BACKYARD EVOLUTION- A CITIZEN SCIENCE PROJECT TO TRACK SEASONAL EVOLUTION AND METAPOPULATION STRUCTURE IN FLY COMMUNITIES IN BACKYARD COMPOST PILES. Megan Stephenson1, Megan Delamont1, Abigail Hayes1, Joaquin Nunez2, & Alan Bergland1, 1University of Virginia and 2University of Vermont. *Drosophila* species living in temperate environments adapt as they evolve to temporal and spatial changes in selection pressure. Contemporary work on adaptive tracking and local adaptation in flies has focused on samples collected from orchards, predominantly from wind-fall fruit. Orchard populations are likely large, permanent and may be subject to temporally varying selective pressures unique to that habitat type, such as pesticide usage. Another habitat for many drosophilids are compost-piles, such as those found in backyards and gardens. This habitat likely harbors smaller and more ephemeral populations that may be subject to different selection pressures than flies from orchards. To test this hypothesis, we initiated Backyard Evolution, a citizen science project to sample flies from backyard compost piles throughout the year. We recruit volunteers primarily from demonstrations at Master Gardeners clubs throughout central Virginia, although volunteers from across the USA have contributed. Backyard Evolution has been running every summer since 2020. In total, we have worked with 45 volunteers, and collected over 56,000 flies from over 14 species. These samples will be combined with seasonal sampling at multiple orchards throughout central Virginia. We show that the community composition of orchard and compost pile samples are different, with more species present in compost piles than in orchards. We will be conducting whole-genome resequencing of samples from selected species to test for: (1) adaptive differentiation between orchards and compost piles; (2) differences in population persistence and turnover between species and habitat types; and (3) signals of parallel seasonal evolution in highly divergent *Drosophila* species. Backyard Evolution is always taking new recruits so stop by if you would like to learn how to participate. This work was funded by NSF CAREER grant #2145688, awarded to AOB. Author contact: [jdj6eu@virginia.edu](mailto:jdj6eu@virginia.edu).