

Description of Additional Supplementary Files

Supplementary Data 1. Publications per year mentioning *Anolis sagrei* or *A. carolinensis*.

Supplementary Data 2. Completeness and Contiguity of preliminary and final assemblies of *Anolis sagrei*

Supplementary Data 3. Completeness and contiguity of *Anolis sagrei* and other lepidosaur genome assemblies

Supplementary Data 4. Annotation Summary Statistics

Supplementary Data 5. *Anolis sagrei* Jukes/Cantor and Kimura substitution levels adjusted for CpG sites. Weighted average Kimura divergence for each repeat family

Supplementary Data 6. *A. carolinensis* Jukes/Cantor and Kimura substitution levels adjusted for CpG sites. Weighted average Kimura divergence for each repeat family

Supplementary Data 7. Chromosomes assigned to chromosome 13 (the ancient X) in *A. carolinensis* in previous publications and inferred in this study. Checked boxes represent scaffolds found in given study.

Supplementary Data 8. Sequence homology between AnoSag2.1 scaffold 7 and AnoCar2.0 as inferred by Satsuma

Supplementary Data 9. Sampling information for *A. sagrei* used for sex chromosome identification.

Supplementary Data 10. Position of *A. sagrei* homologs of *A. carolinensis* X-linked genes

Supplemental Data 11. Summary of X chromosome synonymous and non-synonymous sites as well as genes per 50kb sliding windows.

Supplemental Data 12. Summary of X chromosome SNPs and Indels per 10kb sliding window.

Supplemental Data 13. X chromosome GWAS results for male/female identity

Supplementary Data 14. Raw sequencing read data used for assembly

Supplementary Data 15. Comparison of AnoSag2.1 scaffold size and chromosome sizes estimated using measurements of chromosomes imaged in Figure 1C, Giovannotti et al. 2017

Supplementary Data 16. Window analysis of ddRAD inferred SNPs