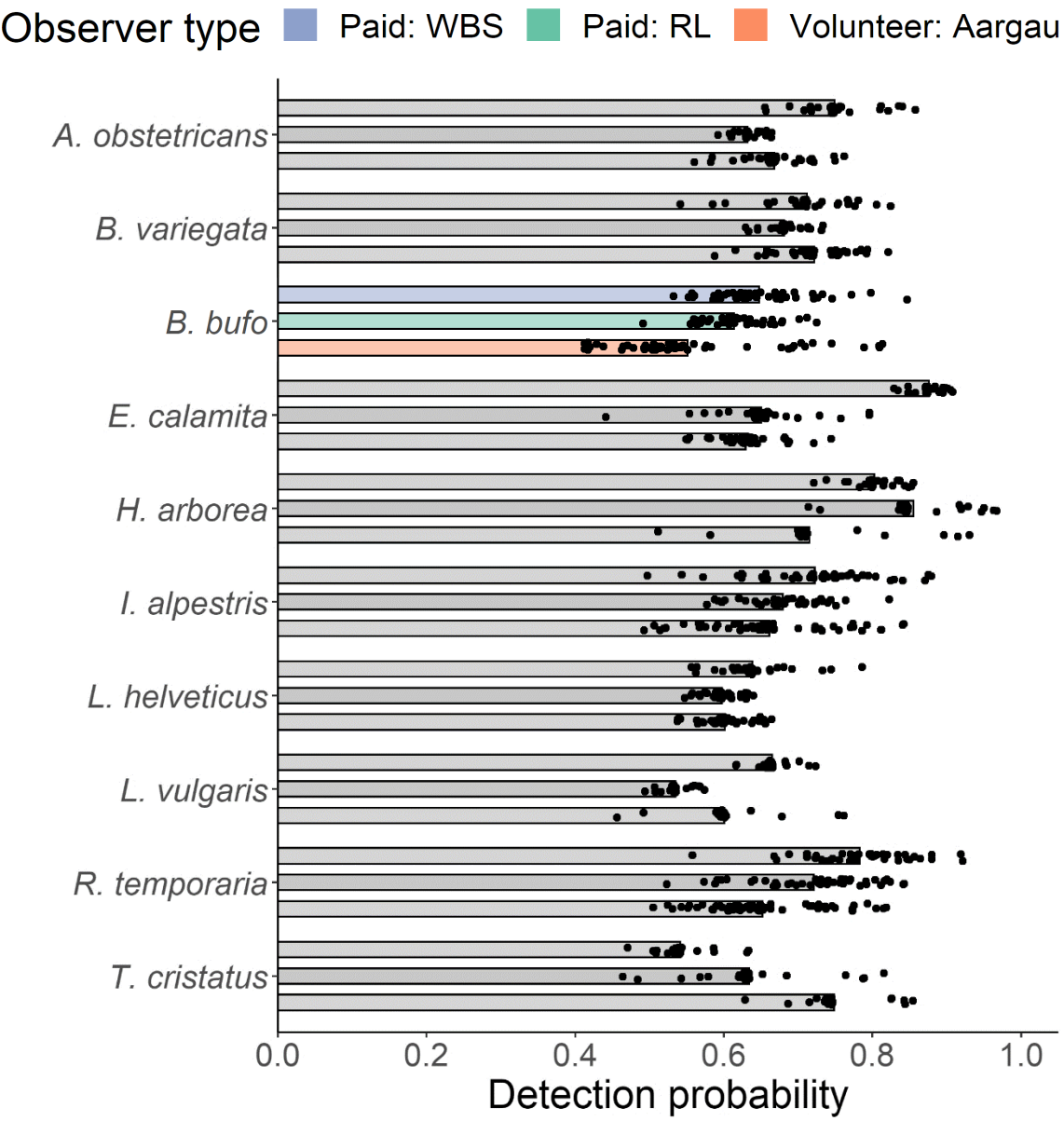
Per visit detection probability



Per visit detection probability



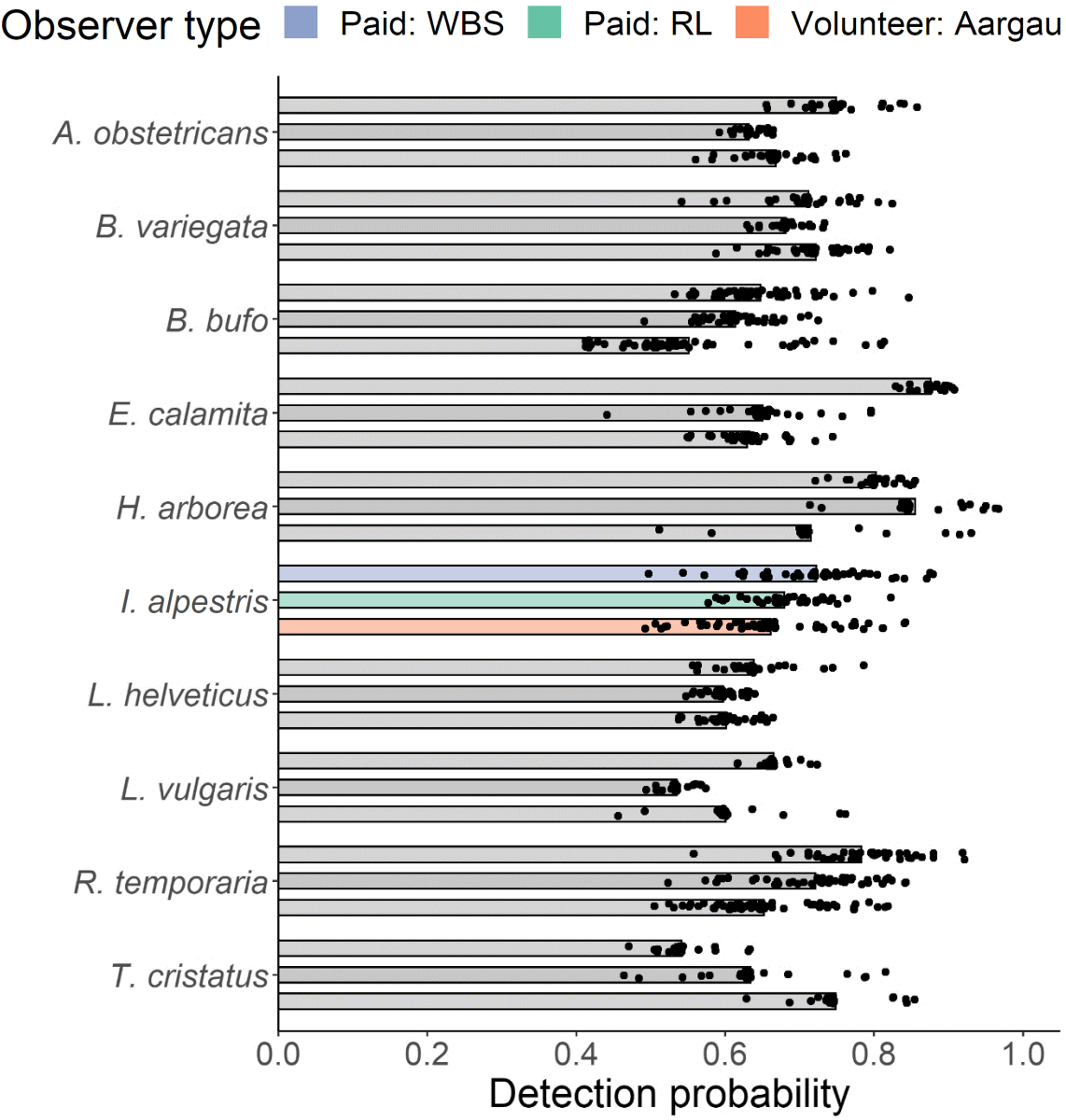
Per visit detection probability



Common Toad

- Paid surveyors have higher values overall
- Volunteers have much higher variability
- Some volunteers as good as paid surveyors

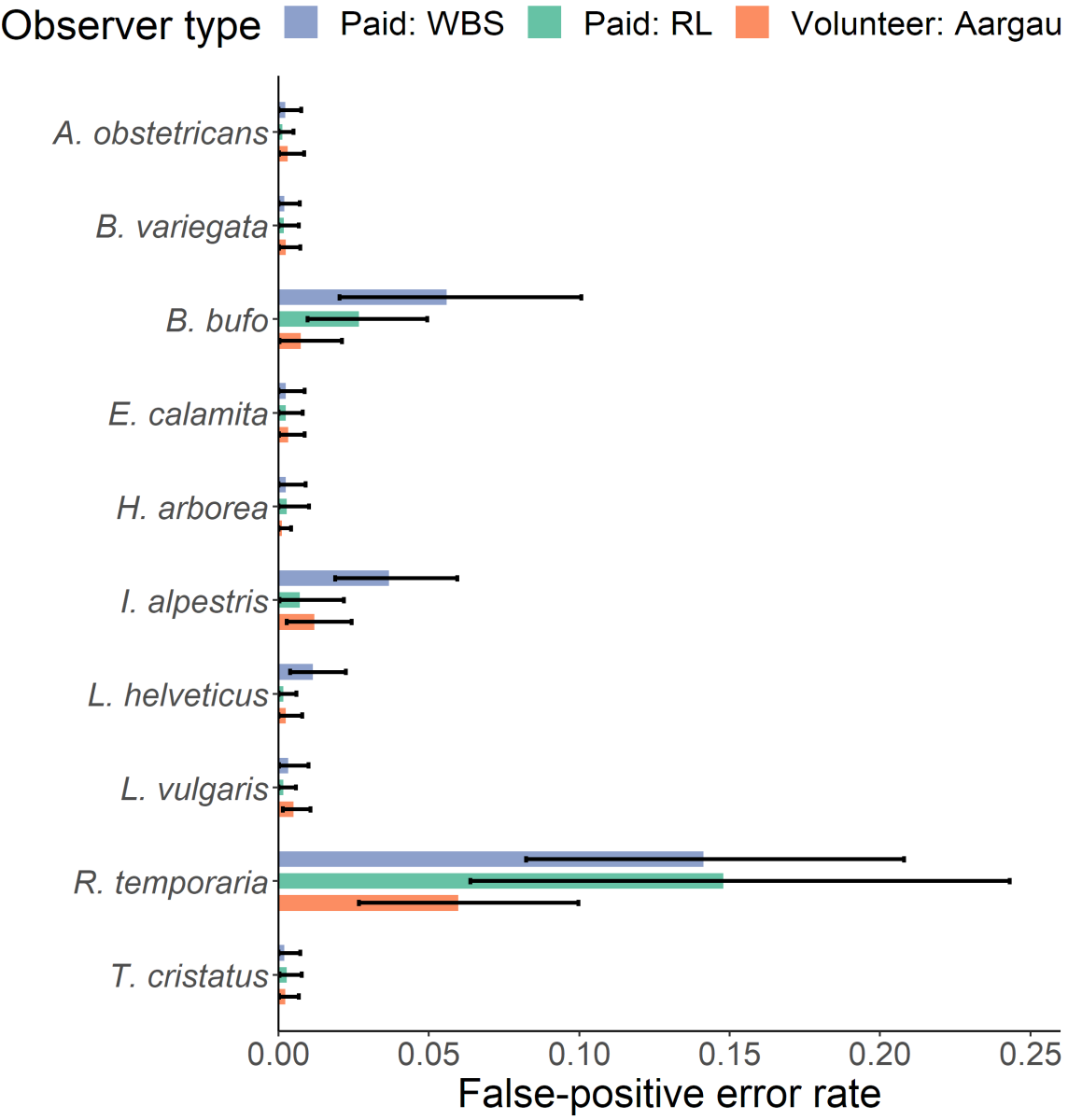
Per visit detection probability



Alpine newt

- Similar values among groups
- Wide range within all groups

False-positive error rate

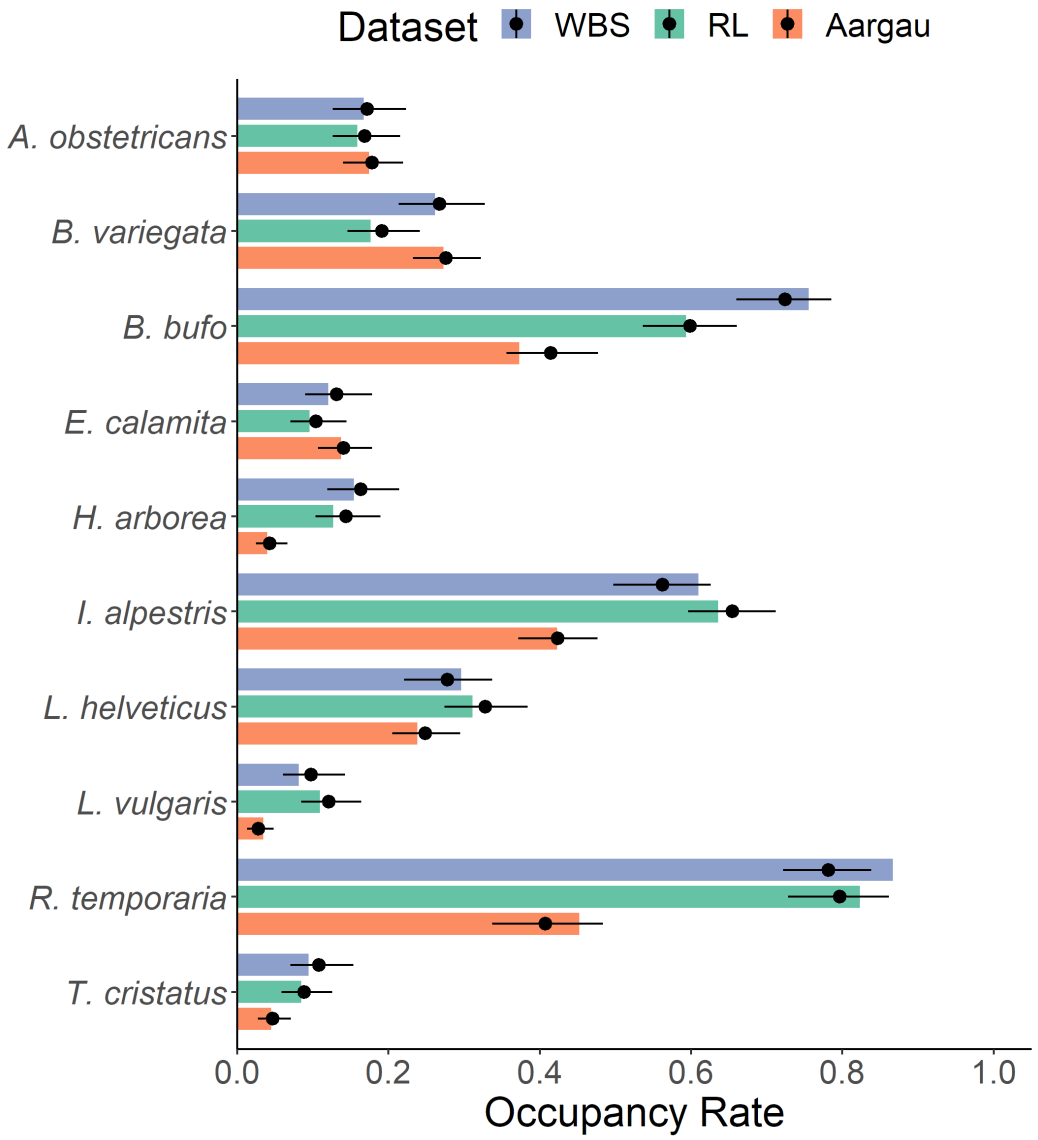


- eggs and larvae

1. Non-existent for most species
2. Common species have higher rates
   - False-positives less of an issue for common species
   - Evidence for cautious observers?
     - Volunteers not reporting eggs if not certain
     - Paid surveyors feel the need to report, but report a common species

- Work in progress….

Occupancy Rate



Bars = Observed

Points = Estimated

Bars= uncertainty around estimated value (95%CI)

- Detection rates high enough that 3 surveys should be enough
- False-positive errors have little effect

- Very few differences between data collected by volunteers and paid surveyors

- Common species may be a bit less common than thought

Summary

- Humans aren't perfect!
  - But, we're pretty good overall
- Most of the time, there is not a big difference between the abilities of volunteers and paid surveyors
- However, volunteer abilities sometimes vary more
  - Reflects a range of motivations
- Misidentification of eggs/larvae does occur
  - But not a major issue

More work to be done:

- Are differences influenced by population size
- Variation in false-positive rates

Acknowledgements

- Benedikt Schmidt
- Ariel Bergamini
- Christoph Bühler
- All the fieldworkers!

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Bundesamt für Umwelt BAFU