

**Phenology/Degree-Day Model - July 2023**  
 by Len Coop, Oregon IPM Center, Oregon State University  
 Grasshoppers (general species)  
 Pests of rangeland, grasses, some crops  
 Goal: Implement a long-used APHIS PPQ model that applies to numerous univoltine grasshopper species in the Western USA.

Source 1: This model is purportedly based on material in a book by Robert E. Pfadt on grasshoppers. I have not tracked down this information, but the legend in the example APHIS PPQ SAFARIS FO map includes sufficient info

**Grasshopper Developmental Degree Days Accumulated**

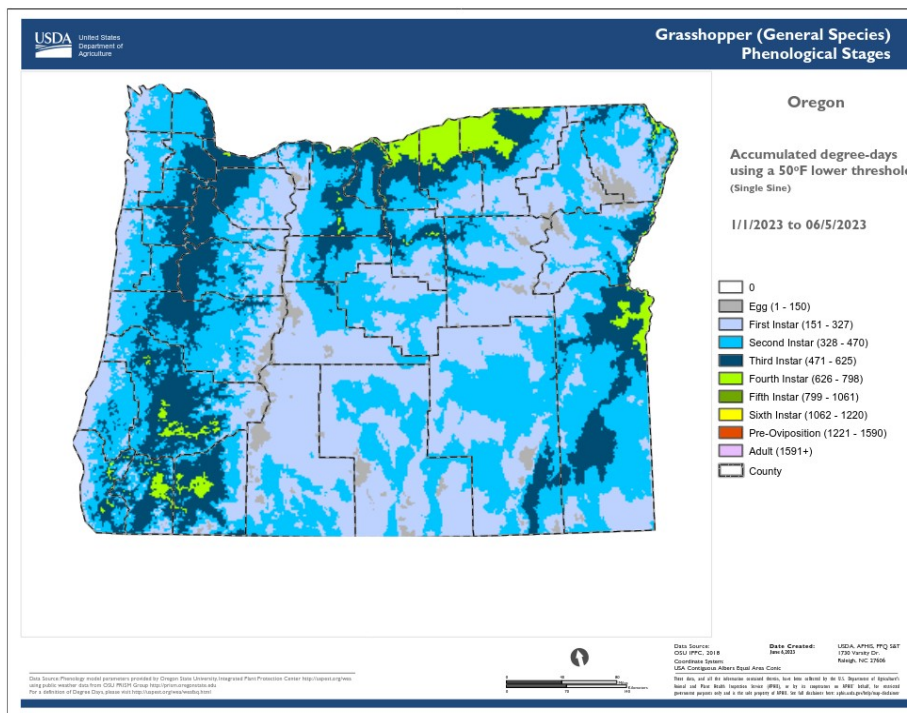


Fig. 5. The accumulation of thermal units up to 05 June 2023 is based on a 50 °F base threshold and is a generalized model for all species of grasshopper.

**Model: Generalized grasshopper species; abbrev: ghg**  
**Start date: Jan 1**  
**Calculation method: Single Sine**  
**Extension link: <https://pnwhandbooks.org/insect/hay-pasture/rangeland/rangeland-grasshopper>  
<https://ars.usda.gov/grasshopper/>**  
**Lower threshold: 50 (F), 10 (C )**  
**Upper threshold: 100 (F), 37.8 (C ) (nominal)**

Stage	<u>DDs F50</u>	<u>DDs C10</u>
Eggs in soil	75	42
First egg hatch, 1st first instars	151	84
1 <sup>st</sup> second instars	328	182
1 <sup>st</sup> third instars	471	262
1 <sup>st</sup> fourth instars	626	348
1 <sup>st</sup> fifth instars	799	444
1 <sup>st</sup> sixth instars	1062	590
1 <sup>st</sup> adults (pre-oviposition)	1221	678
Adults	1591	884