Regional testing of *Diorhabda elongata* ecotypes for the biocontrol of Saltcedar (*Tamarix* spp.) in western US

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Tamarix invasions

Invades riparian areas
Lowers ground water tables
Increases soil salinity
Reduces faunal and floral diversity
Increased fire hazard
Interferes with recreational uses

Tamarix distributions in CA

Tamarix parviflora

Tamarix ramosissima

http://plants.usda.gov

Biocontrol agent *Diorhabda 'elongata'*

D. elongata – Fukang ecotype

Background

- *D. elongata* from Fukang (China) did not establish at sites below 38º N in latitude

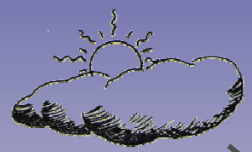
  Lewis et al. (2003) Biol. Control, 27: 101-116

- Fukang beetles cease reproduction and enter reproductive diapause at day lengths of 14h 30min or less

  Bean et al. (2007) Env. Entomol. 36: 15-25

Fukang, China 44.1º N

Evolution of daylength responses



?

Reproduction

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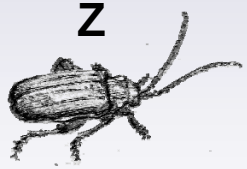
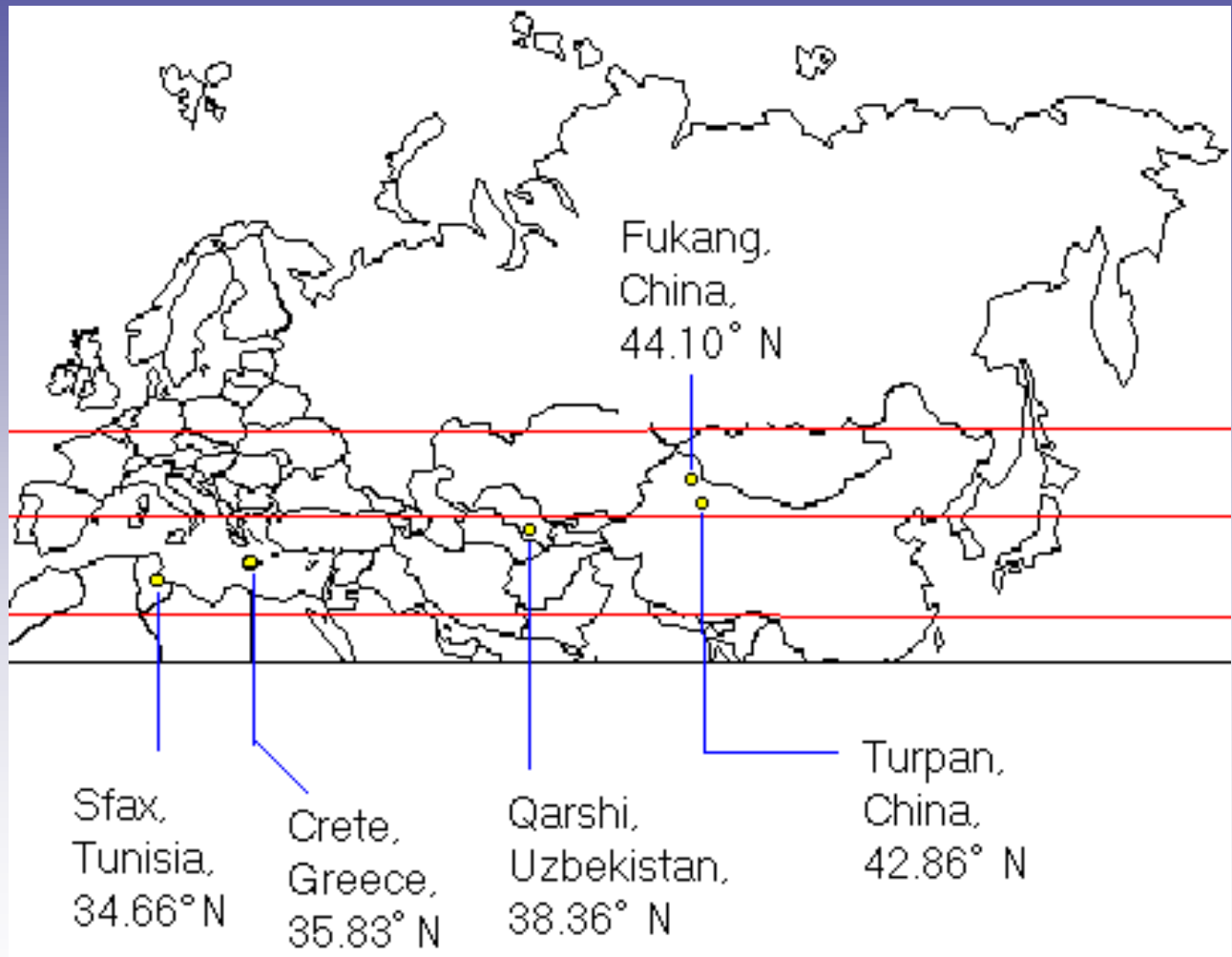
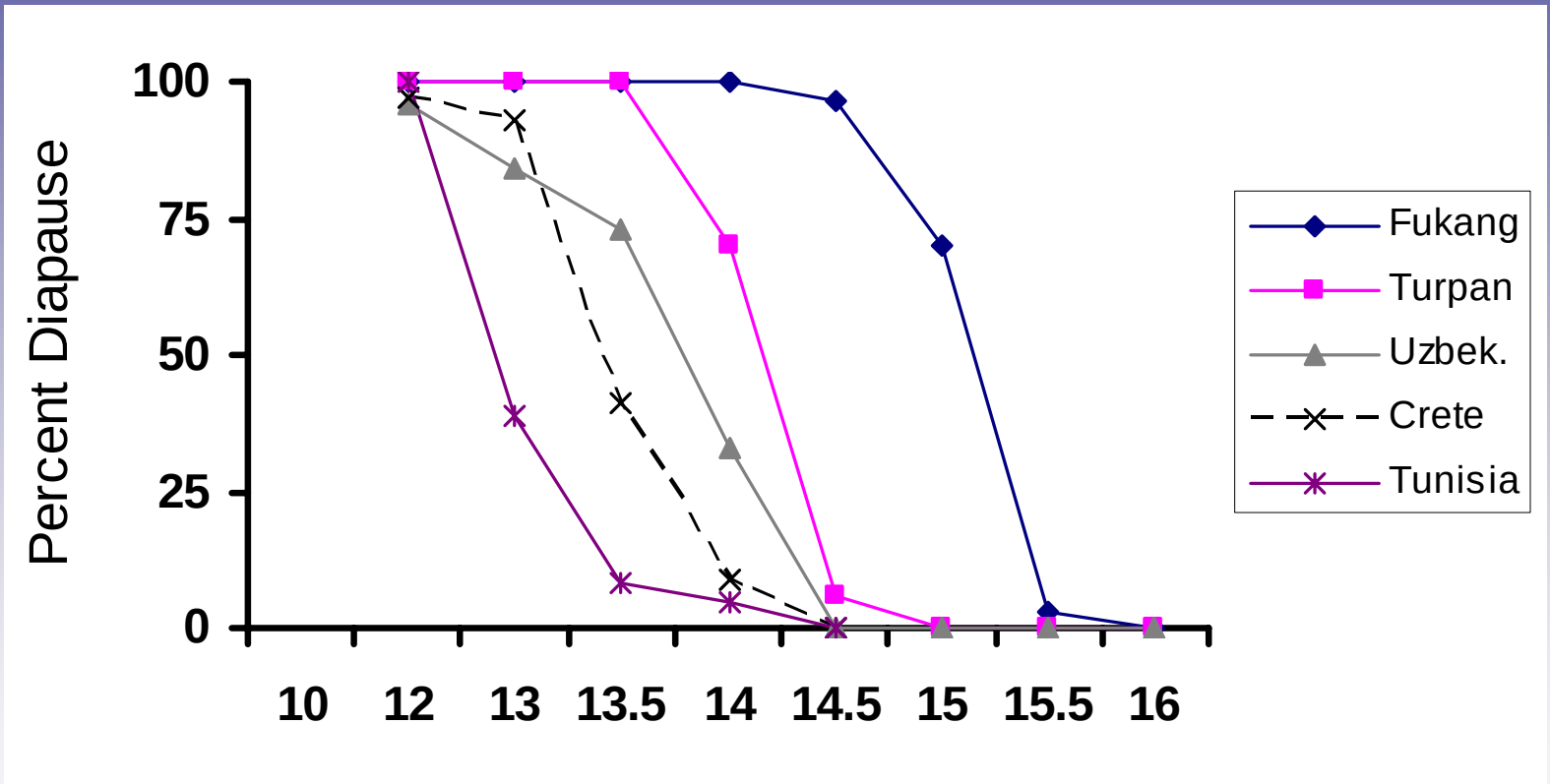


Diapause

D. elongata ecotypes present in U.S.



Daylength responses of *D. elongata* ecotypes



(Bean et al.: unpublished data)

Hypothesis

- *D. elongata* ecotypes will be reproductively active for the longest time periods at those latitudes that match their latitude of origin

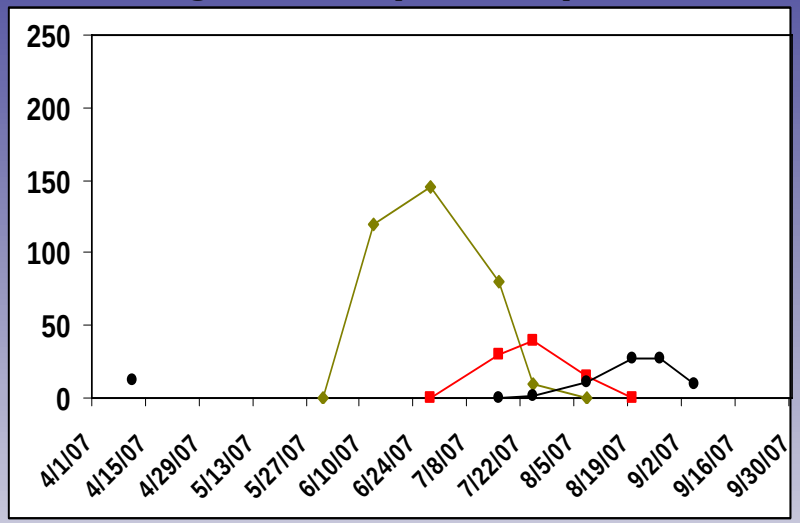
Fukang, China	*D. elongata* '*carinulata*'	44.1º N
Turpan, China	*D. elongata* '*carinulata*'	43.5º N
Karshi, Uzbek.	*D. elongata* '*carinata*'	38.1º N
Crete, Greece	*D. elongata* '*elongata*'	35.1º N

Methods

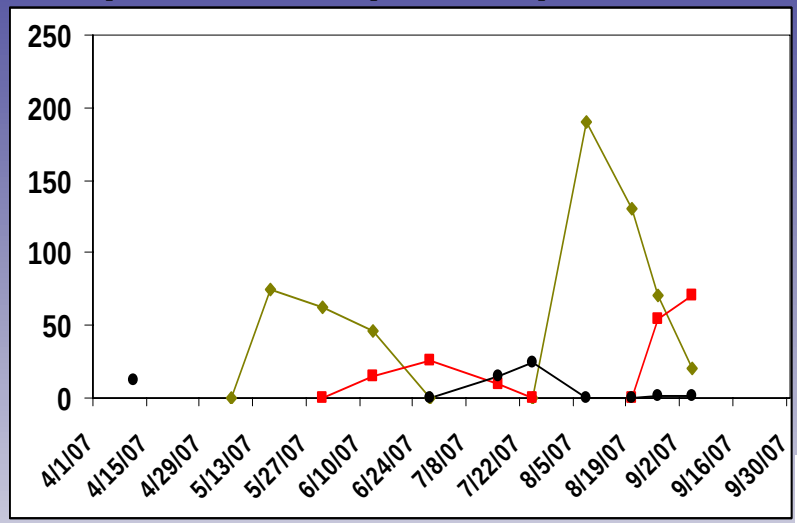
Santa Clara River 34.3° N

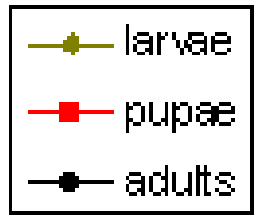
Host plant: *Tamarix ramosissima*

Fukang, China (44.1° N)

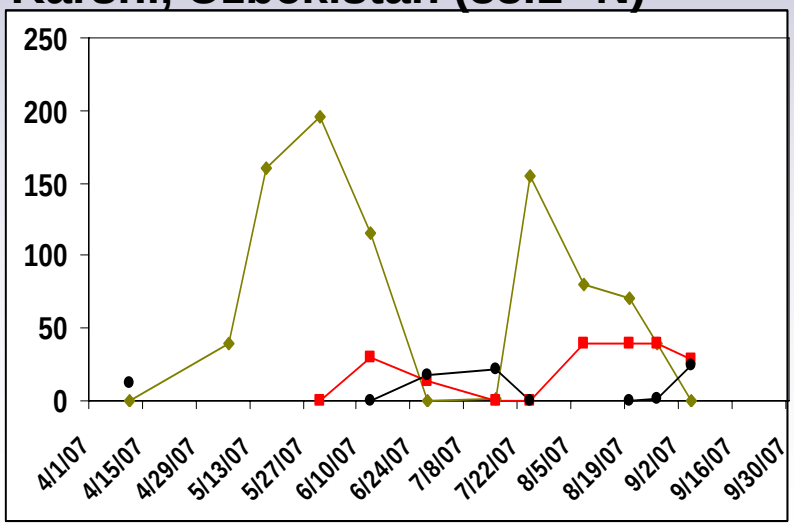


Turpan, China (43.5° N)

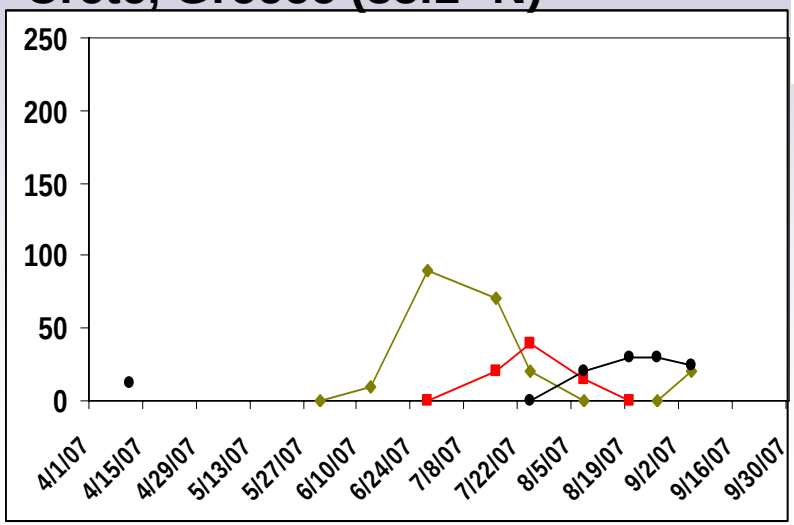




Karshi, Uzbekistan (38.1° N)



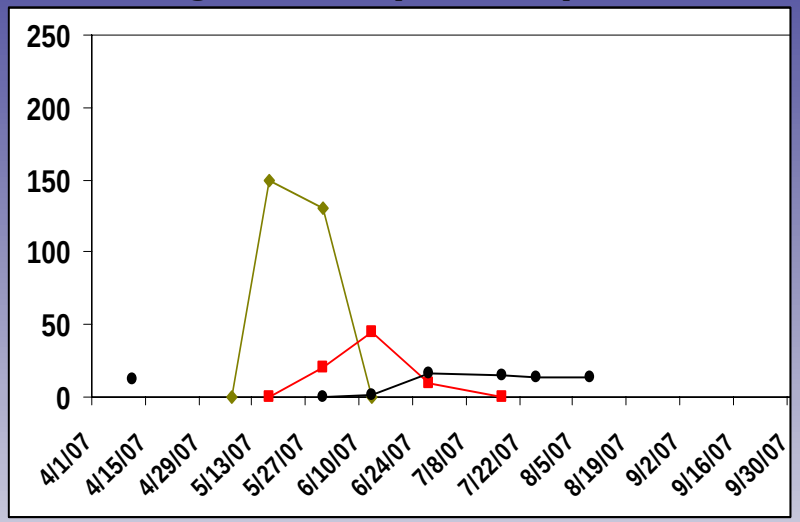
Crete, Greece (35.1° N)



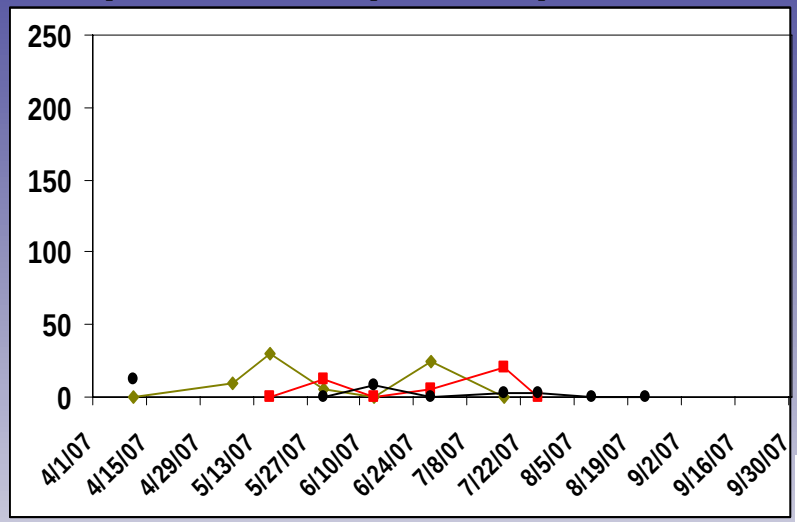
Mojave River 34.9° N

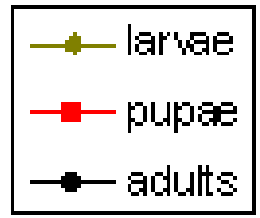
Host plant: *Tamarix ramosissima*

Fukang, China (44.1° N)

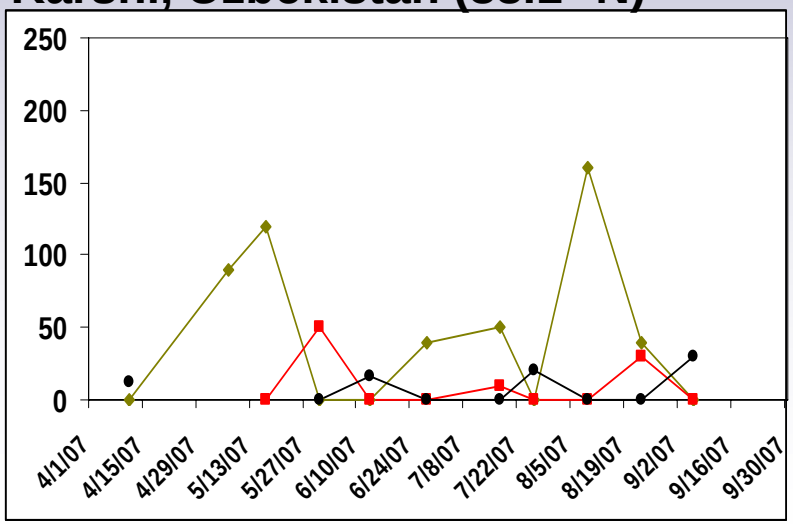


Turpan, China (43.5° N)

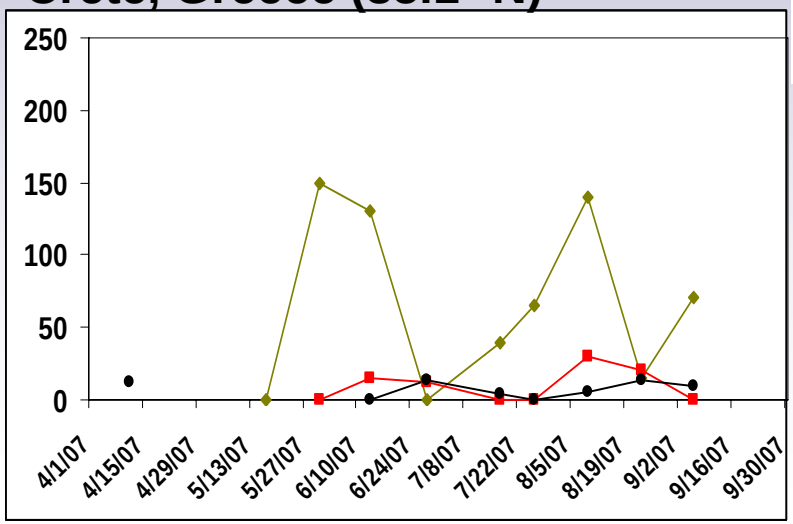




Karshi, Uzbekistan (38.1° N)



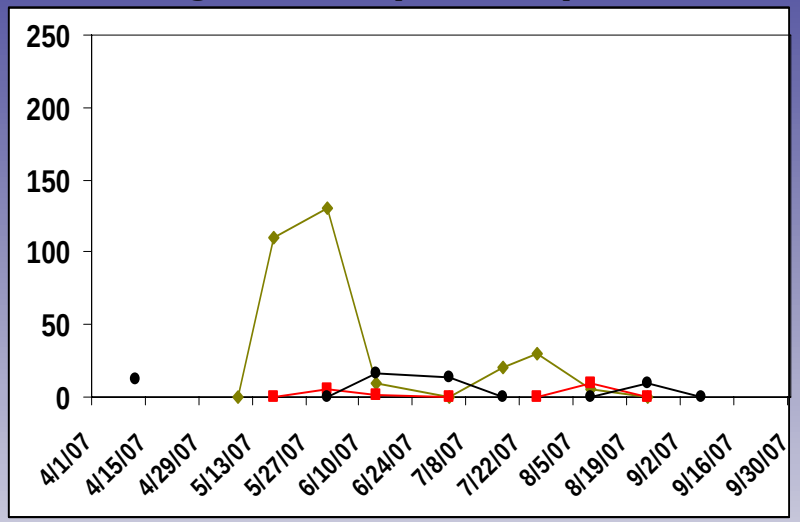
Crete, Greece (35.1° N)



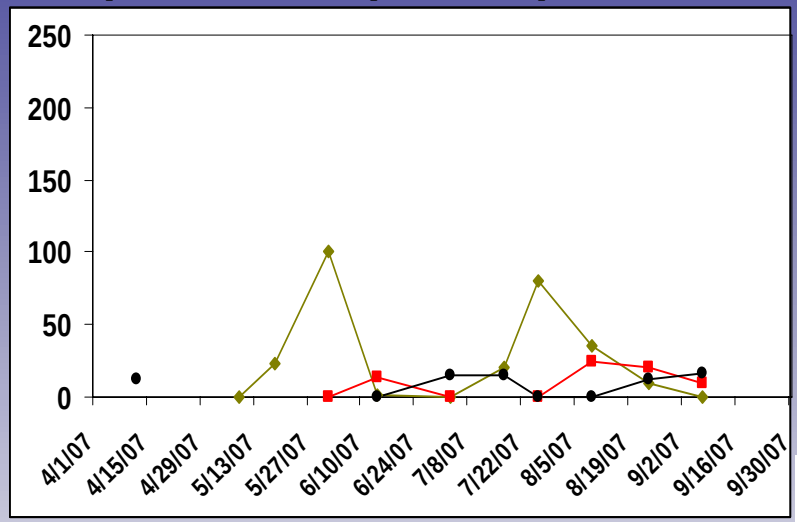
Kern NWR 35.5° N

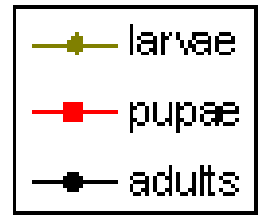
Host plant: *Tamarix ramosissima*

Fukang, China (44.1° N)

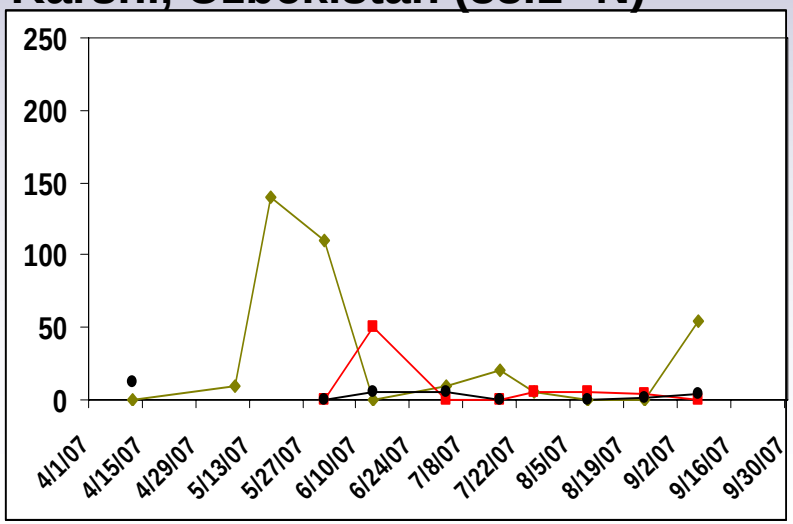


Turpan, China (43.5° N)

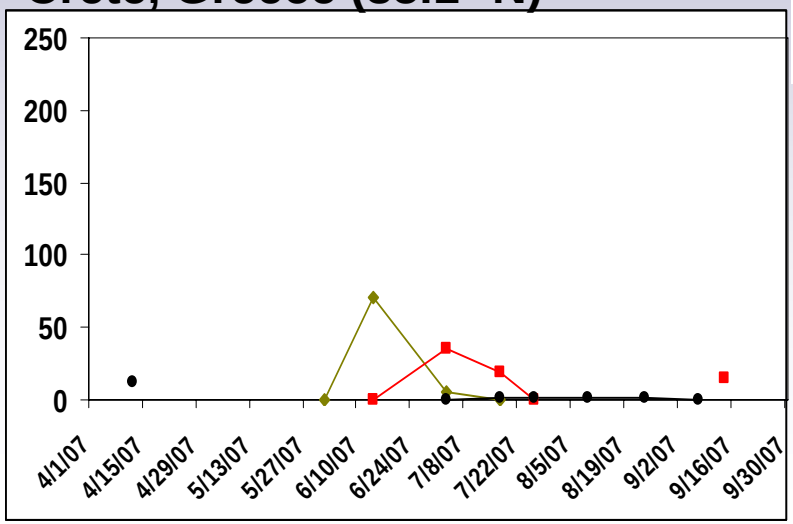




Karshi, Uzbekistan (38.1° N)

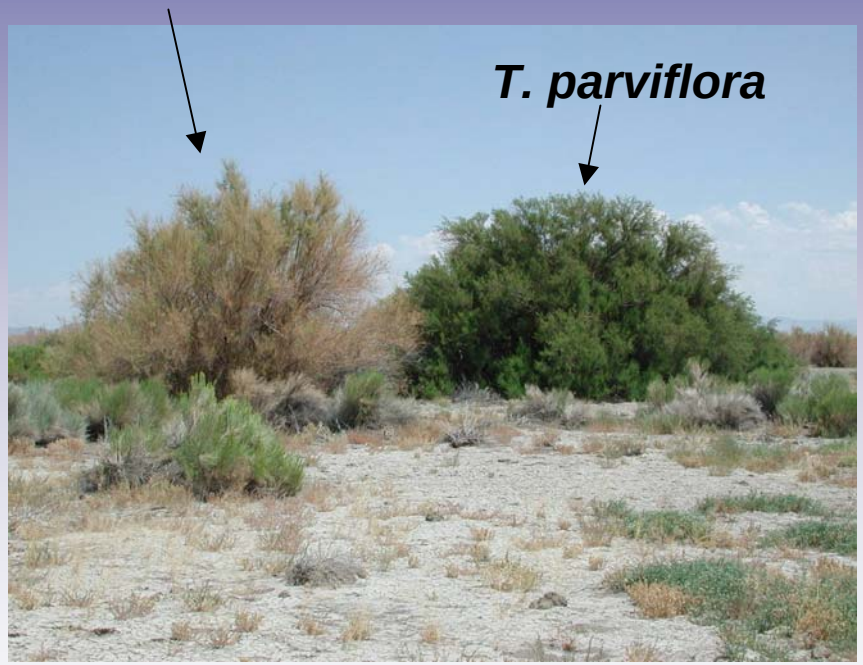


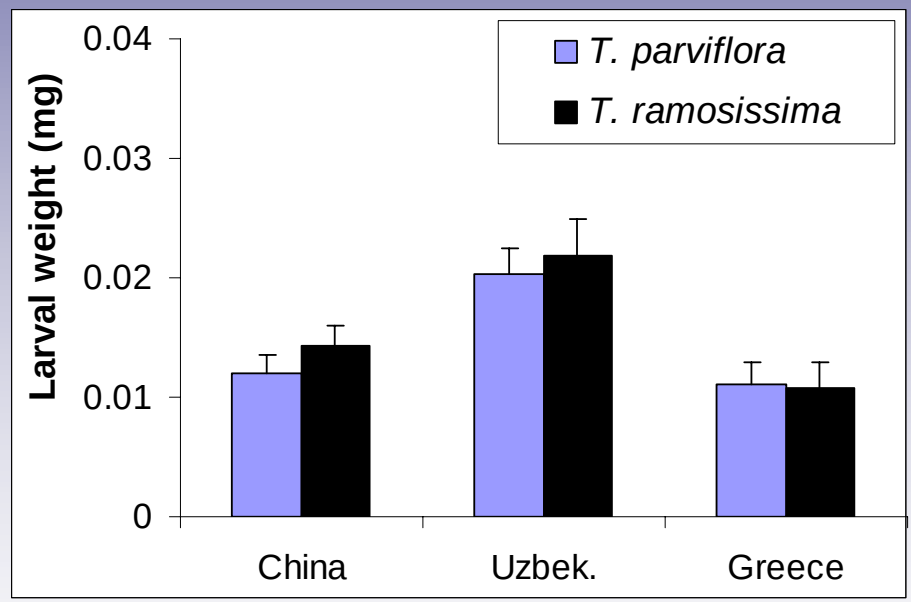
Crete, Greece (35.1° N)



Tamarix parviflora – a poor host for *D. elongata*?

T. ramosissima defoliated by *D. elongata*

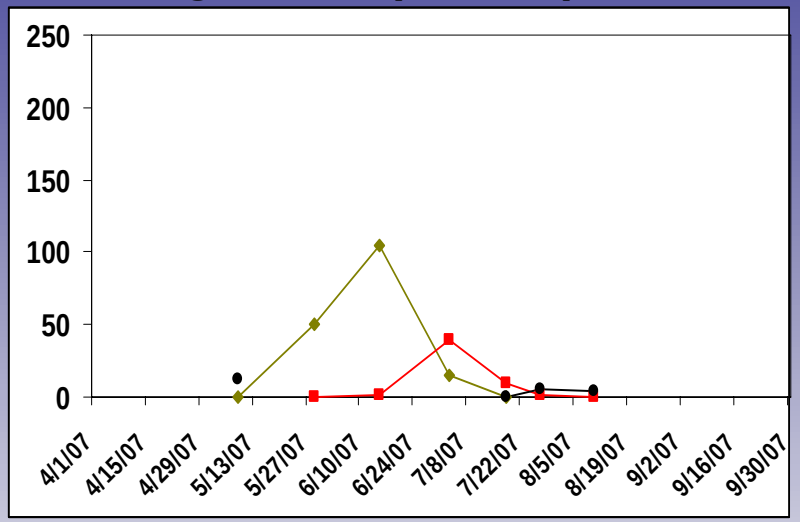




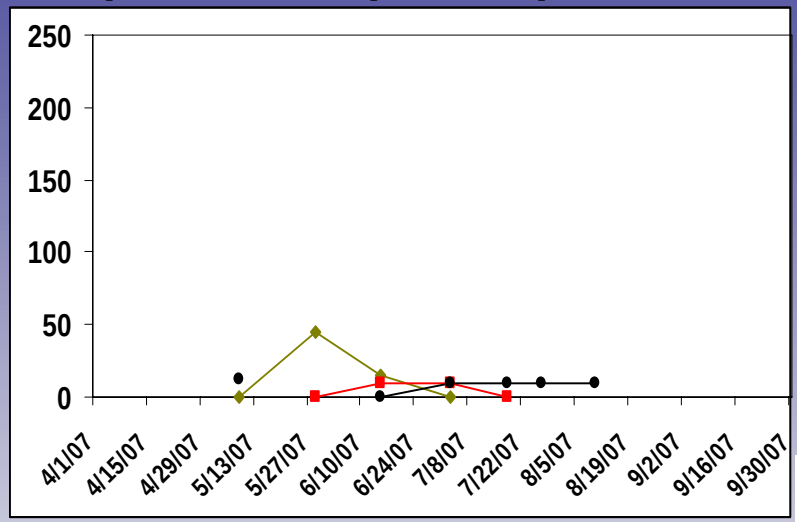
San Antonio Creek 35.9° N

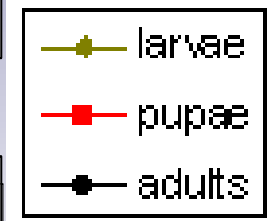
Host plant: *Tamarix parviflora*

Fukang, China (44.1° N)

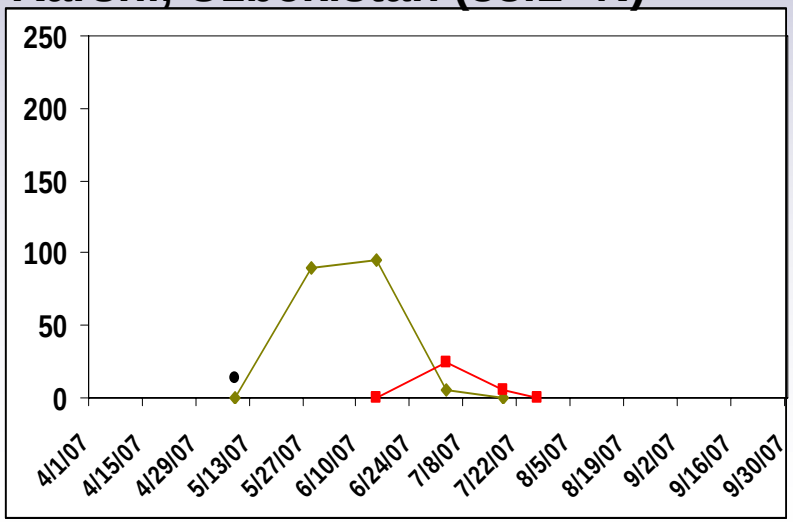


Turpan, China (43.5° N)

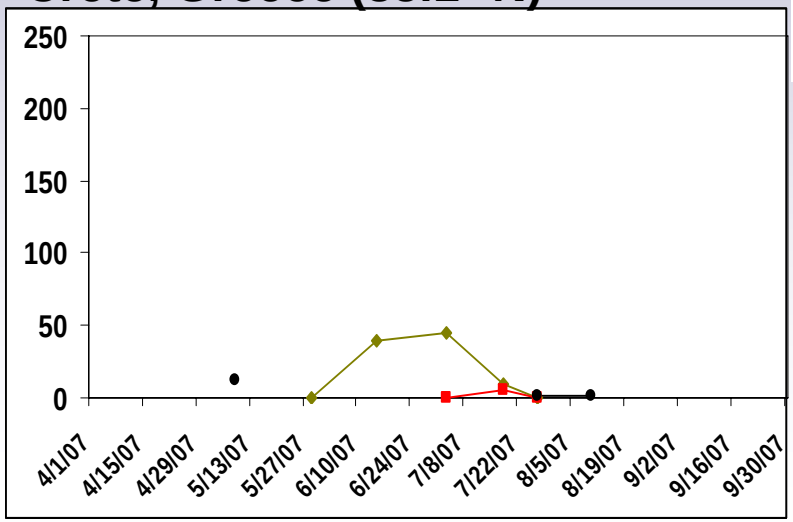




Karshi, Uzbekistan (38.1° N)



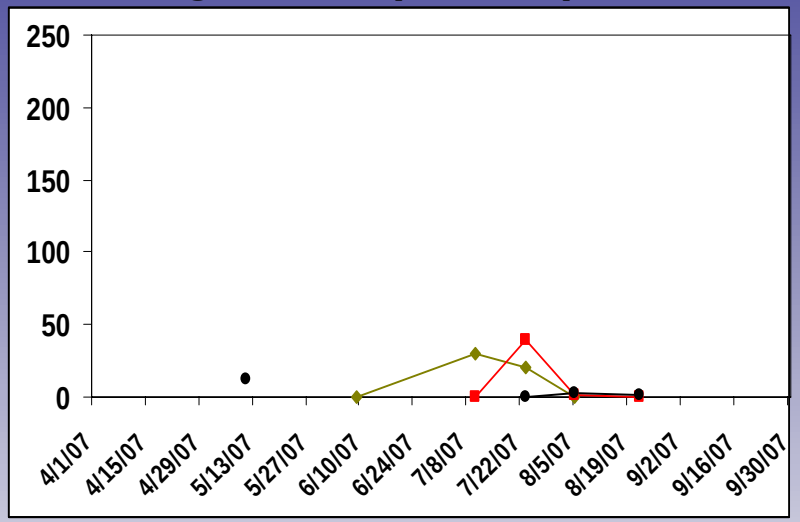
Crete, Greece (35.1° N)



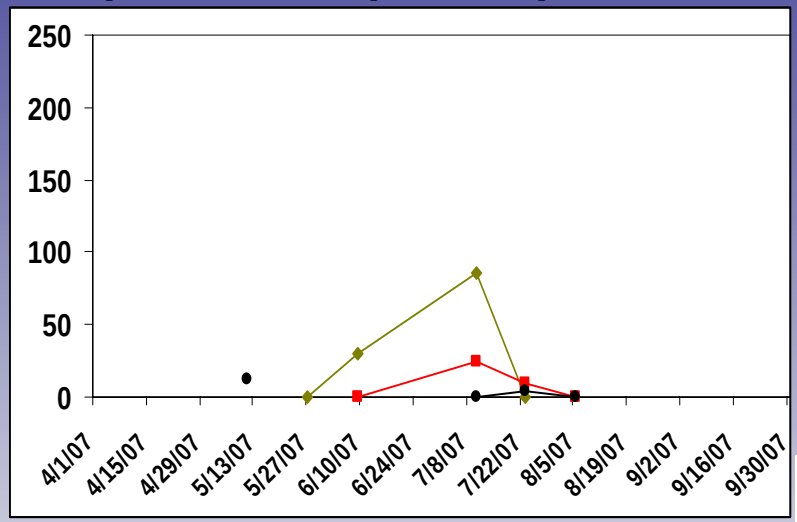
Cache Creek 38.3° N

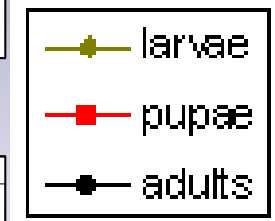
Host plant: *Tamarix parviflora*

Fukang, China (44.1° N)

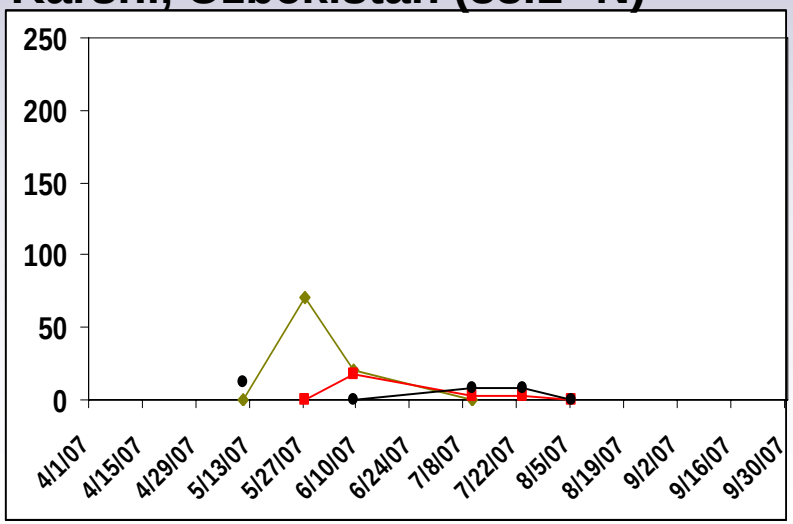


Turpan, China (43.5° N)

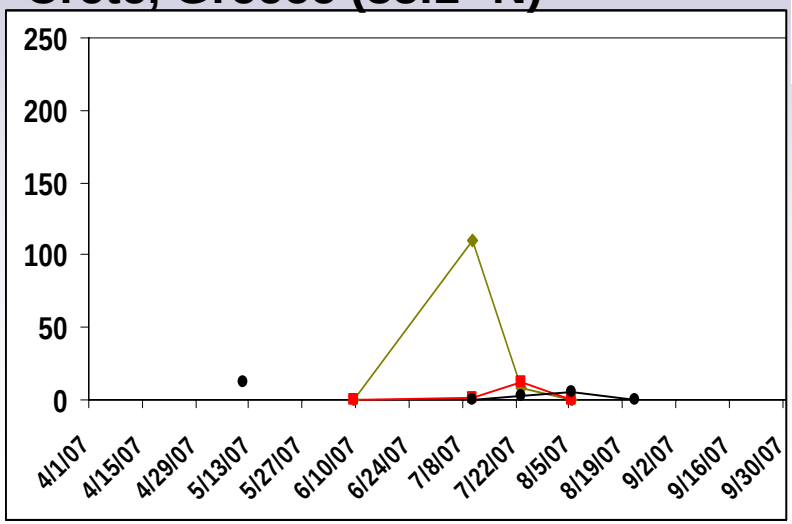




Karshi, Uzbekistan (38.1° N)



Crete, Greece (35.1° N)



Conclusions

T. ramosissima

- Uzbek and Crete works best in so. California
  (3-4 gen. - defoliation events)
- Turpan: mid-latitudes (36-38ºN)
- Fukang: above 38ºN

T. parviflora

- Uzbek grows better than the other ecotypes on *T. parviflora*
- Crete population at Cache Creek, northern CA

Acknowledgements

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