



**Supplemental Figure S5. Down sampling.** (A) Graph of % ECE in different species downsampling combinations, showing which survive statistical support in the downsampled group. Testing selective regime using a single oscine species shows that oscine clade ARs are much more likely to be accelerated than the universe of non-learner conserved elements. (B) We further tested the impact of increasing the number of species sampled by testing the selective regime recovered from analyses of 1-6 oscines. Because there are a very large number of possible combinations we began with a crown lineage (White Throated Sparrow) and then added the most divergent species not yet included (in order: White Throated Sparrow, Satin Bowerbird, American Crow, Tibetan Ground Tit, Collared Flycatcher, Zebra Finch). We found that with 4 species, all of the oscine clade ARs were accelerated but that power continued to increase as more individuals were added. (C) Test of the impact of removing outgroup species from the analysis. We compared the sequential removal of 1-5 of the nearest relatives non-learning of oscines and 1-5 randomly selected other Neoaves (sequentially Common Cuckoo, American Flamingo, Killdeer, Hoatzin, Chuck Will's Widow). Removing near relatives of oscine songbirds had a much greater impact on power to detect significant acceleration than removing more distantly related species suggesting that near relatives of the clade being tested exert a greater influence on the analysis.