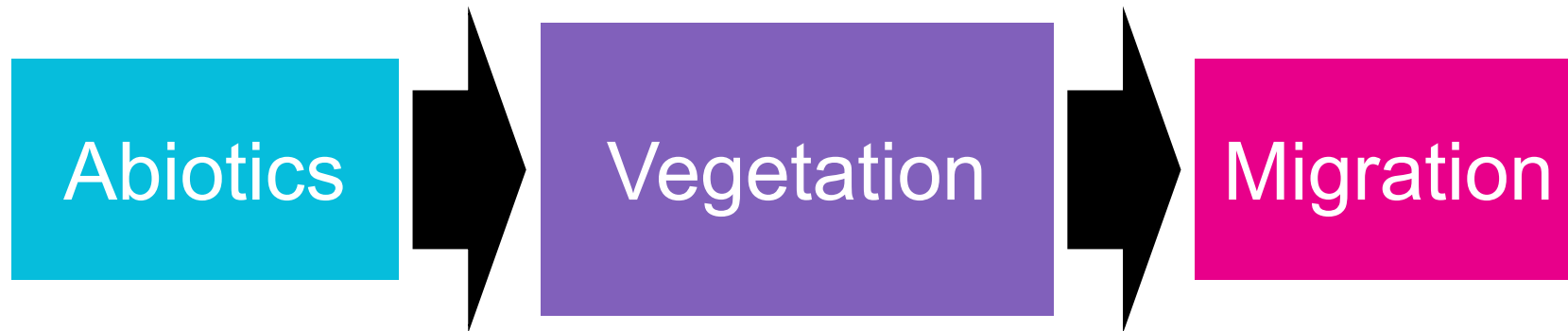


Beet Leafhopper Migration Warning System



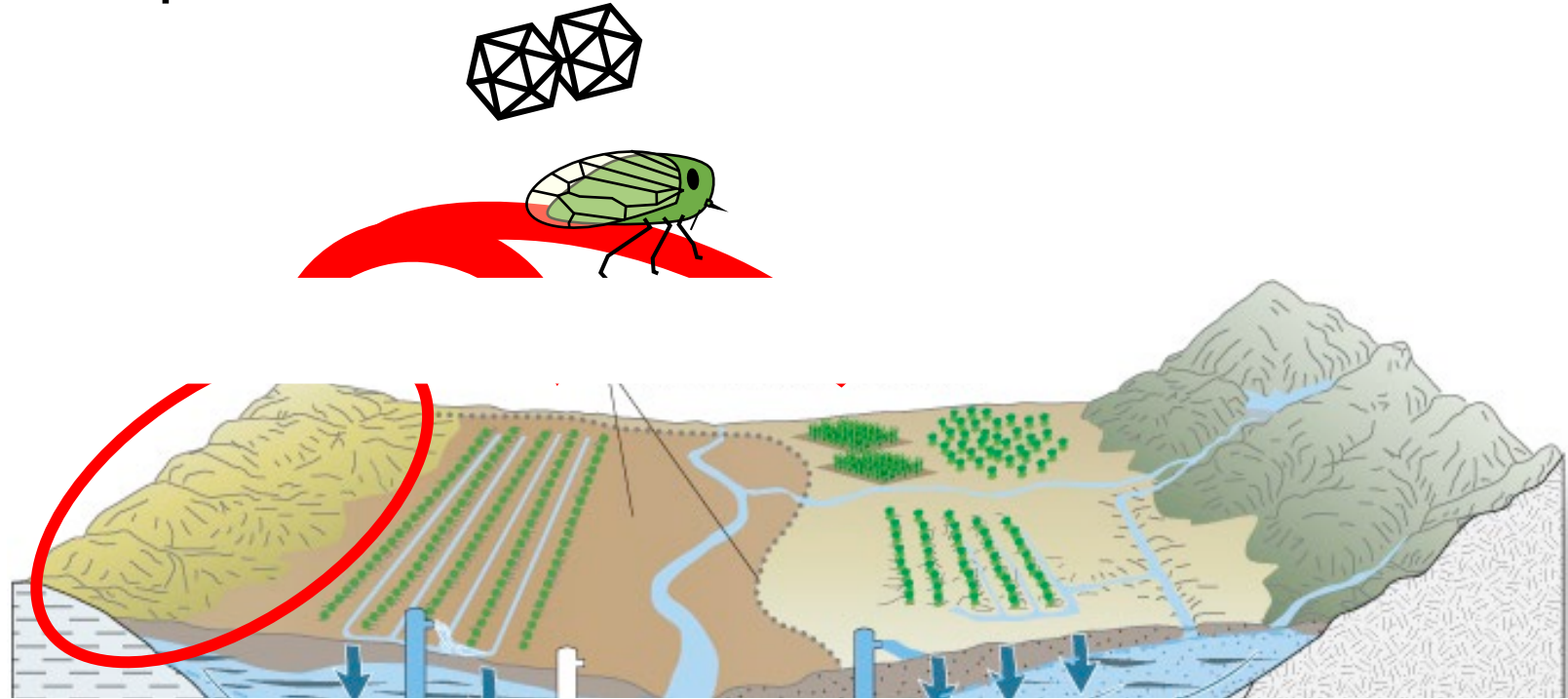
11/10/2021

Hyoseok Lee

Nansen Lab, UC Davis

Movement of BCTV

- In California, beet leafhoppers overwinter in nonagricultural areas and migrate into crop fields



Vegetation in the foothills

Winter



Spring

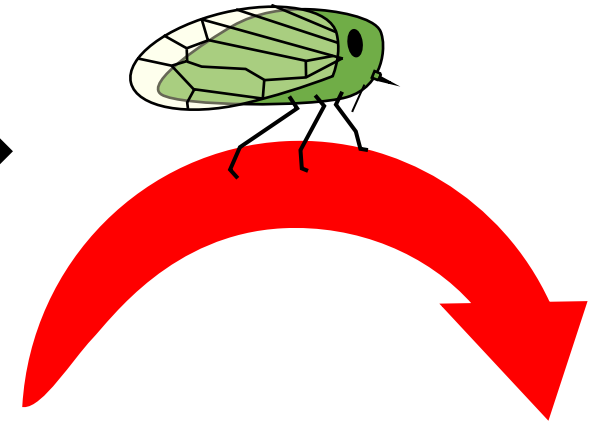
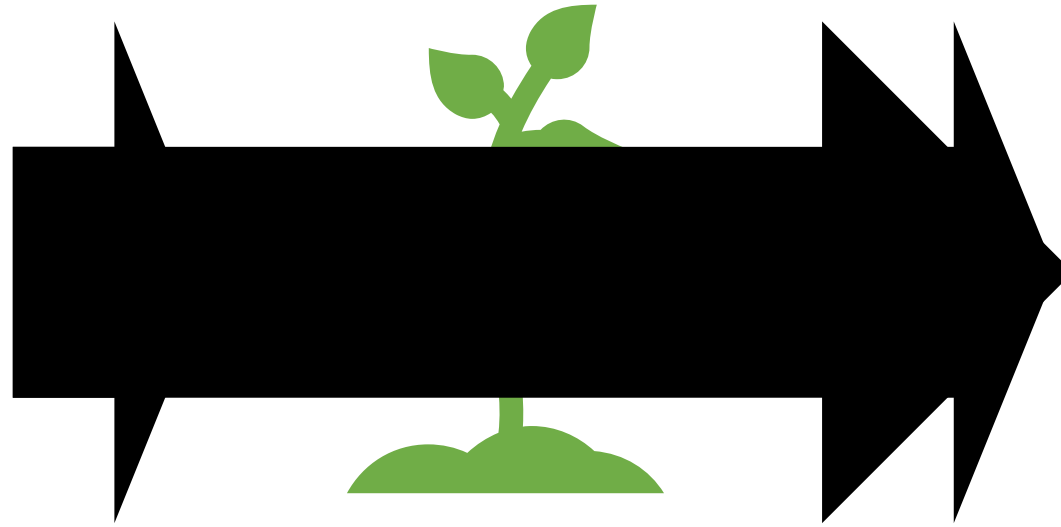
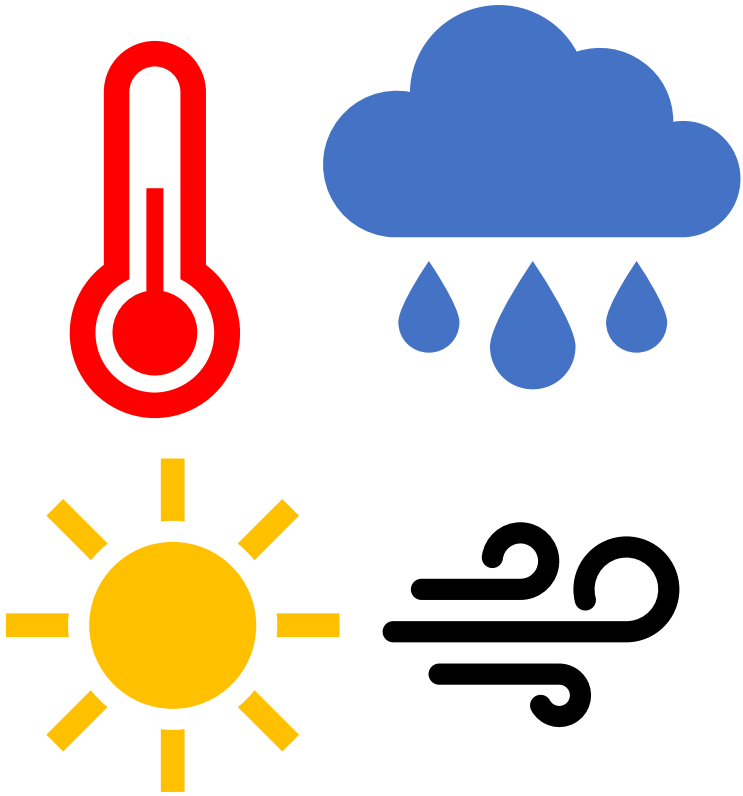


Predicting migration time

Abiotic factors

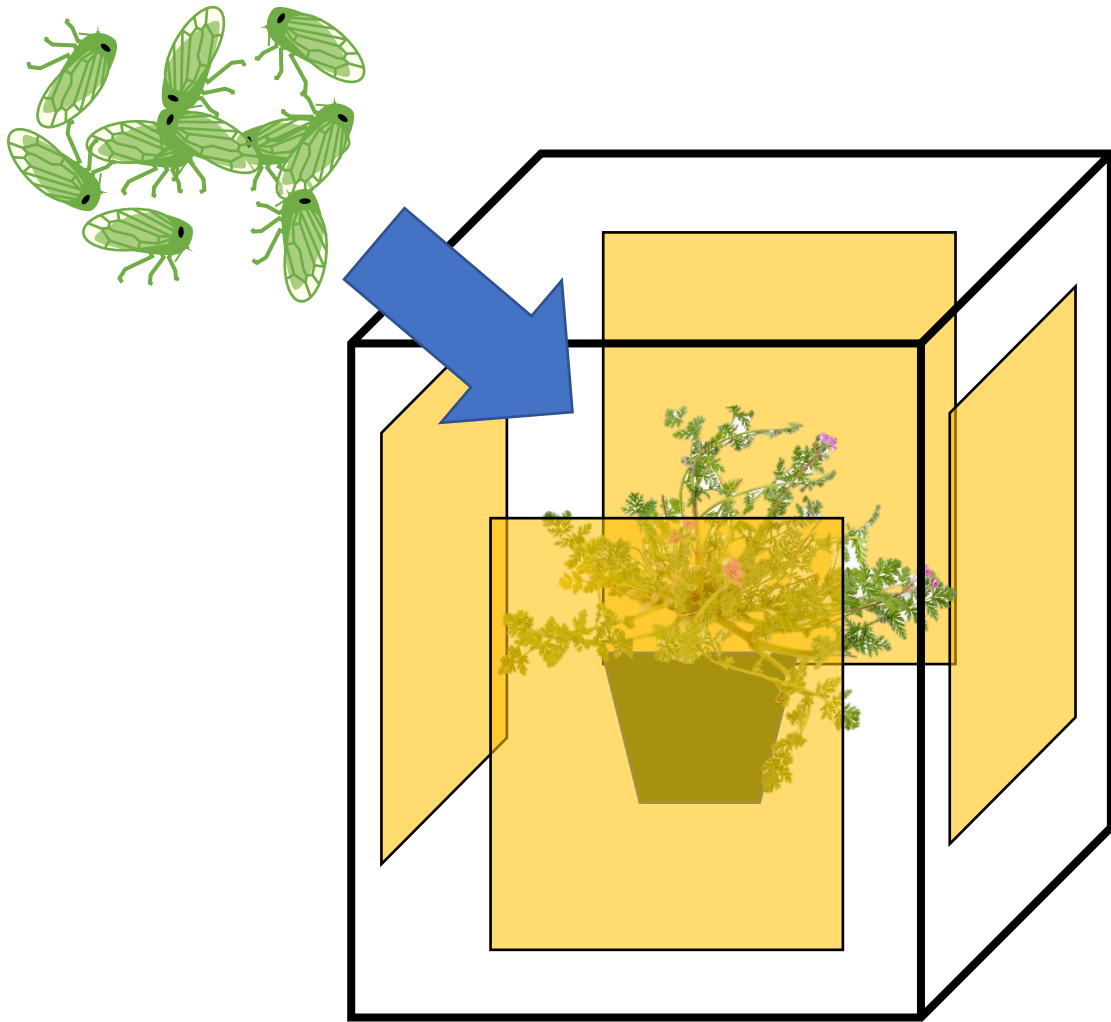
Vegetation

Migration



Temperature, precipitation, daylength ...

Flight propensity experiment (greenhouse)



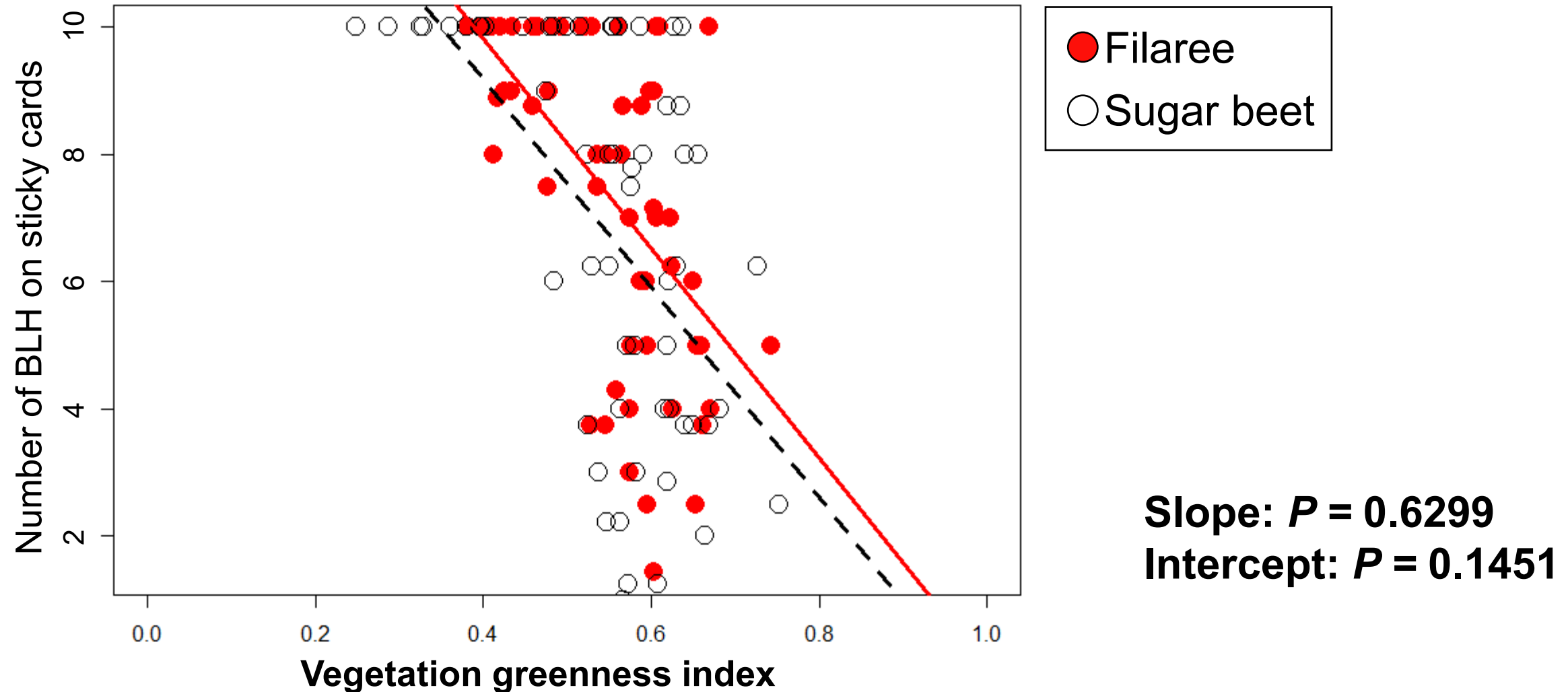
Filaree



Sugar beet

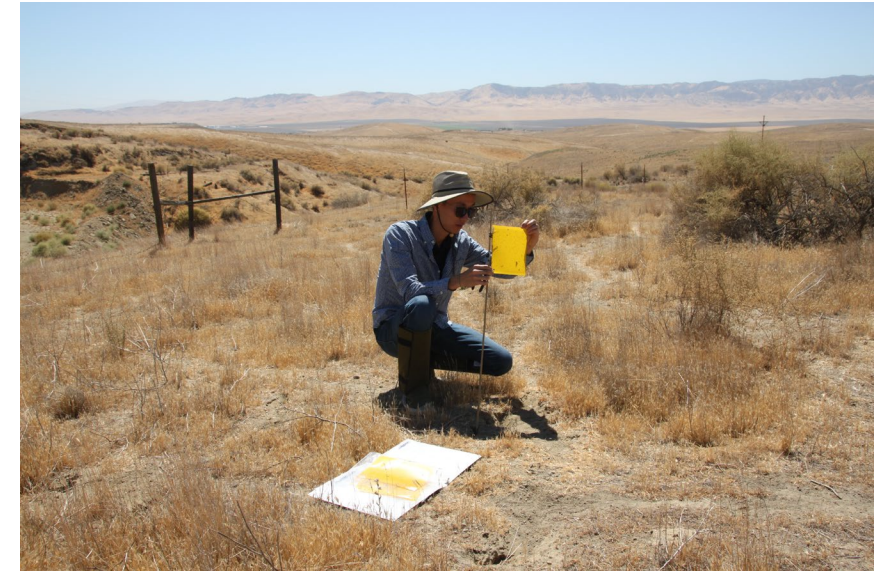


Flight propensity experiment (greenhouse)



Field monitoring

Sticky traps

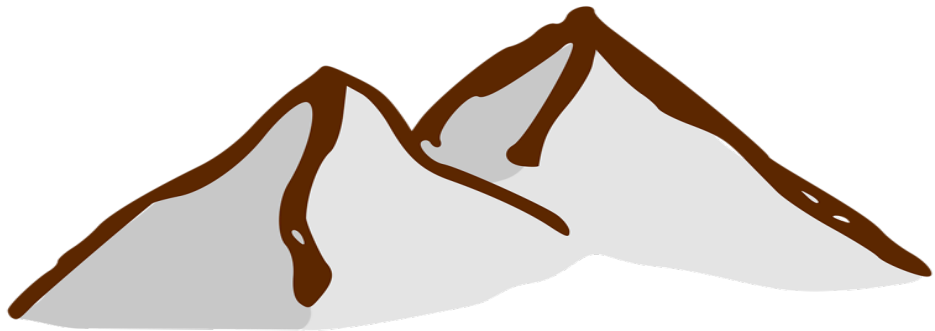
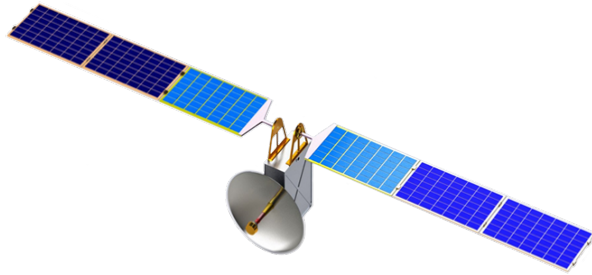


Beet
leafhoppers

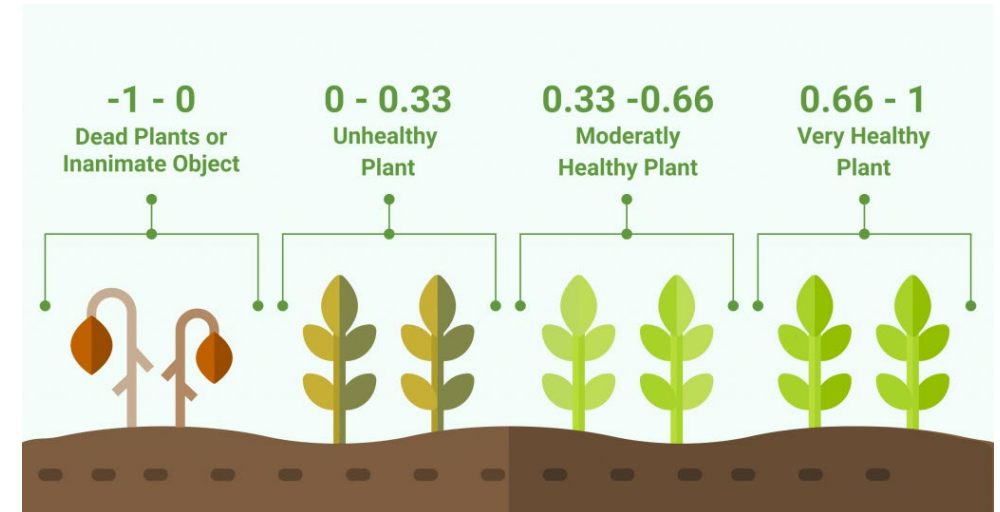
Field monitoring

Quantification of vegetation in the foothills

Satellite Imagery



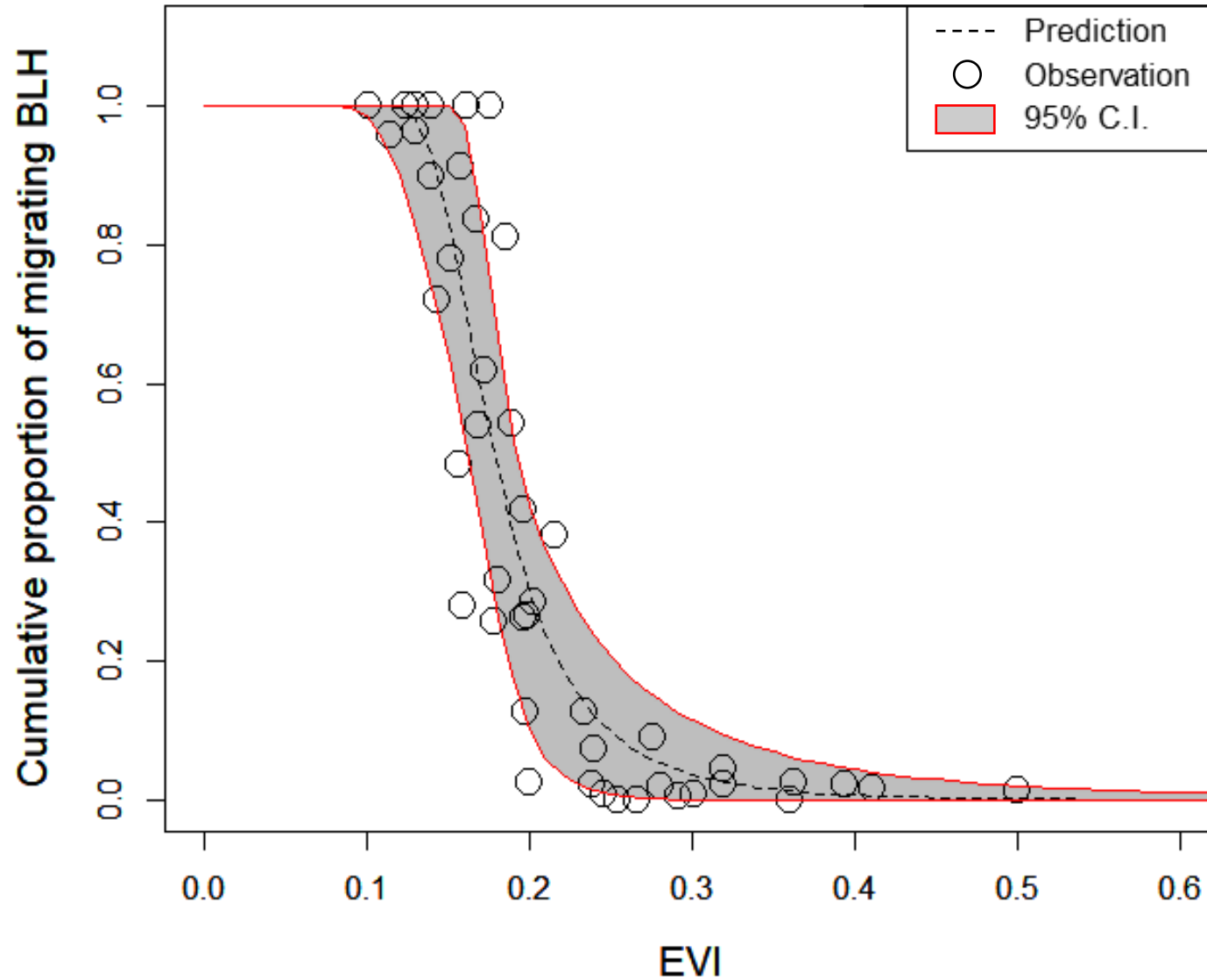
Foothills



Vegetation Index

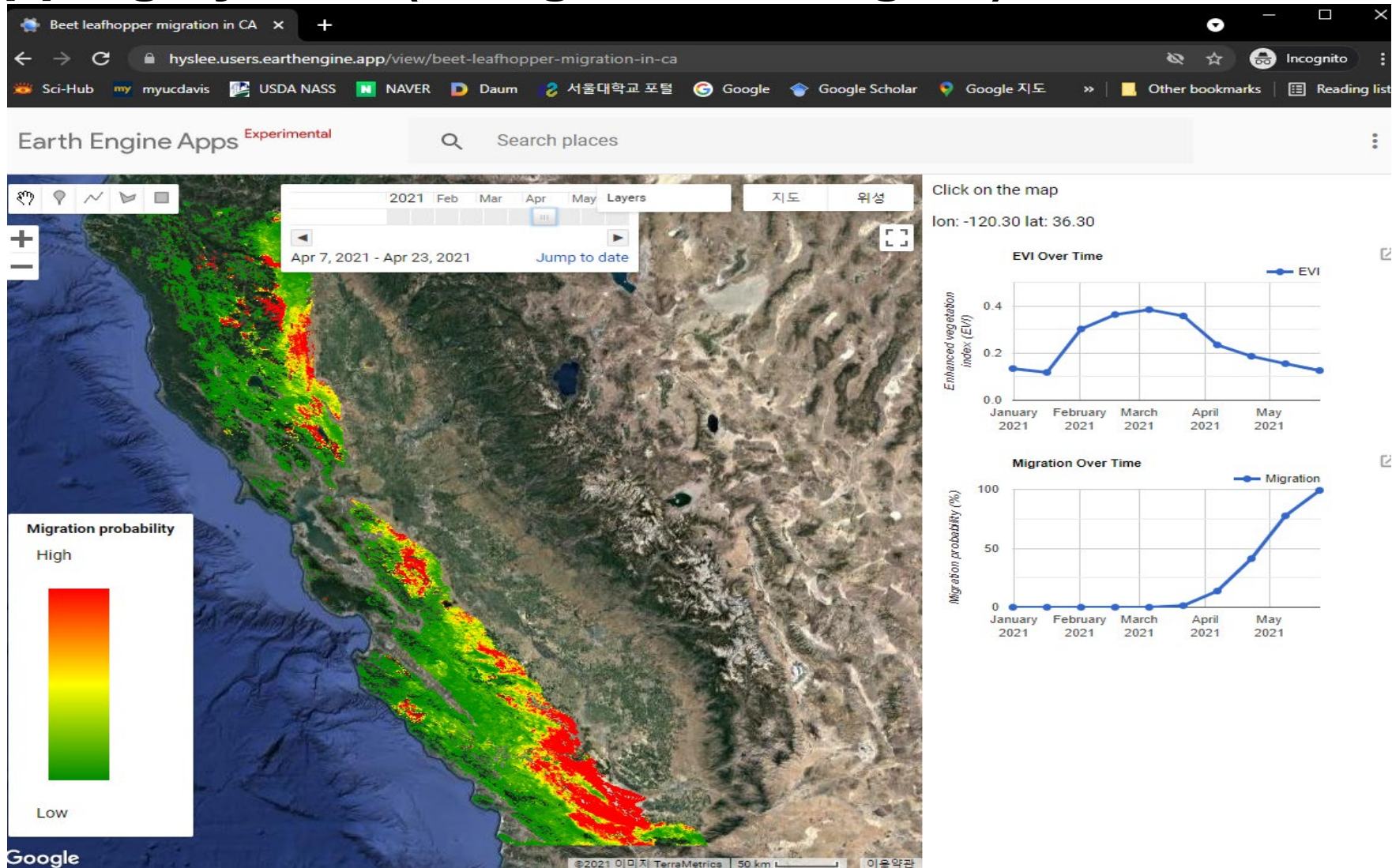
Migration model

Model validation



Migration model

Mapping system (Google earth engine)

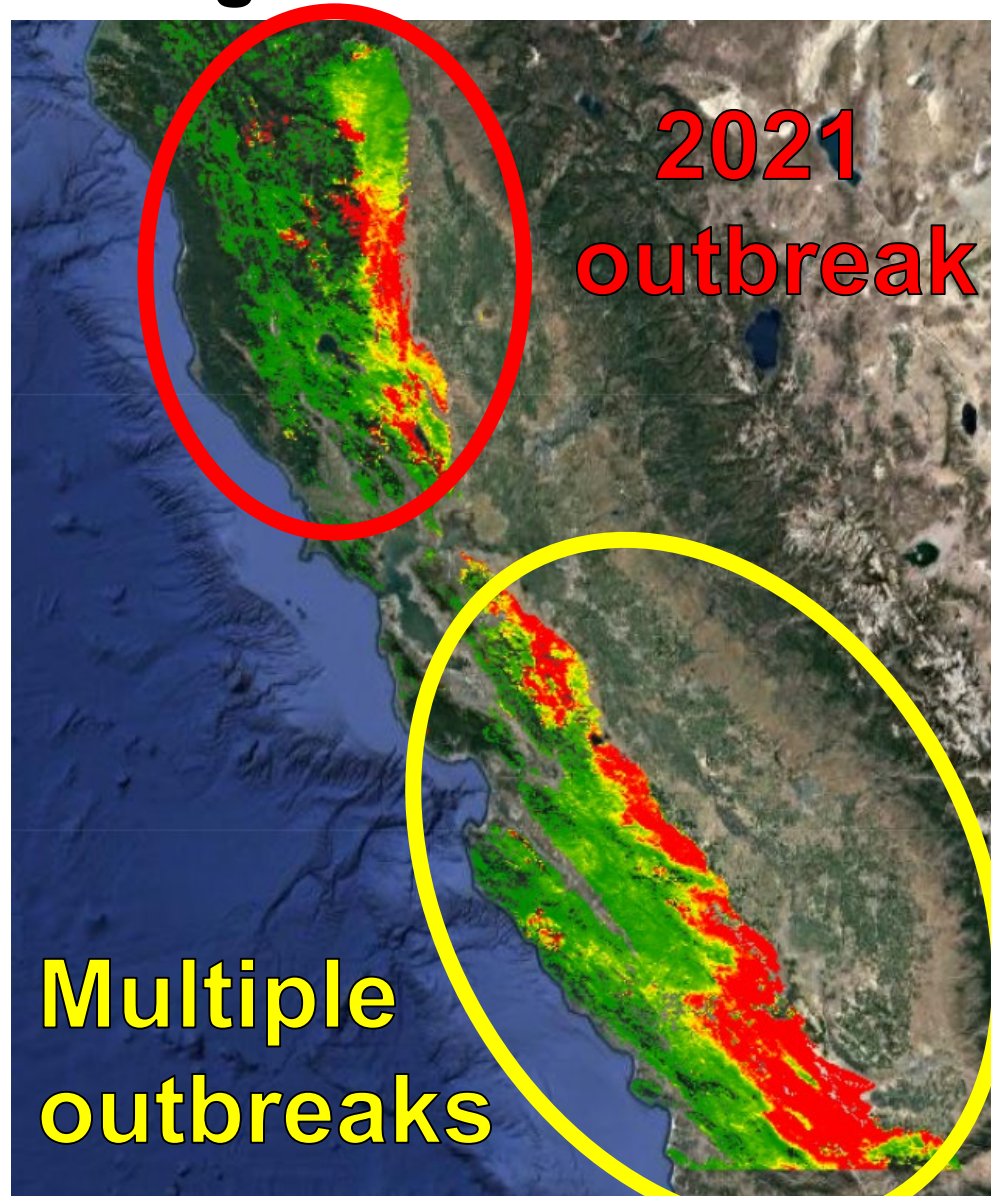


<https://hyslee.users.earthengine.app/view/beet-leafhopper-migration-in-ca>

Versatility of the model

Migration model

Explaining BCTV outbreaks in CA



Sacramento Valley

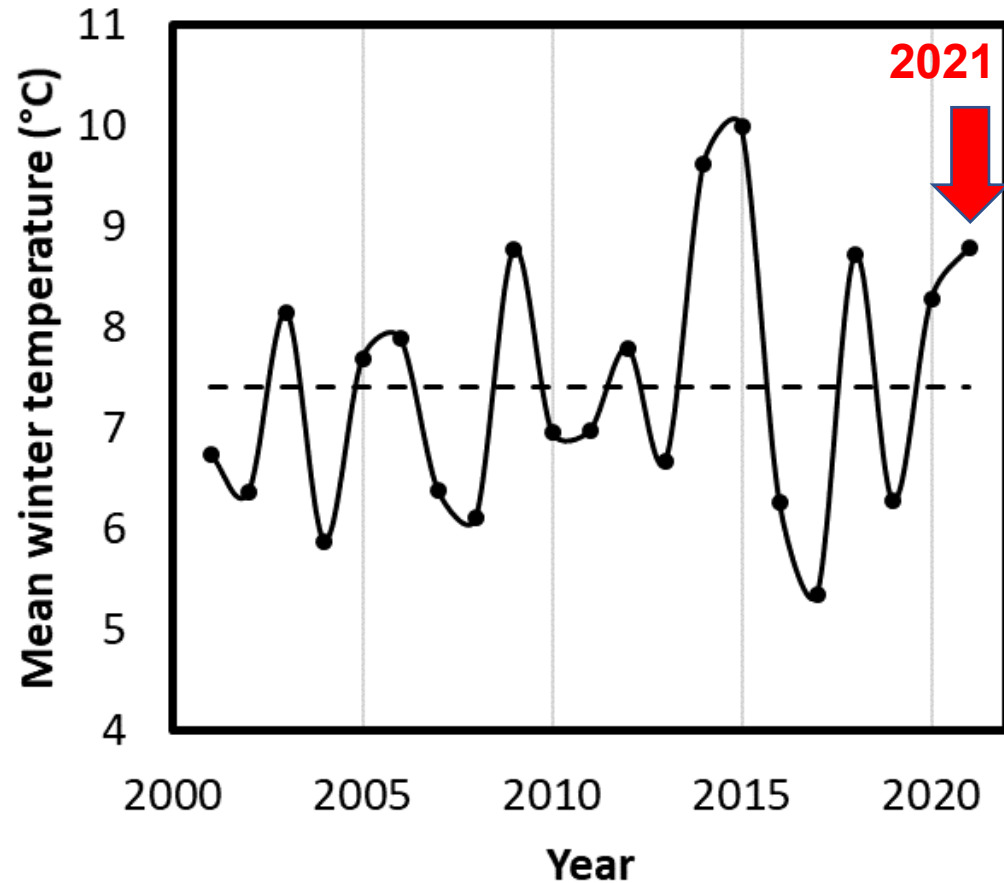
San Joaquin Valley

Tomato field in Colusa County (2021)

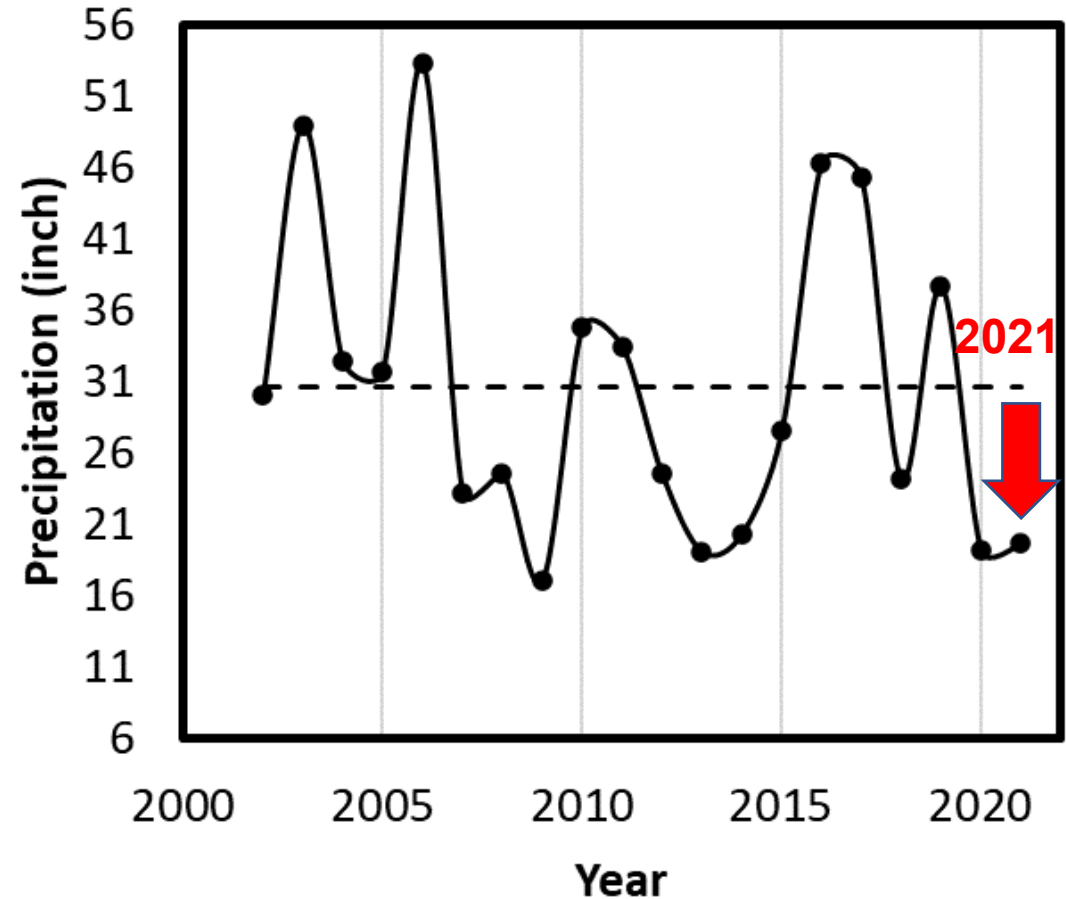


Abiotic conditions (Sacramento valley)

Winter temperature



Winter precipitation



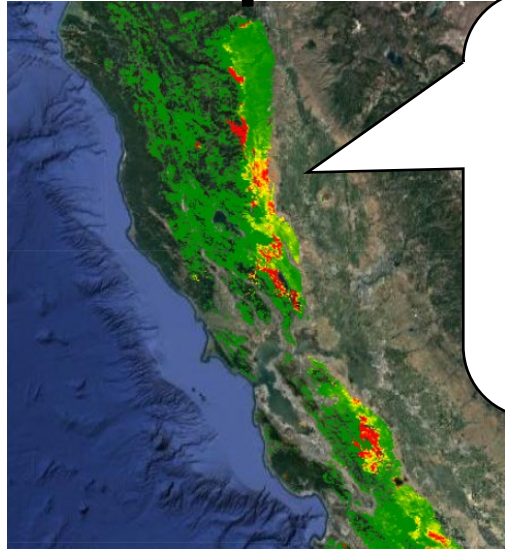
Modeled migration in 2020 and 2021

2021

Mar 22

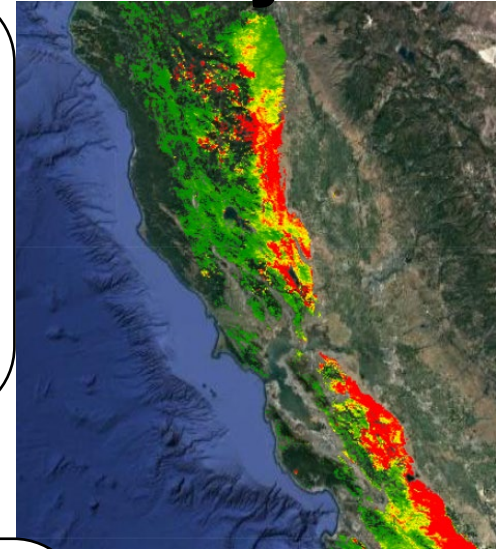


Apr 7



Migration
started

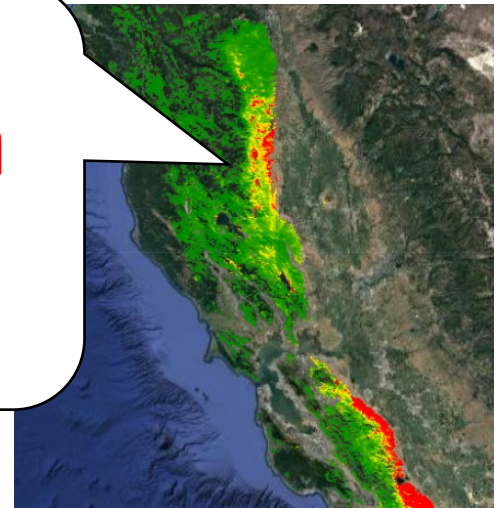
May 25



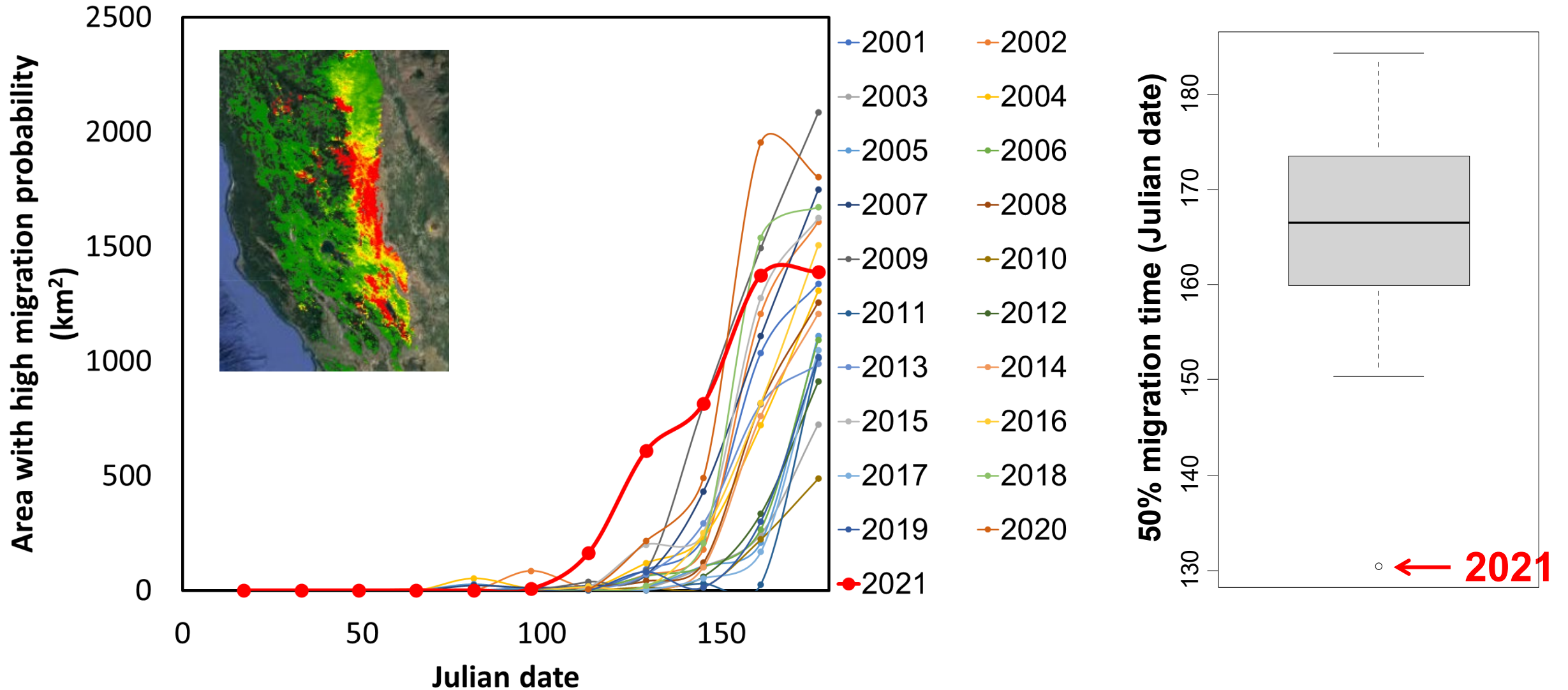
2020



Migration
started

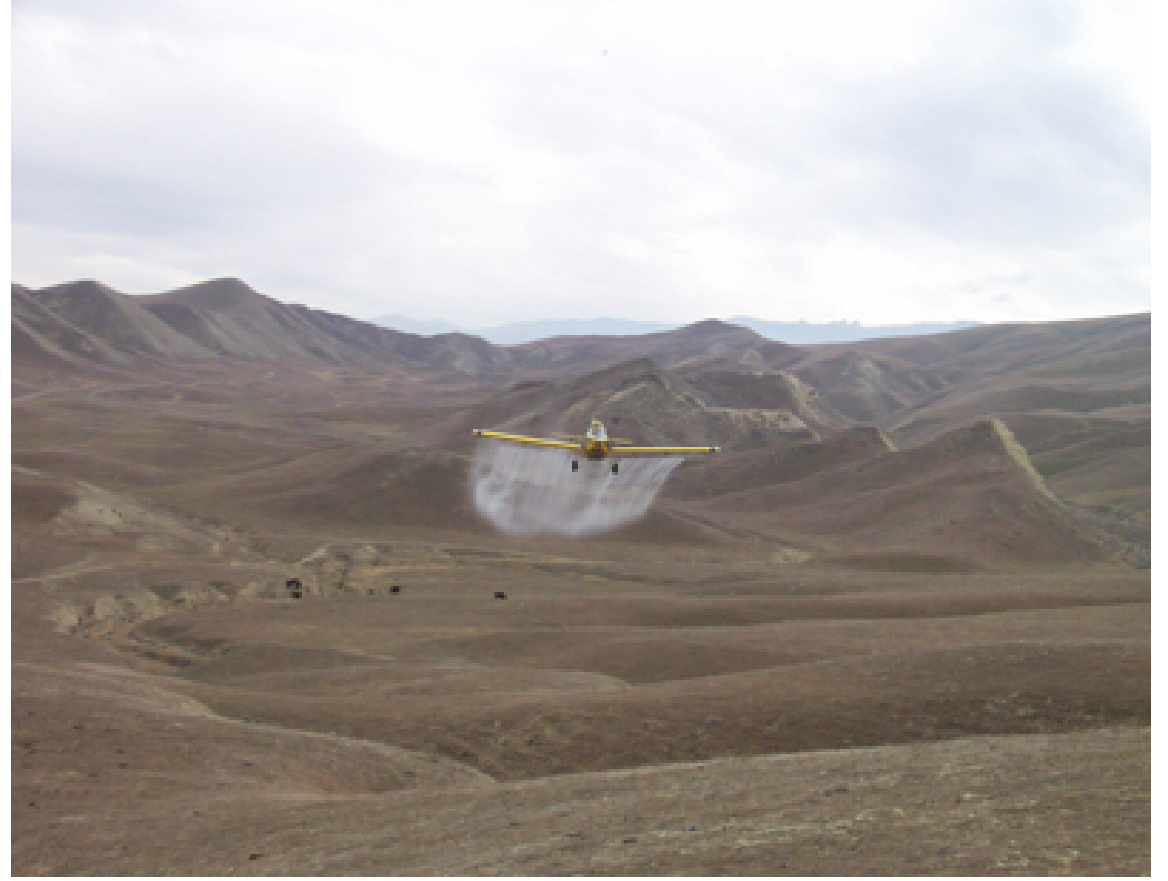


Trends in modeled migration time



New potential

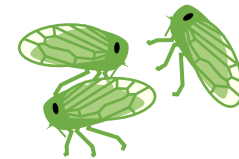
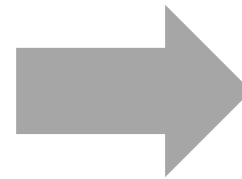
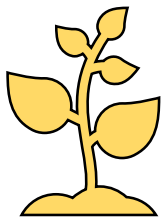
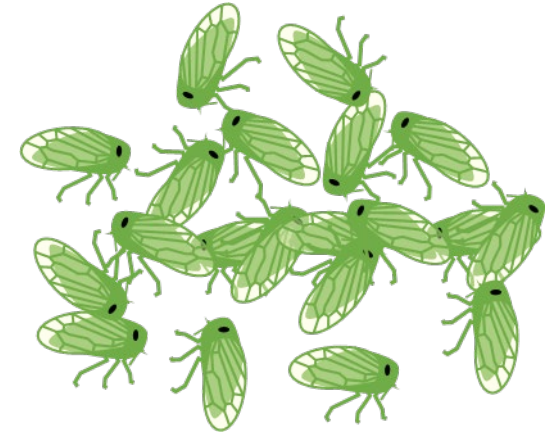
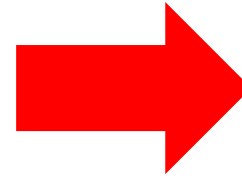
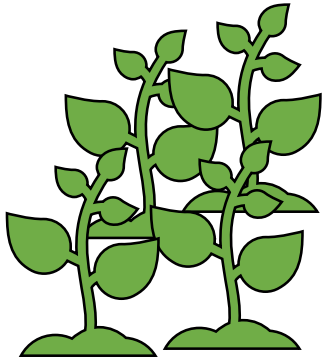
Field monitoring



Pointing out hotspots

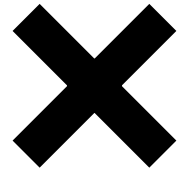
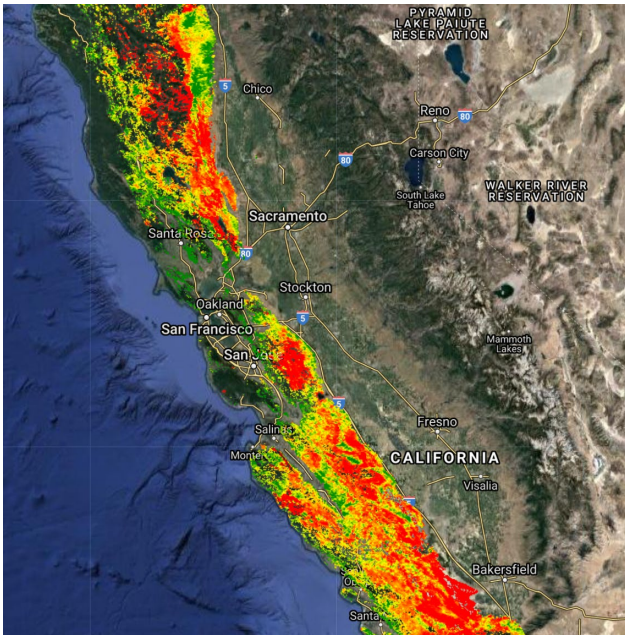
Vegetation

Abiotics

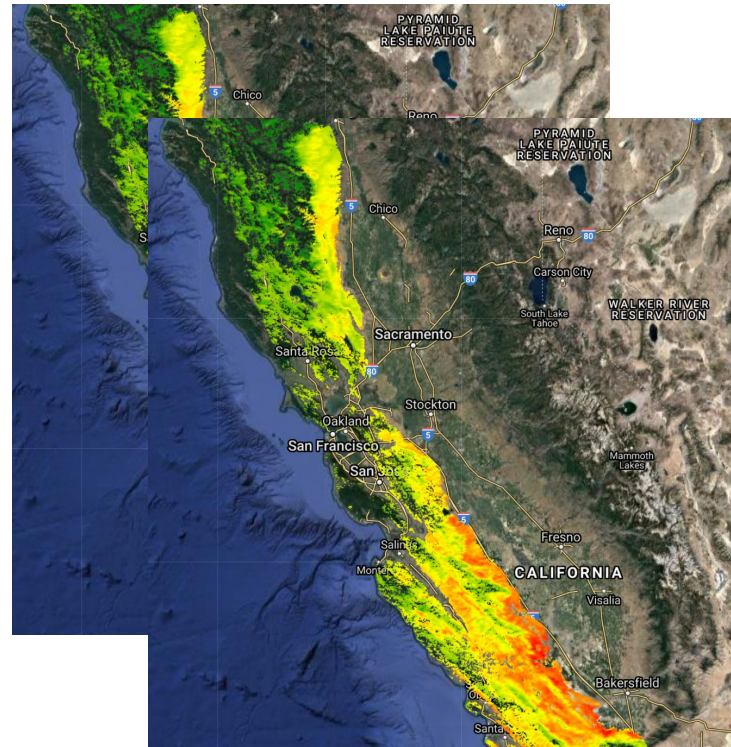


Model to detect hotspots

Veg. greenness & type



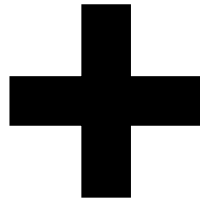
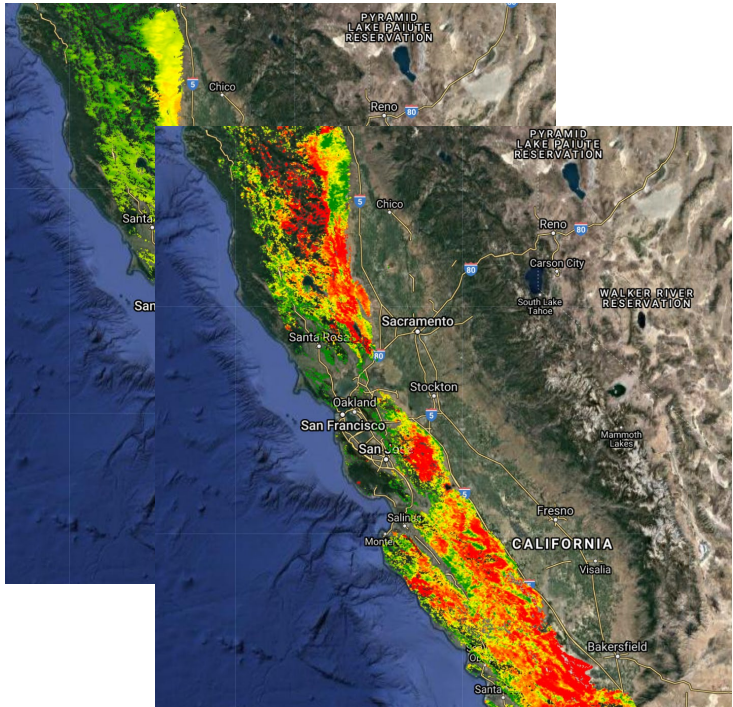
Abiotic conditions



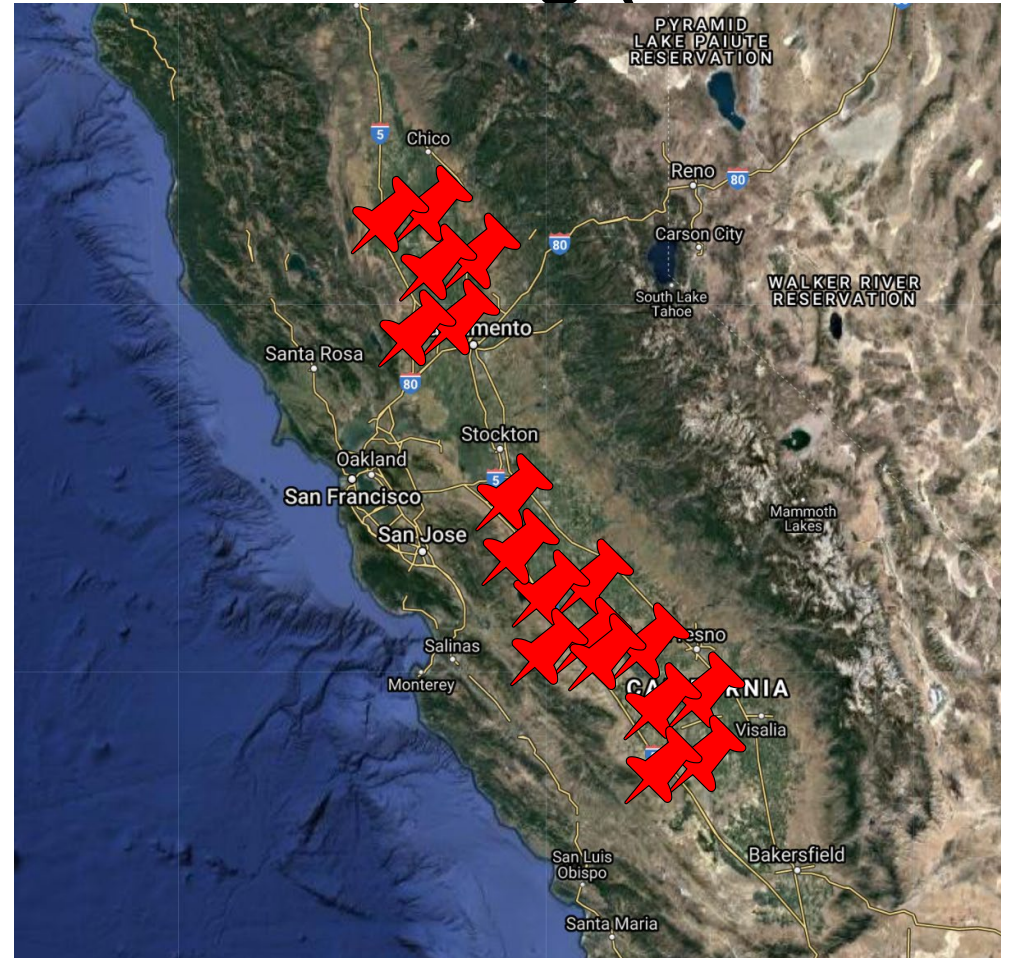
**Hotspot
prediction
model**

Model to detect hotspots

Hotspot prediction model

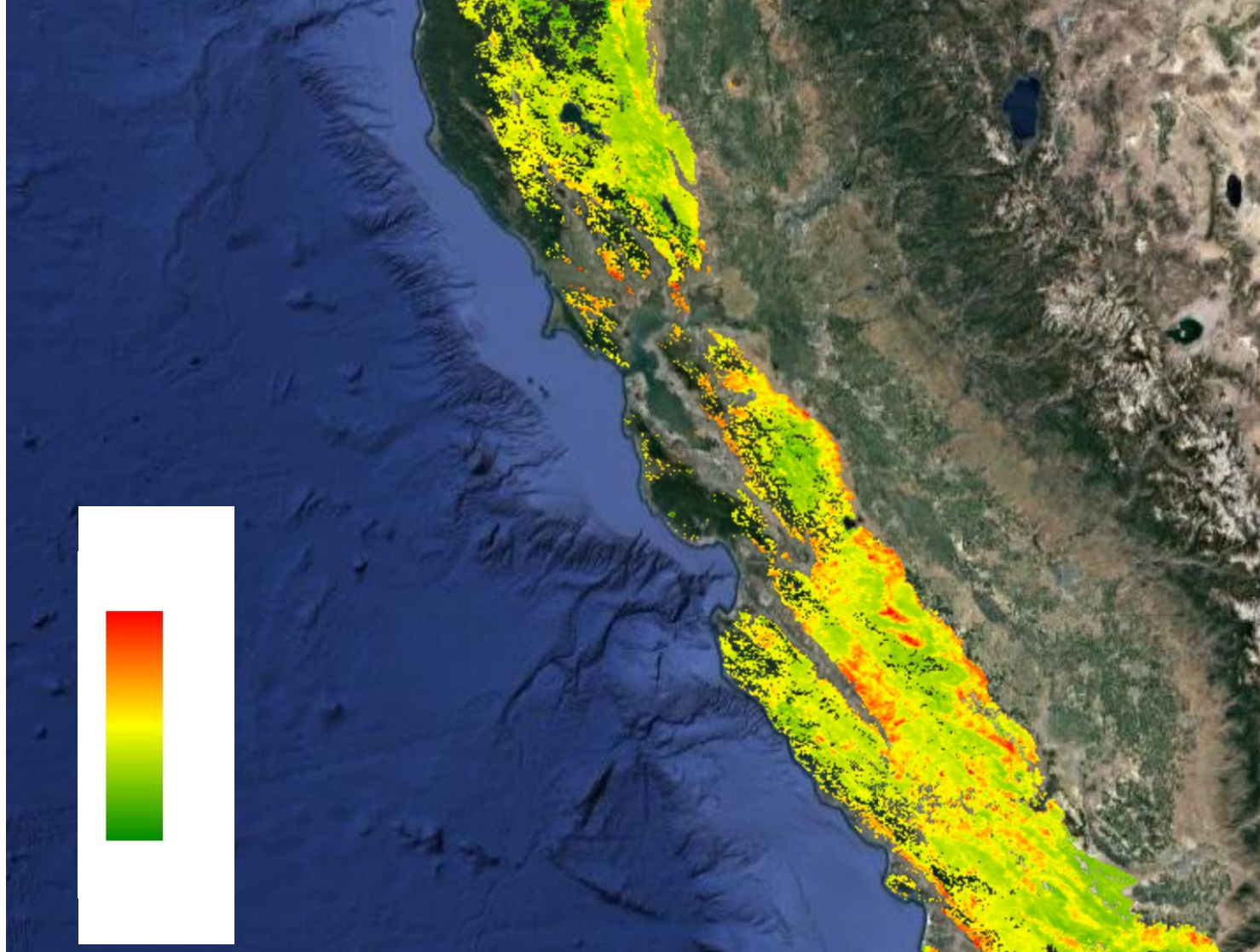


Field monitoring (calibration)

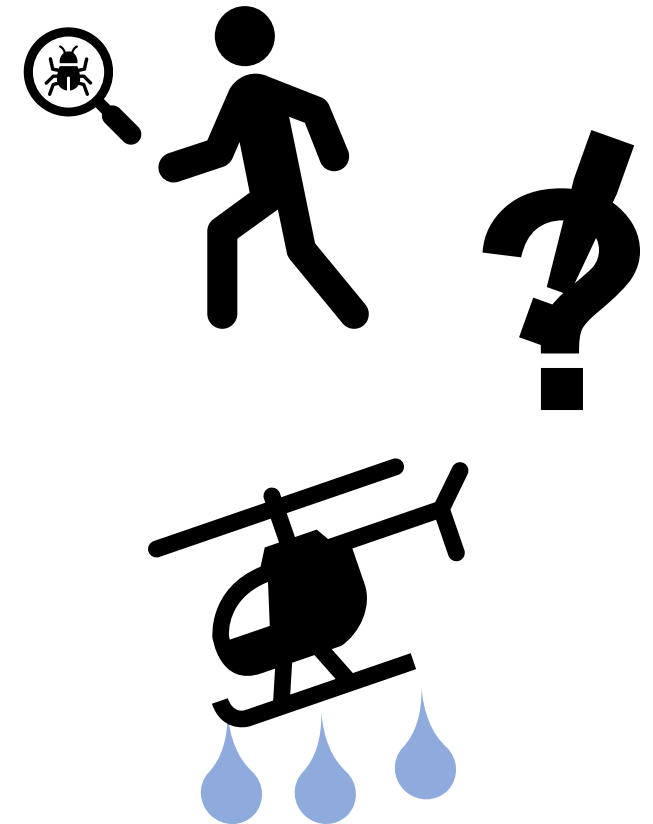
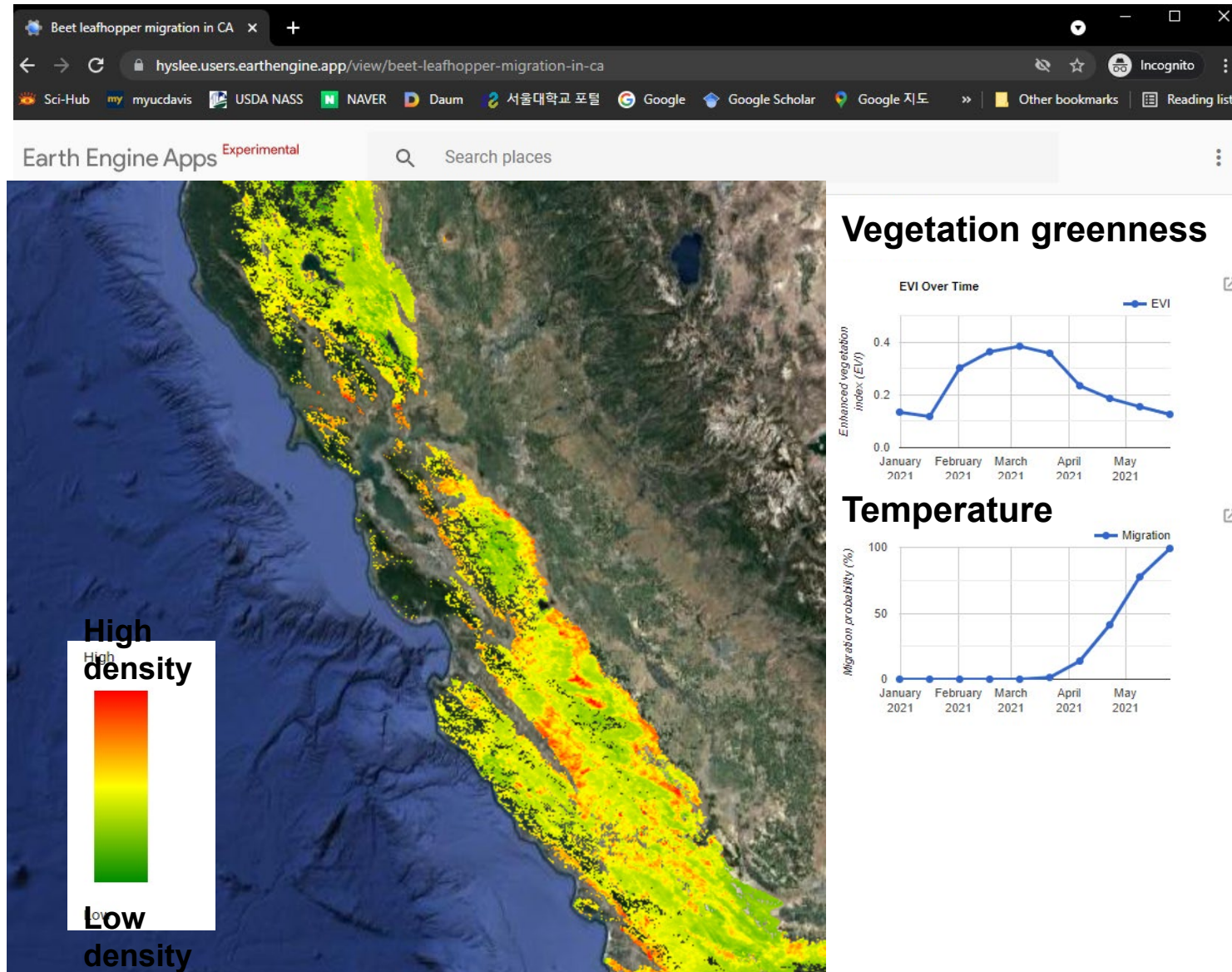


**Abiotic conditions,
Veg. greenness & type**

Hotspot mapping system



Precision-guided scouting & spraying



Thank you