Thoughts on GDD – We can use growing degree days to show few things and deal with the reviewers who focus on phenology. At our site, 2023 was obviously warmer than average, we find this whether we look at GDD or just mean temperature. We also see that the GDD before the date of the last freeze hasn’t changed since 1980. This means that the amount of warmth trees experience before the last freeze doesn’t seem to increase or decrease through time. If it had increased, then that would suggest phenology could be advancing (because it is forced through GDD) while late spring frost hasn’t changed.

A graph of a number of years

Description automatically generated

Accumulated growing degree days since January 1st for study years (2022 – dotted, 2023 – dashed) and long-term average from 1980-2021 (solid lines with SD[gray shaded area). 2023 being warmer than 2022 and long-term average. 2022 being a pretty average year.

A graph showing the number of years

Description automatically generated

Accumulated growing degree days up until the last freezing date since 1980. For each year I found the last day with a 0C temperature and then calculated GDD up until that date.

We can relate phenology to GDD but we shouldn’t make this a main point of the paper. The figure below summarizes how phenology of stage 2 and 3 for each species varies with year and GDD or julian day. 

GDD (top row) and Julian Day of year (bottom row) for phenophases 2 and 3 for each species in each sample year.