"Nature's grossest blunder"? High occurrence of hybridization between two *Acrocephalus* species.

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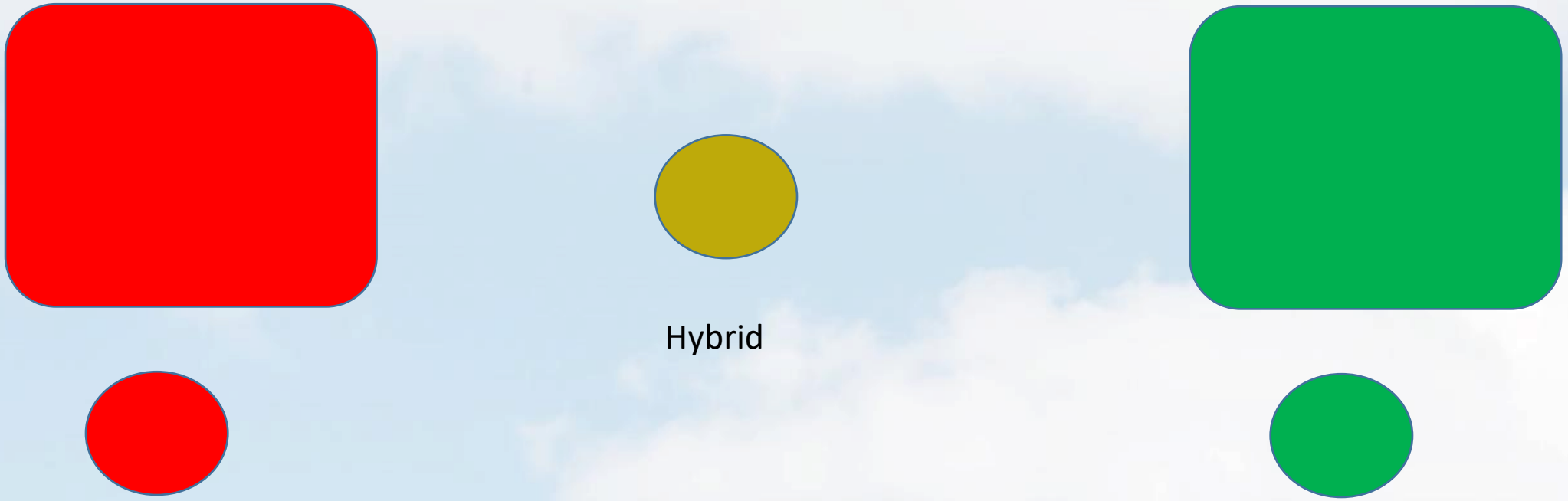
Disclaimer – Warblers…

- Birdwatchers, birders, bird enthusiasts…
- Ok twitchers, researchers, listers, photographers and the awkward kid down the block…
- We all LOVE birds!
- But…
- Old world warblers VS New world warblers – OMG vs LBJ…
- Acrocephalus warblers (reed warblers), the kings and queens of LBJ

Hybridization

- **Biological Species – a group of populations that might or actually does breed in nature, but can not breed with other similar populations.**
- **Hybridization – the inter-breeding between two distinct biological species. Thus challenging the definition of species.**

Hybridization - "Nature's grossest blunder"?



Hybridization - "Nature's grossest blunder"?

- **While historically hybridization was considered maladaptive and thus rare, in recent years, there is growing acknowledgment that hybridization is more common. In avian species hybridization can occur between species that breed in sympatry.**

- **1 in 10 avian species is now known as being able to interbreed**

Acrocephalus warblers

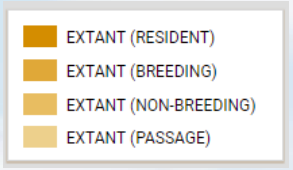
- Ancestral fossils of this genus date back to the Miocene.
- Quite modern differentiation of the last 10 million years.
- 37 species worldwide
- 9 species in Israel
- Eurasian Reed warbler (*A. scirpaceus*) extreme common migrant and breeder
- Marsh warbler (*A. palustris*) a sparse migrant

Marsh warbler

Acrocephalus palustris

Eurasian reed warbler

Acrocephalus scirpaceus



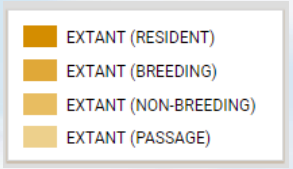
Marsh warbler

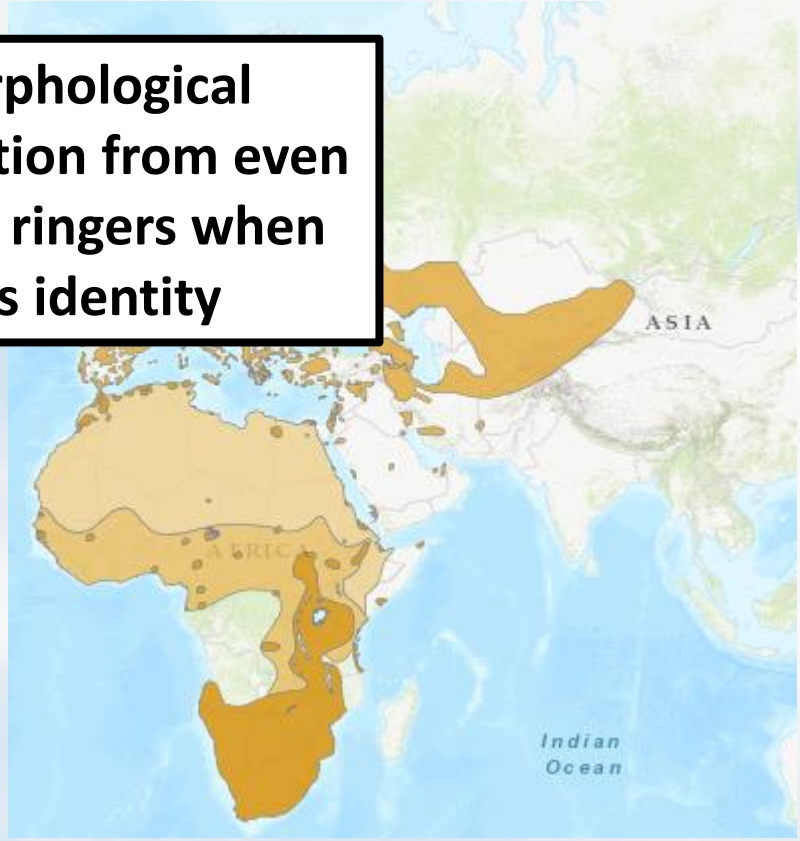
Acrocephalus palustris

Eurasian reed warbler

Acrocephalus scirpaceus

The two species morphological similarity, claims for caution from even highly experienced bird ringers when determining species identity





Research Aims

• every ringer/researcher working with *A. scirpaceus* & *A. palustris knows that at least some individuals are hard to differentiate.*

•*Do we actually identify them all?*

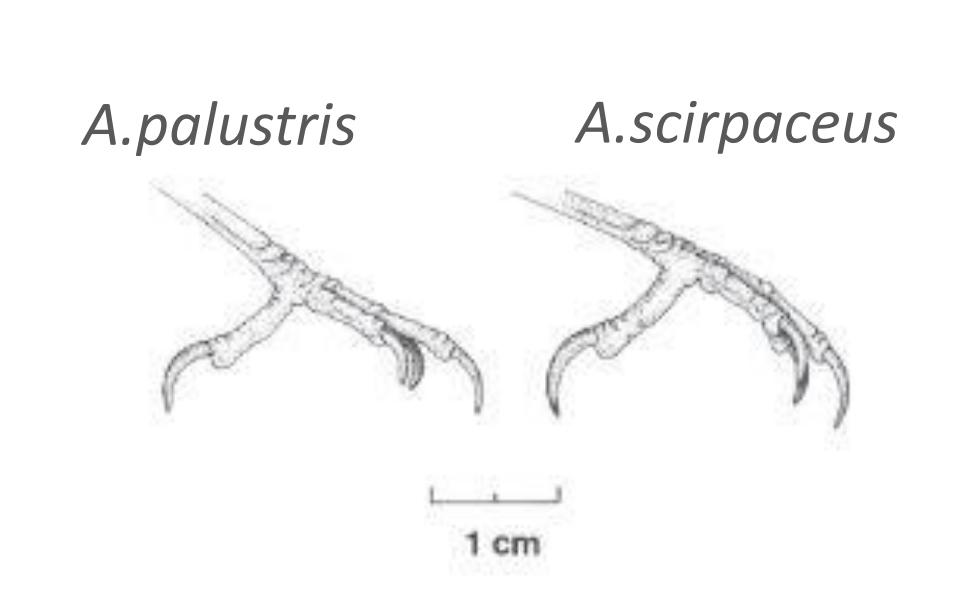
•*If not, is it because of species similarity only or maybe more than that?*

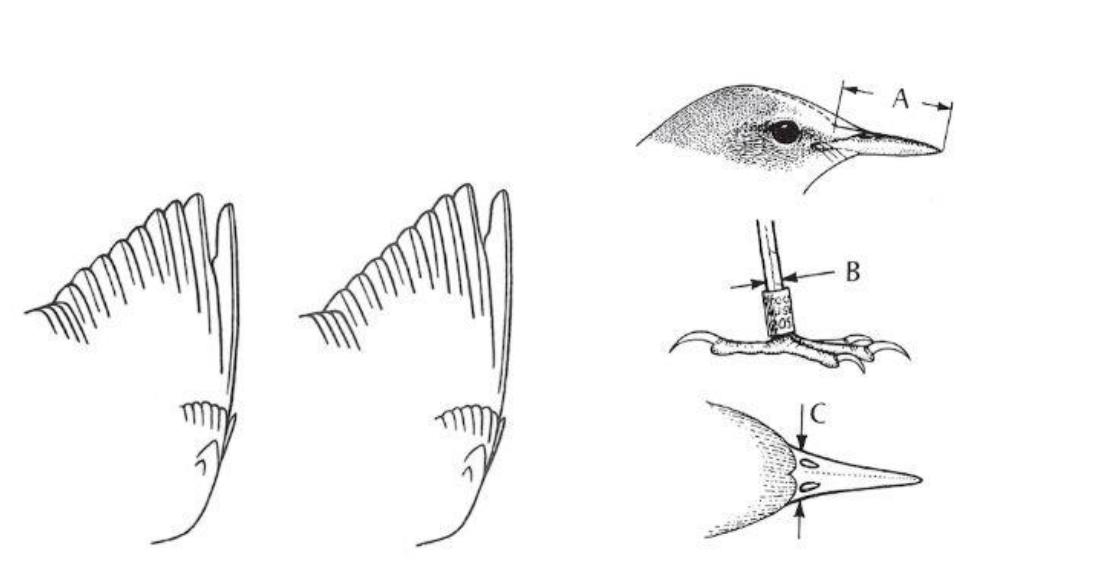
•*Can we morphologically distinguish hybrids if they exist?*

• *if they exist can they survive migration?*

Behavioral and morphological differences

- The most accurate way to identify – song
- Overall size and wing length
- 2nd primary notch length
- Foot span and toe length
- Special measuring and statistical methods – walinder et al.

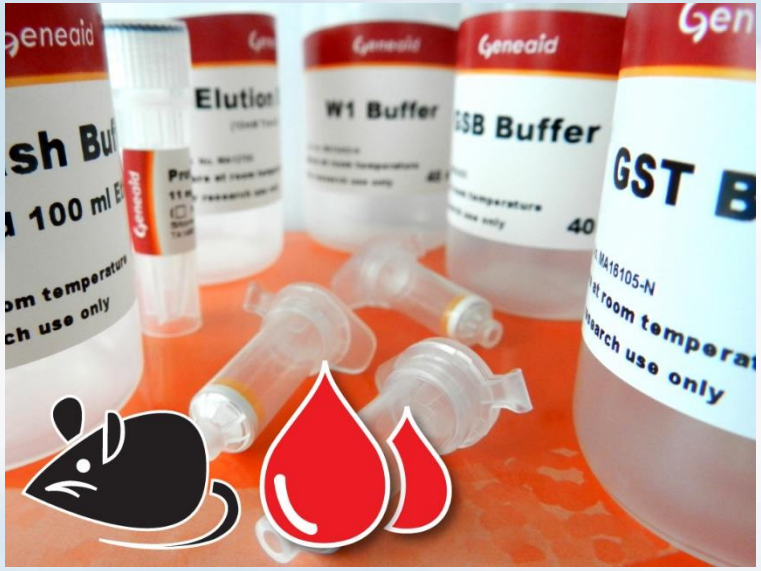




Work methods:

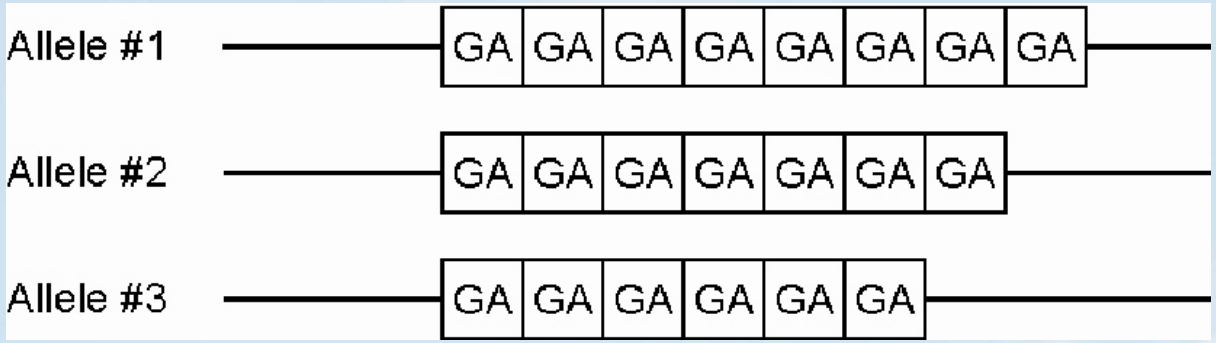
- Mist netting
- Measurements
- Blood sampling

- DNA Sampling



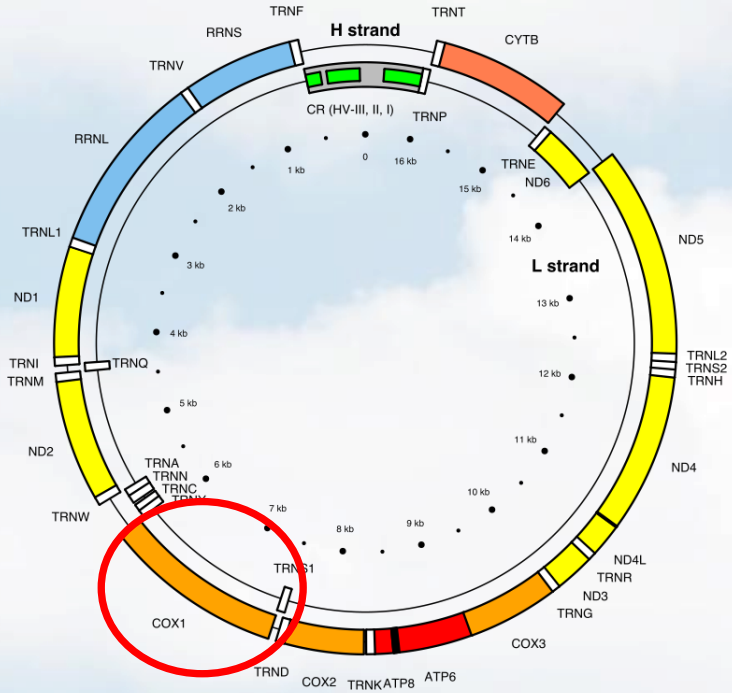
Work methods:

- Molecular examination of two microsatellites loci.
- Molecular sexing



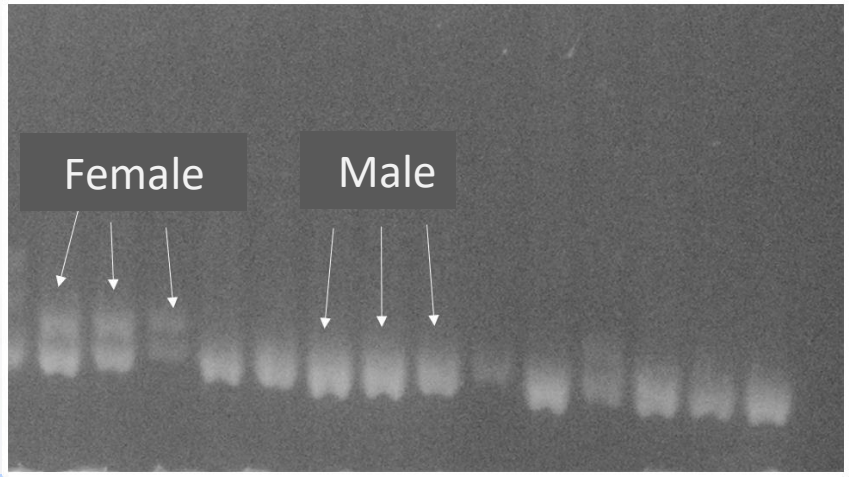
- Genetic sequencing of a segment of Cytochrome C oxidaze 1 gene

(CO1)



Results

- Sex Loci (marked in black)
- *A. palustris* equal male/female ratio
- *A. scirpaceus* mostly males (biased sampling)



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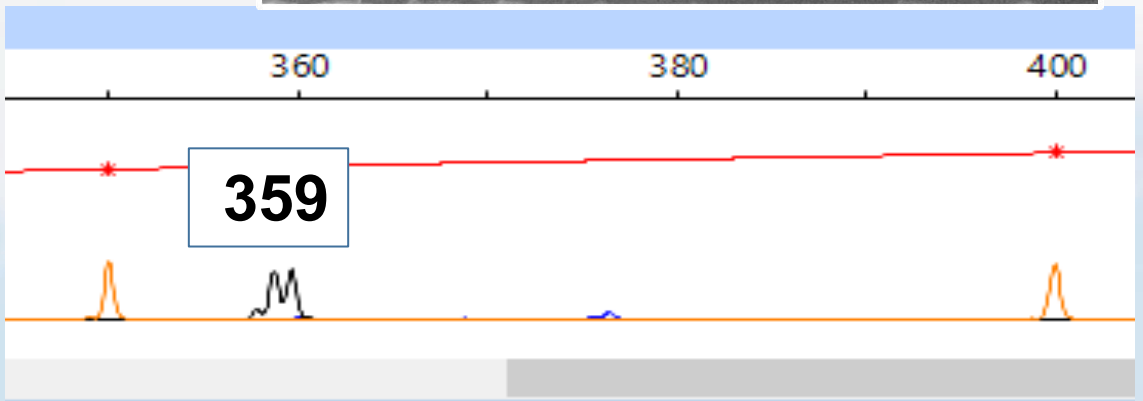

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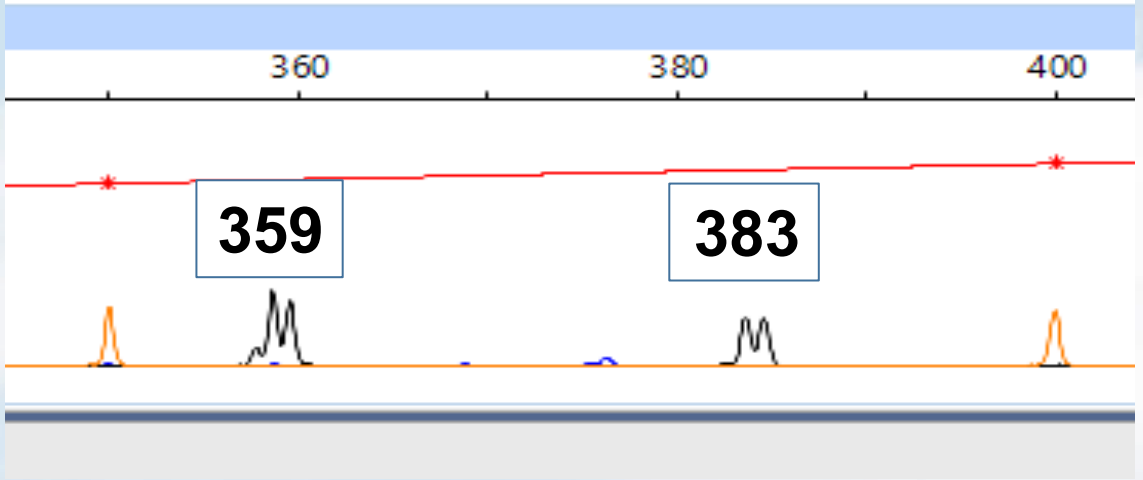
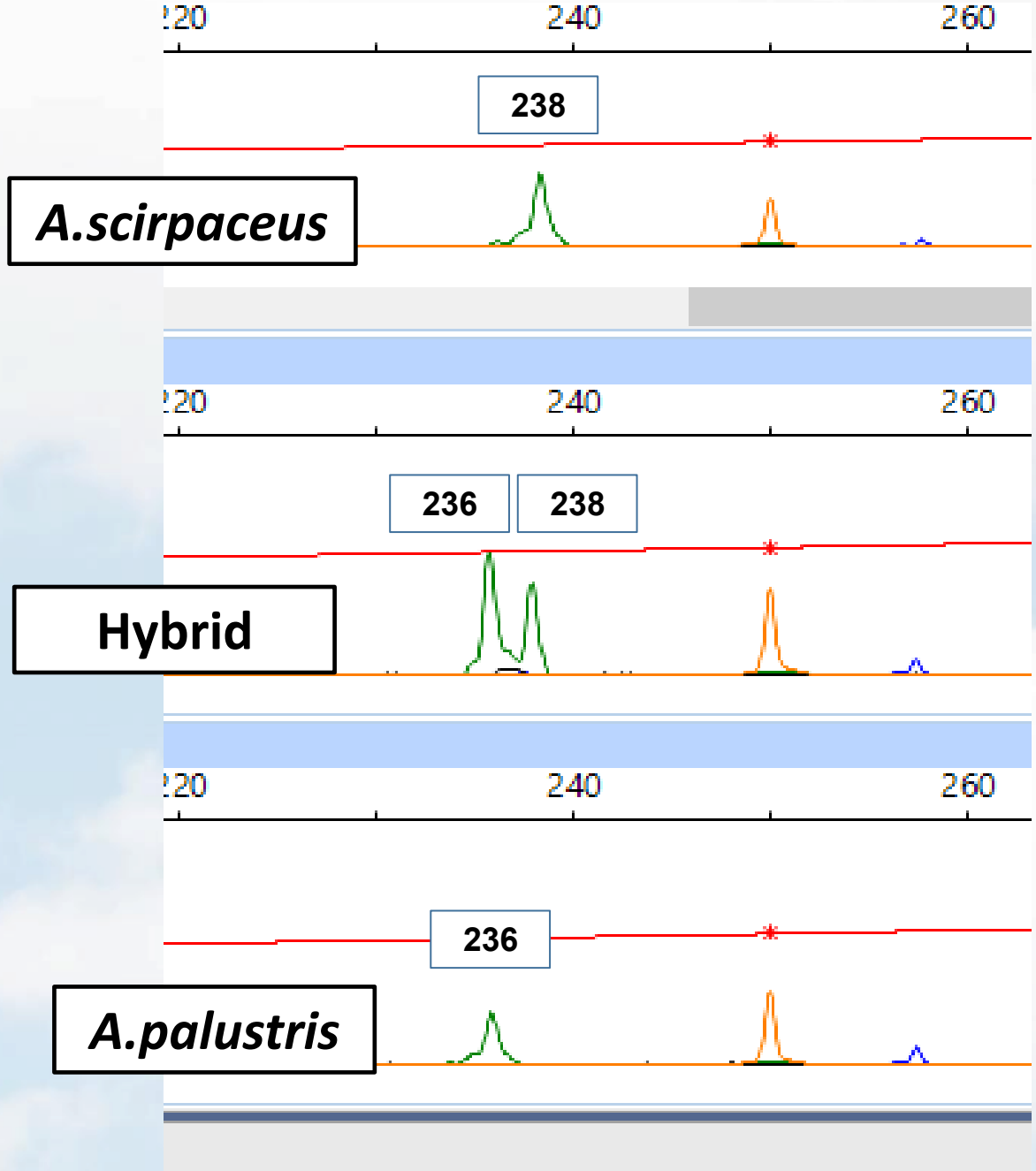


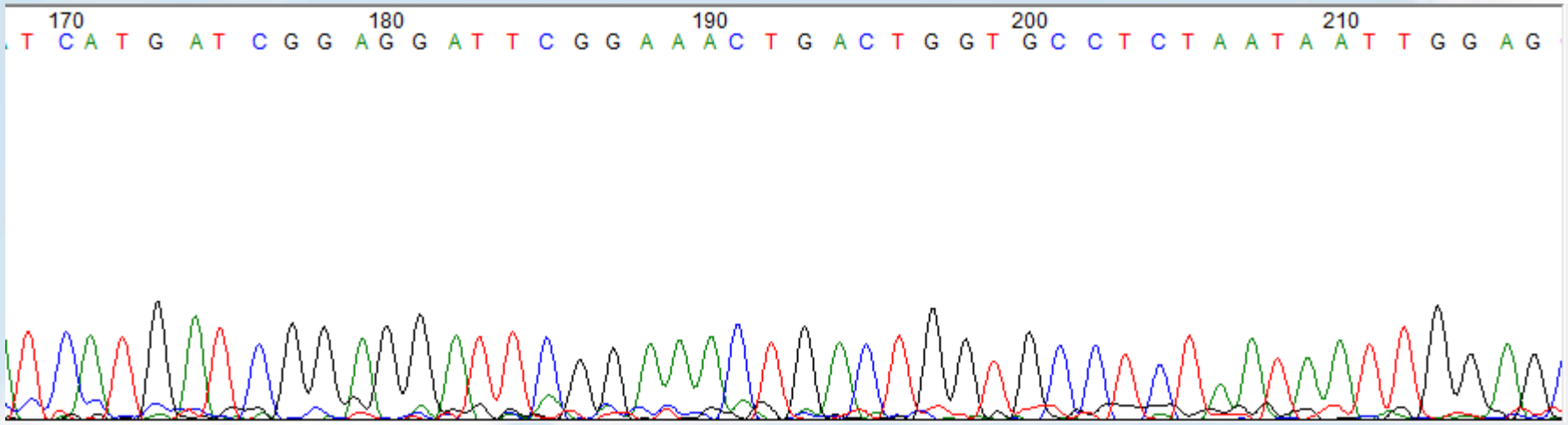
Results

- Green microsatellite loci: a difference of 2 bases was found between the two species.
- Sample size : 50 *A. palustris*, 70 *A. scirpaceus.*
- **5 hybrids confirmed**



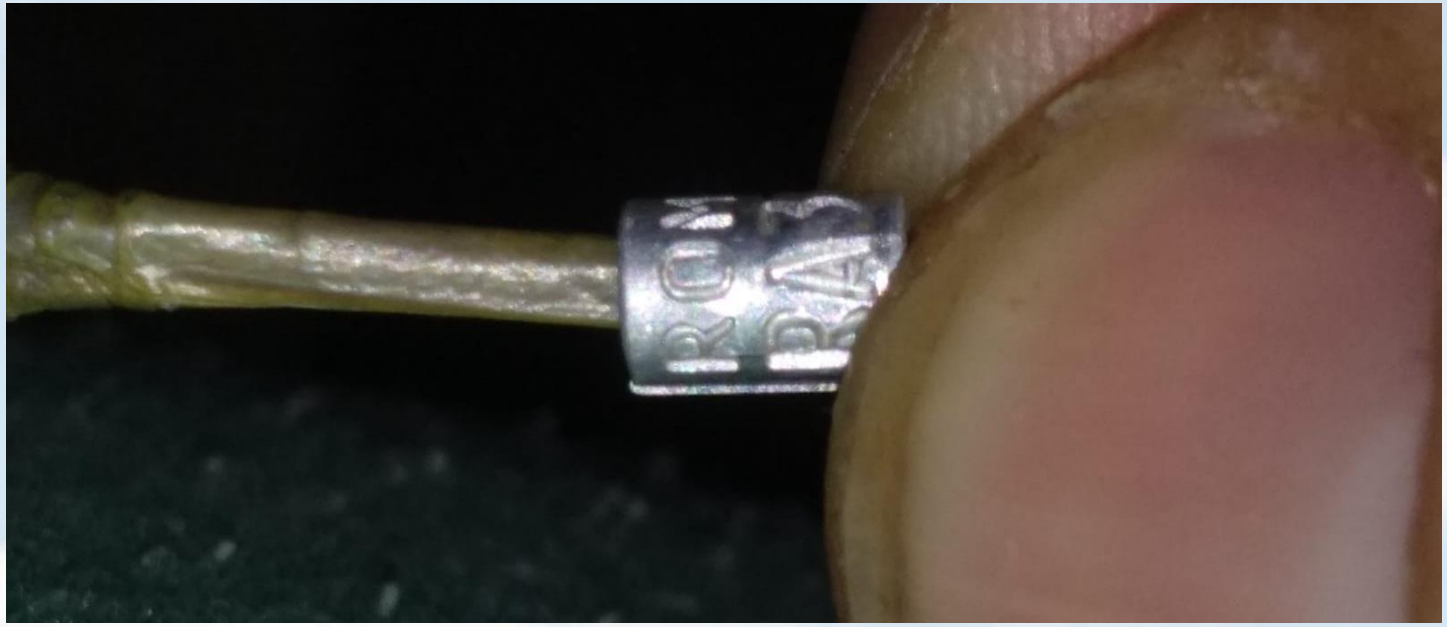
CO1 sequencing

- A full correlation between CO1 sequencing and microsatellite loci identification. (120 of 120)



Conclusions – comparison to ringing and in the hand data

- Several misidentifications were found
- none of those were hybrids
- 3 of the hybrids were caught in spring, thus showing high survivability



conclusions

- Hybridization exist (3% of sampeld individuals)
- Hybrids are fit and able to migrate.
- Hybrids do survive most of the migration route at the least.

Thanks -

- Ella Fishman
- Yoni Vortman
- Yaron Charka
- Yael Lenhardt
- Netanel Kave
- Rachel Ben-Shlomo
- KKL - JNF

KKL-JNF Wings

And Thank You All for listening!!!