Main challenges for red partridge mating in cage-free system: reproduction efficiency, pedigree recording, and management of genetic diversity

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Context

- Red partridges are usually housed in aviaries, except for the reproduction phase

- Couples mate in cages :

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Pedigree recording for genetic evaluation, management of genetic diversity	Citizens concern for animal welfare, use of cages could be banned

→ Need to assess if cage-free reproduction is feasible in a breeding scheme

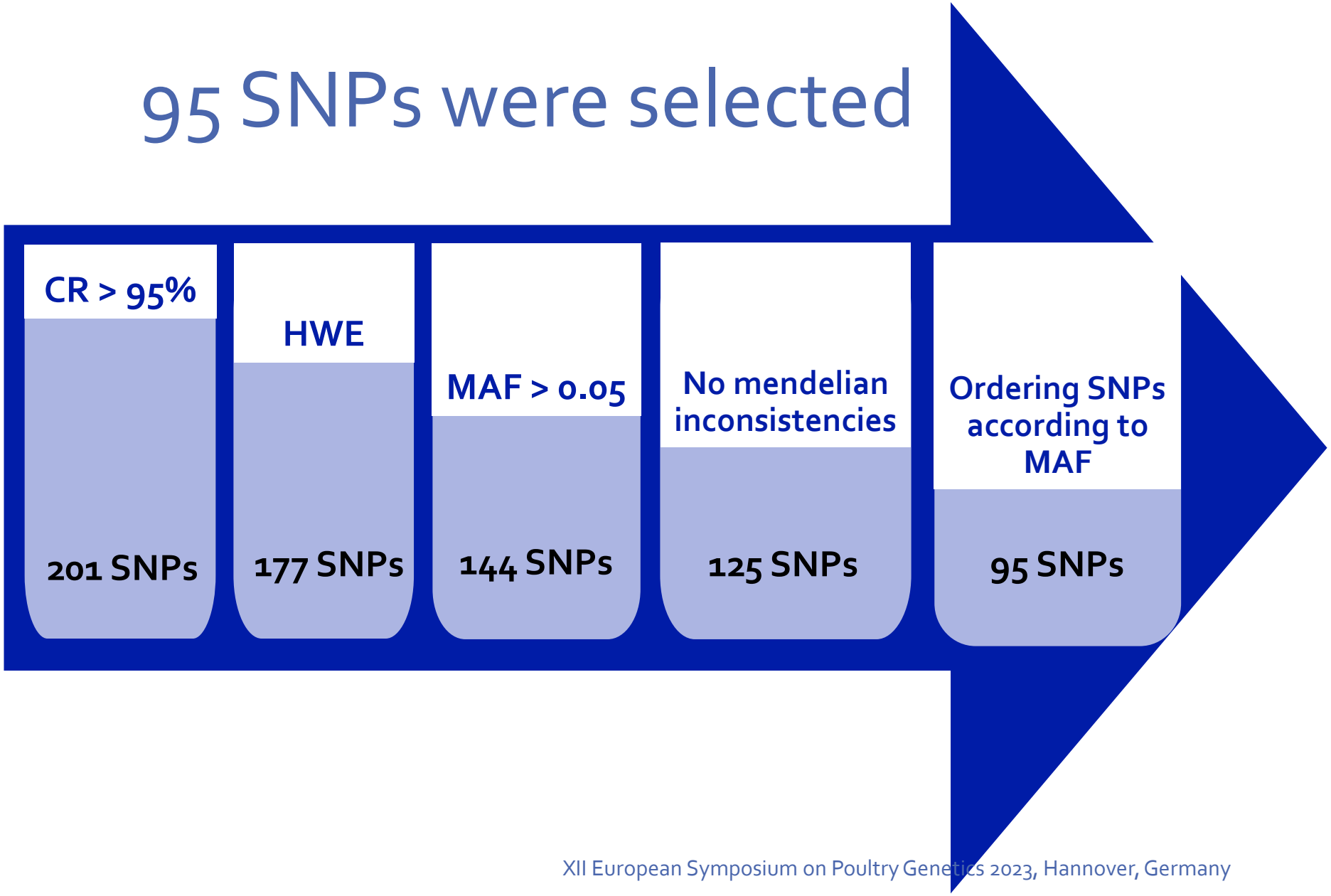
Objectives of RufAssign project

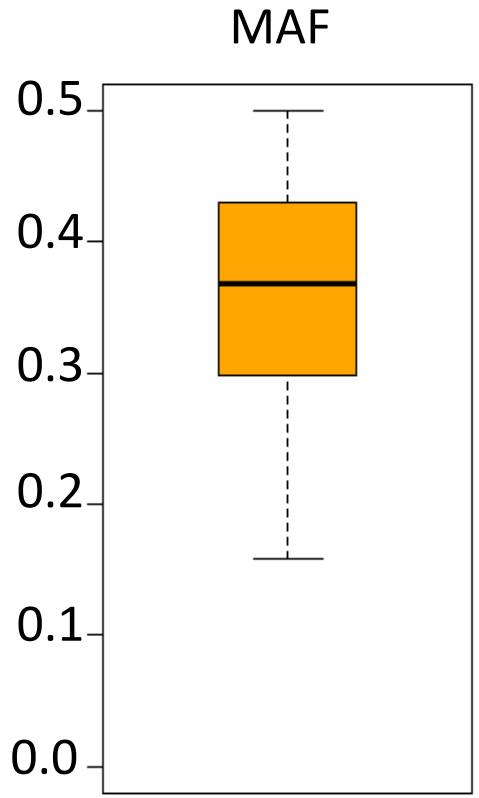
- Design and validate a SNP panel for parentage assignment
- Check if reproduction of red partridge is possible in aviaries
- Use parentage assignment to measure parents contribution to progeny with different sex-ratios and densities

Design of a parentage assignment panel

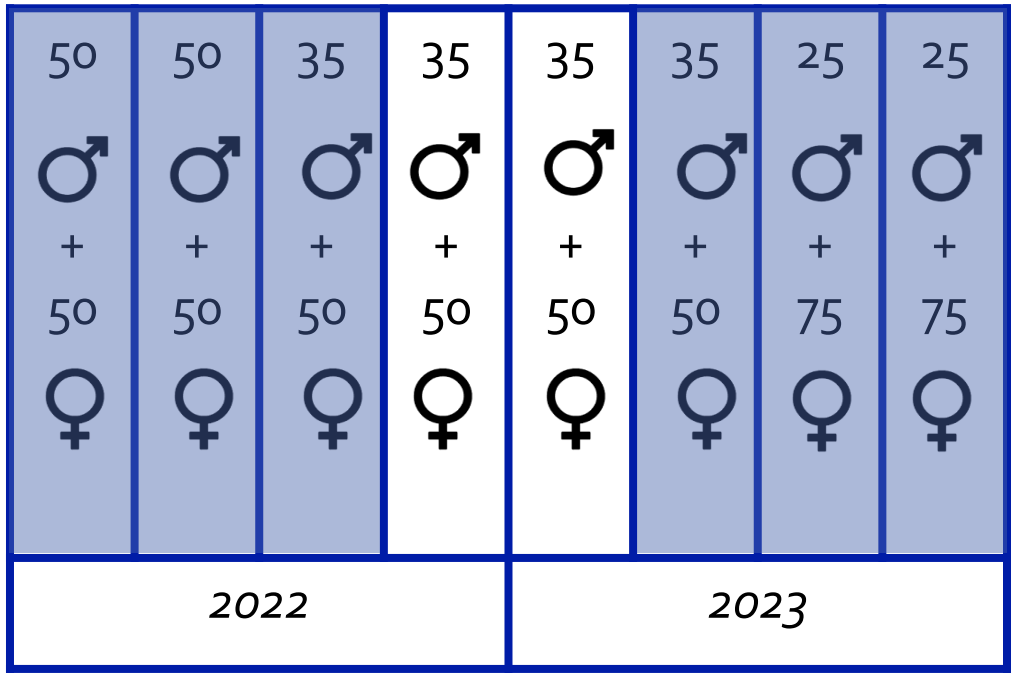
- 25 parent-progeny trios or duos were genotyped on 254 SNPs
- 95 SNPs were selected

95 SNPs were selected



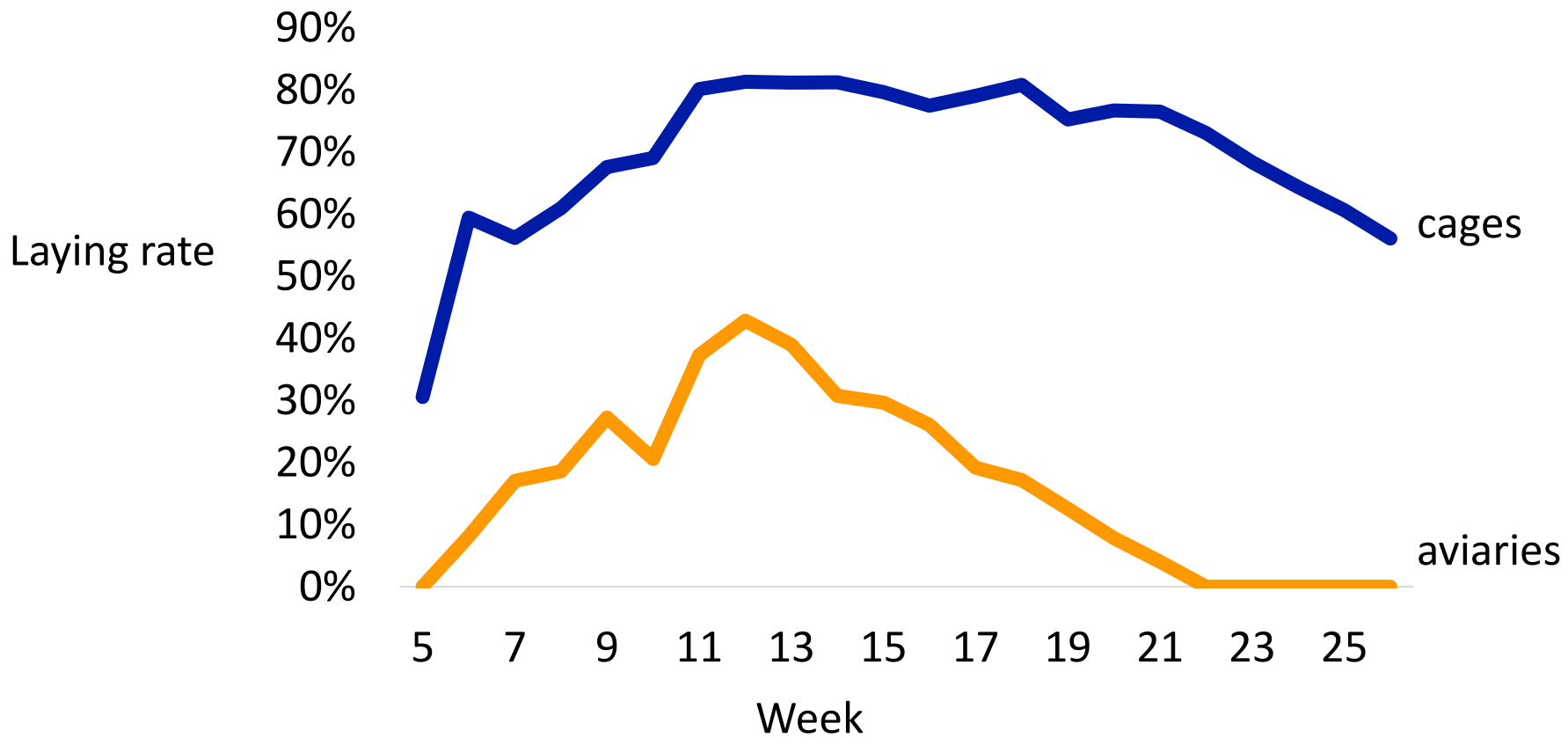


Breeding of red partidges in aviaries

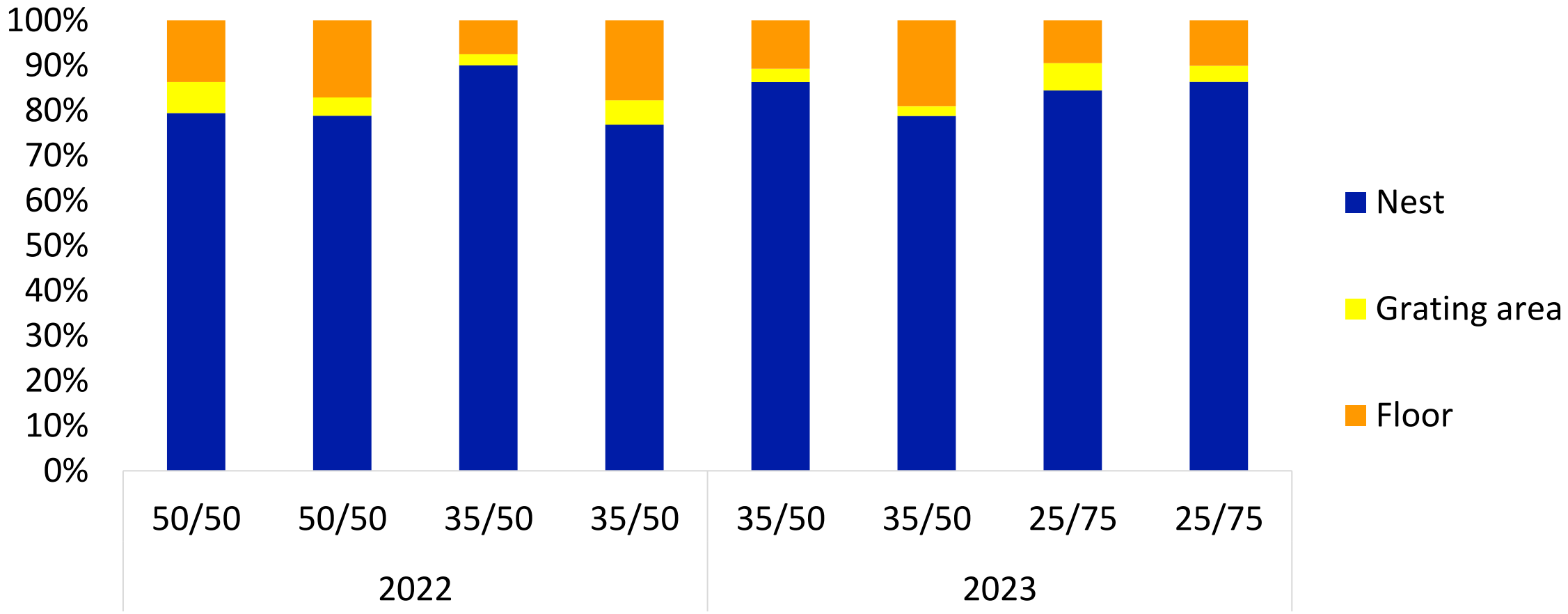


- Eggs were counted during the laying period
- Laying location was recorded
- Parents and progenies from 6 aviaries were genotyped on the 95 SNPs panel
- Parentage assignment was performed with APIS and reproductive success was observed

Laying rate was much lower in aviaries compared to cages



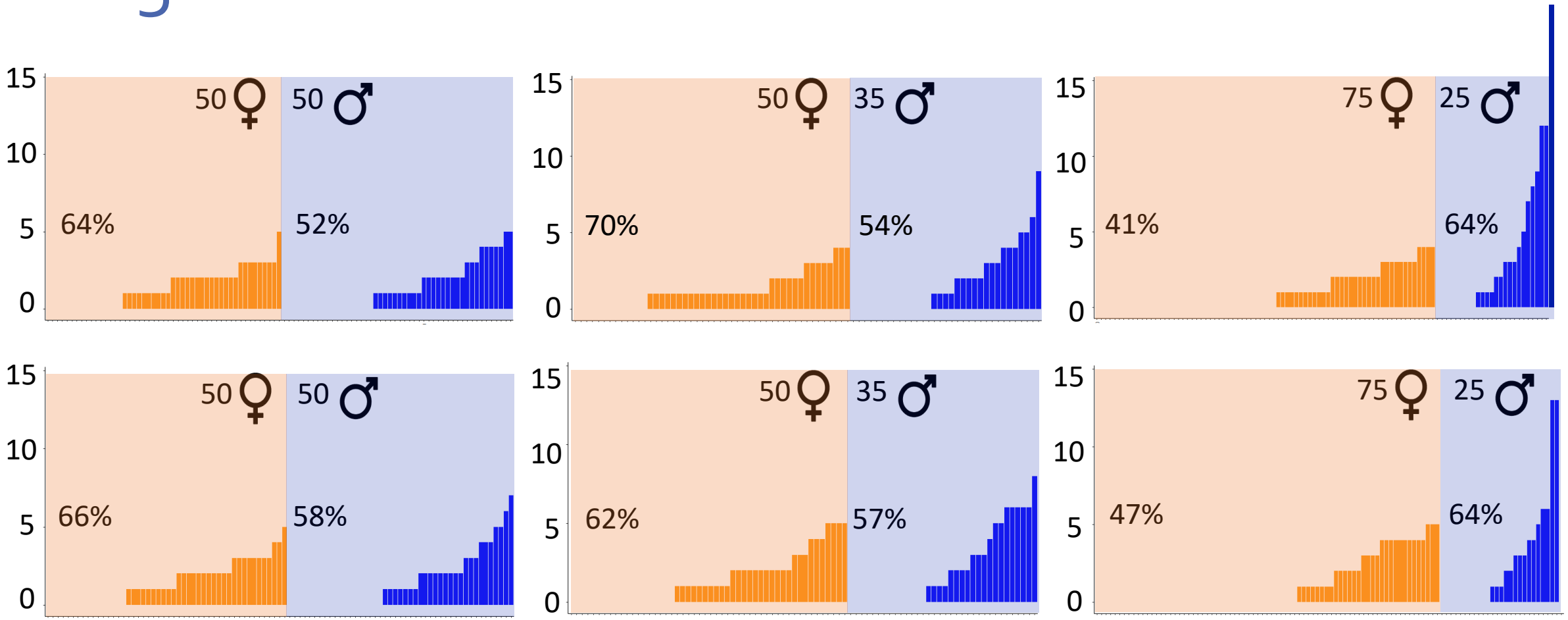
Most of the eggs were layed in nests



89% of offspring was assigned

2022	50	♂	+ 50	♀	88%
	50	♂	+ 50	♀	94%
	35	♂	+ 50	♀	88%
2023	35	♂	+ 50	♀	85%
	25	♂	+ 75	♀	92%
	25	♂	+ 75	♀	85%

Contribution of parents to the next generation was unbalanced



Breeding of red partridges in cage-free system will be challenging for the breeding scheme

- ✓ The 95 SNP panel reached **89% of parentage assignment** (with a few missing parents)
- ✓ Laying rate of red partridges bred in aviaries was **divided by two** compared to red partridges bred in cages
- ✓ Free mating leaded to an **unbalanced contribution** of sires and dams to the progeny

- Further work will be needed on cage free-systems to
  - improve laying rate
  - assess the consequences of free mating on genetic progress and genetic diversity

Thank you for your attention

- Funder
- Partner
- Genotyping

Red partridges were not monogamous in aviaries

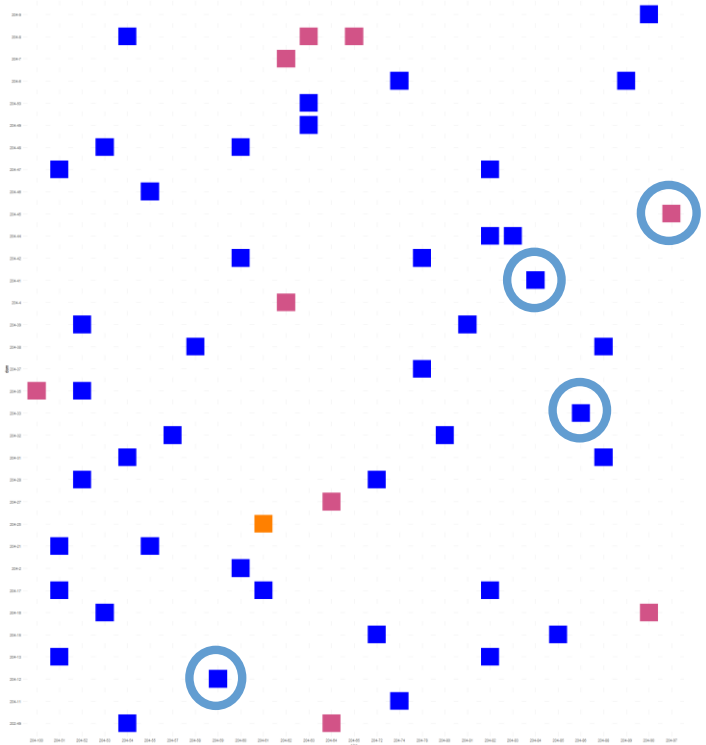
Number of offspring per couple

4

1

50 ♀ 50 ♂

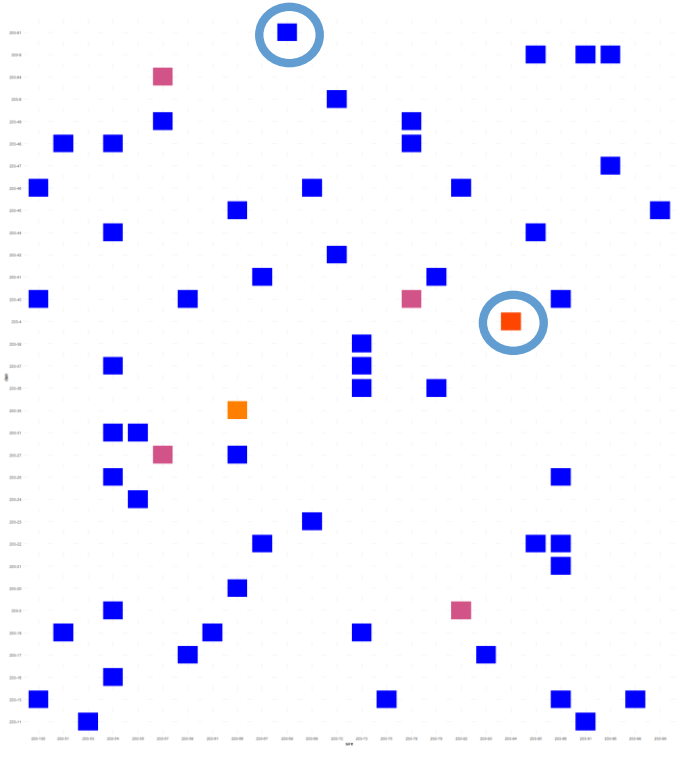
Dam



Sire

50 ♀ 50 ♂

Dam



Sire