Regent Honeyeater, Whiplash

Jeongwoo Park

Report 2 of 3

Report 2

2. Whiplash: Sad Natural History for Meme Bottleneck

2.1. Theoretical Backgrounds & Things Going on

In his steady seller book The Selfish Gene in 1976, renowned british evolutionary biologist Richard Dawkins proposed the term of meme. Meme is cultural trait that replicate itself just like the gene of the organisms behave. Dawkins proposed that evolution is the general theory that can be applied to all kinds of self-replicators. Initial 'model' Dawkins considered as examples were the human one: language and the 'religion', which were often considered his lifelong enemy. Up to today, there are several evidences that show Dawkin's insight was not wrong, including phylogenetic-perspective approach to the language origins and/or adaptive physiological approach to the convergence of the religion (Dunn et al., 2005).

After revolution of the ethology field by Jane Goodall and colleagues, the emerging field of 'meme evolution' colonized by Dawkins is now expanding toward the 'meme evolution' in animals. For this field of 'animal meme evolution', birds are one of the most well-investigated groups, coining for their song and nest-building characters. For example, Breen and his colleagues show the cultural transmission between generation of nest metarial use in the Zebra Finch (Taeniopygia castanotis) with elegant experiment involving different colors of straws (Breen et al., 2020).

The significance of the extinction story of Regent Honeyeater lies in the unique natural experiment reporting their cultural, 'meme' collapse. Like other songbirds, this species also learn and adjust its song template in its juvenile 'sensitive period'. In this period, individuals are kicked off from the natal territory and disperse, so they learn their songs from other neighboring male singers. However, due to the extremely low density of conspecifics in Blue Mountains Area, juveniles in sensitive periods did not find appropriate tutors and ended up developing an incomplete version of the song, which is called "Clipped Blue Mountains Song" (Crates et al., 2021). As the female preference is tuned with complete, complex cultural norms in the area, these males experience significant fitness cost of breeding, which in turn potentially results in general decrease in population growth, effective population size and cohesion in population scale (Crates et al., 2021). This story is just in parallel with an evolutionary event of 'genetic bottleneck', so can be called as "Meme Bottleneck". Moreover, according to Dr. Ross Crates, recently the male fitness of the clipped song rise steadily, indicating even worse: females don't have more options (Crates, 2024, Pers. Observ.).

On the other hand, Similar events also happened in the Taronga zoo, where the reproduction and reintroduction program taking place. While luckily avoiding the catastrophic genetic drift, they face the emergence of a weird 'zoo song'. Moreover, the examination of Ross's team demonstrates the preference of zoo-bred females also has some problems. They prefer zoo song singers rather than wild song singers, which creates a potential pre-mating reproductive barrier between wild and reintroduced individuals (Appleby et al., 2023).

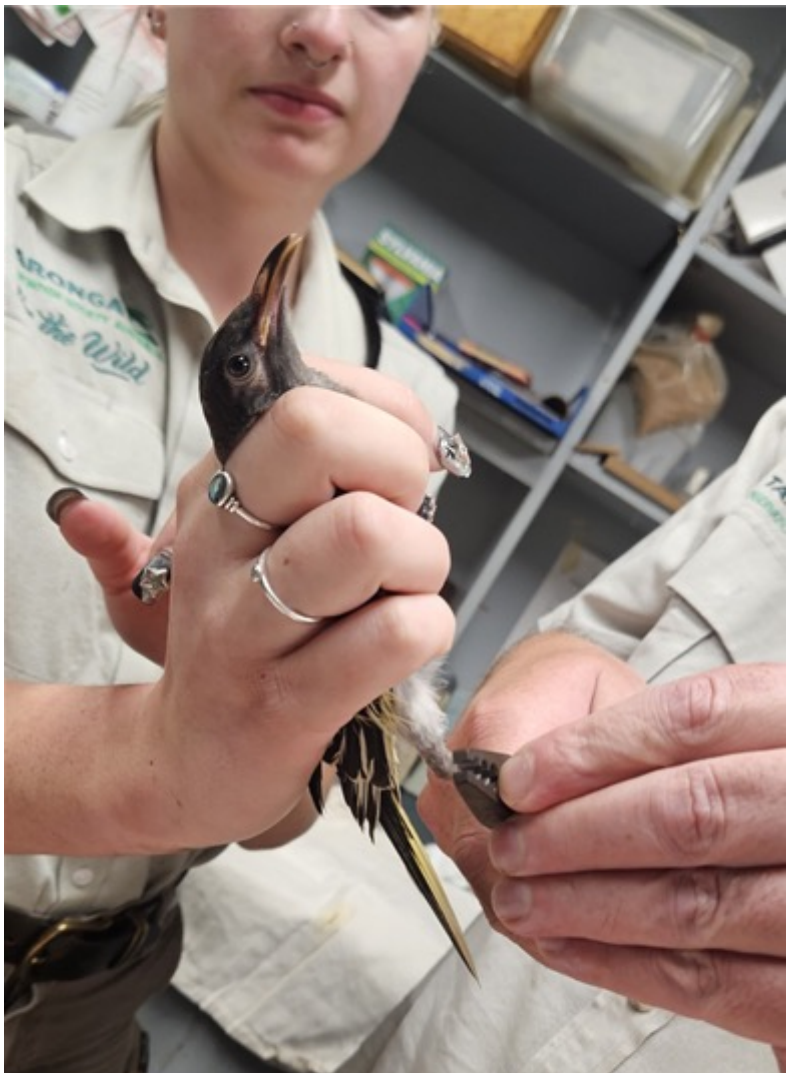
After finding this problem, fixing it had been a major challenge to the Regent Honeyeater keepers in Taronga. As juvenile 'copy' the neighboring male's behavior, they had to put good singers as tutors for juveniles. Luckily again, they could capture and introduce 3 wild song individuals to the zoo, who are the first 'founders' of the songs. In zoo. Starting from them, the zoo is teaching 'wild song' not only to the bird-to-release but also to individuals not subject to release – as next-generation tutors. Moreover, although it's only male that 'sing', they also teach female juvenile proper song because Ross's team's research indicates female prefer the song that they exposed in juvenile.

Practically, in the first periods of their tutoring, the zoo put one tutor for 7-8 tutees, but it didn't work because tutees overwhelmed the single tutor by number. Now, they adjust the ratio to 4 juveniles per 2 tutors, with providing playback of wild song (by doing so, they trick juveniles into pretending the playback is from the tutors), which up to now, seemed to be in great success.

Now, Zoo coordinators with Ross's team are thinking beyond the simple 'teaching'. The next objective is to testify the idea of reintroducing 'wild song before meme drift' to wild population nowdays using zoo individuals as vectors.

2.2. Overview to Behind-the-scene

Although not planned by the program, we directly requested an interview with Dr. Ross Crates on the second day of the project (Wednesday). Fortunately, he was at NSW University and asked us to meet on Thursday. However, that embarrassed us because there was a plan for Thursday to visit a national park. After a day of e-mail contact, we eventually made a meeting in the NSW University Library Entrance Friday. Dr. Ross was a really nice guy, younger than we expected and more passionate about the interview. I'm disappointed we can't cover all comment of him in the format.



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