

Research on *Leptoglossus occidentalis* at the iuFOR Forest Pests Laboratory



Coordinator



Partners



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774632

Wild harvested nuts and berries in time of new pests, diseases and climate change
Interregional Workshop, Palencia, June 12-14, 2019

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1. SEED AND CONE DAMAGE



2. LIFE CYCLE



3. CHEMICAL ECOLOGY

4. BIOLOGICAL CONTROL



1. SEED AND CONE DAMAGE

9 experiments run between 2015–2018 in
“El Molinillo” clone orchard (Tordesillas, Va)



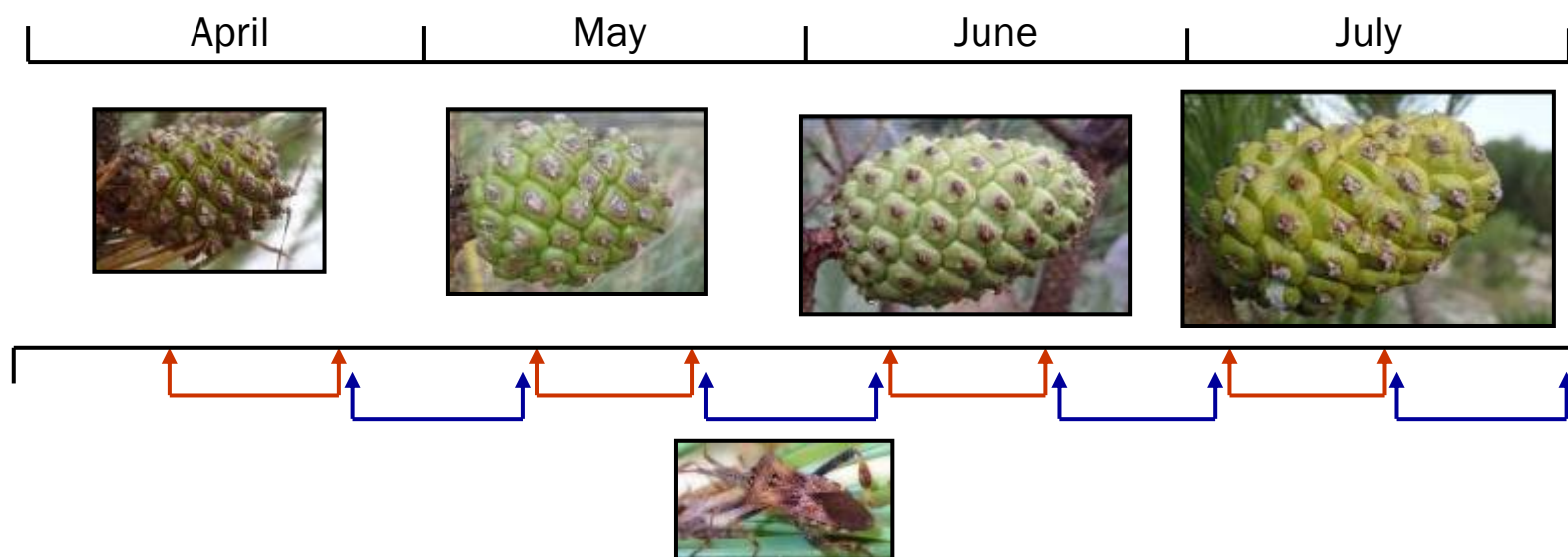
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1. SEED AND CONE DAMAGE

I. Enclosing females and nymphs with cones

Seven experiments (2015 – 2017)



1. SEED AND CONE DAMAGE

I. Enclosing females and nymphs with cones



Experiment	N Trees	Cones/tree	Cone age	Treatment
1	15	5	3°	2 ♀ 2 weeks
2	10	5	3°	2 ♀ 2 weeks
3	15	5	2°	2 ♀ 2 weeks
4	15	3	1°	N3 + N4 1 week
5	12	3	3°	2 ♀ 2 week
6	15	5	2°	2 ♀ 2 weeks
7	15	3	1°	N3 + N4 1 week



1. SEED AND CONE DAMAGE

I. Enclosing females and nymphs with cones

- Cone harvesting in fall
- Affected seeds were classified in: Aborted, damaged type 0, I and II



1. SEED AND CONE DAMAGE

I. Enclosing females and nymphs with cones

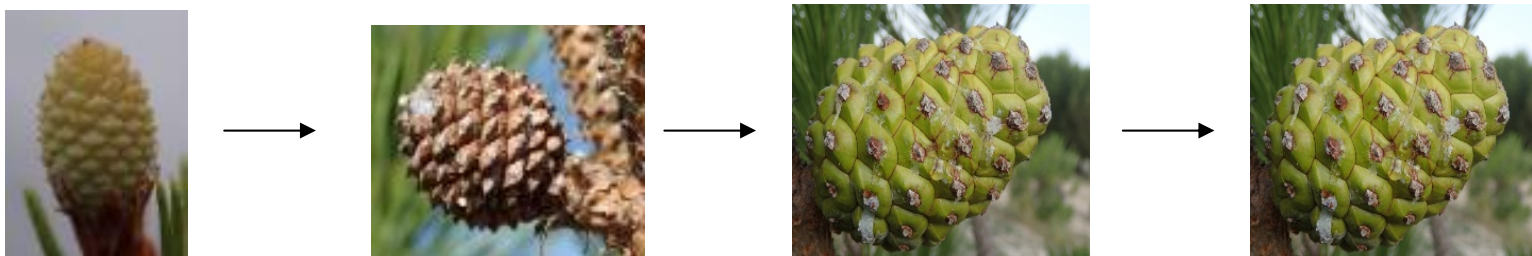


+ High mortality of 1st and 2nd year cones and high reduction of yield of 3rd year cones when feeding occurred during spring and first half of summer (may-july)



1. SEED AND CONE DAMAGE

II. Survival of a cone cohort



+ Cohort survival to harvest: 27%

* Cohort yield at harvest: 2%



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1. SEED AND CONE DAMAGE

III. Survival of exposed vs protected cones (2016–2018)

15 trees; 10 cones/tree (5 each treatment)

- + Survival of Exposed cones to harvest: 30%
- + Survival of Protected cones at harvest: 90%
- + Yield of Exposed cones to harvest: 1,7 %
- + Yield of protected cones to harvest: 3.9 %



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2. LIFE CYCLE

6 experiments carried out (2015 – 2018) in
“El Molinillo” clone orchard (Tordesillas, Va)
- Monitoring bagged and free colonies



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2. LIFE CYCLE

- Visual/trap weekly monitoring

2 complete generations in Valladolid



3. CHEMICAL ECOLOGY

Potential sex/aggregation pheromone

- Field experiments (2014–2016)



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3. CHEMICAL ECOLOGY

Identification of a potential sex pheromone (underway)

- Laboratory bioassays (2014–2019)



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4. BIOLOGICAL CONTROL

I. Native parasitoids: Sentinel egg masses (2017–2018)



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4. BIOLOGICAL CONTROL

I. Native parasitoids: Sentinel egg masses (2019)

- 5 sites in Valladolid



ONGOING



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4. BIOLOGICAL CONTROL

I. Native parasitoids: Sentinel egg masses (2017–2018)

- Two species of *Ooencyrtus* egg parasitoids identified
- . Parasitism rate: between 10% - 29% in two consecutive years over > 2500 eggs observed



4. BIOLOGICAL CONTROL

III. *O. oencyrtus* parasitism rates (2019)

- Laboratory bioassays

ONGOING



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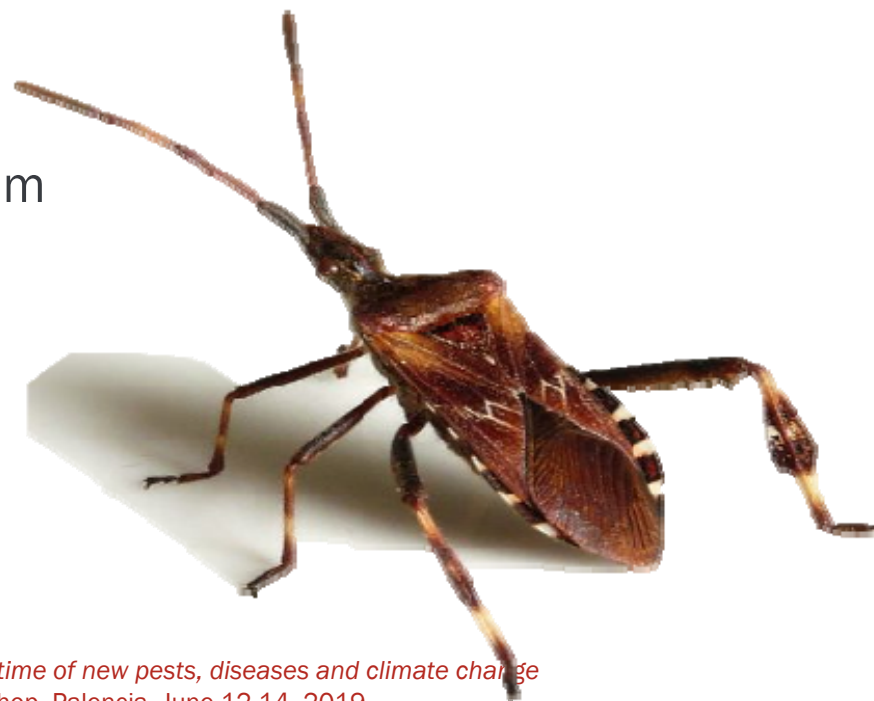
SUMMARY

- High damage to nut production caused by the Western conifer seed bug
 - High mortality of 1st and 2nd year cones
 - Strong yield reduction
 - Damage related to cone phenology: the earlier in the season the worst
- Two generations in Castile and León
- A potential sex pheromone has been detected (identification underway)
- Two native egg parasitoids causing moderate levels of parasitism have been found (studies underway)



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QUESTIONS

1. ¿Are there tools to control *Leptoglossus occidentalis* incidence?: *NO, not even for monitoring in forest stands*
2. ¿Is integrated pest management being developed for this species?: *NO. Much research is still required*
3. ¿What new agents are threatening forest dry nuts?:
Toumeyella parvicornis (pine tortoise scale)
4. ¿Will climate change worsen forest and tree resilience?
Most likely if an increase of aridity occurs
5. ¿Will geographical range of *P. pinea* change? *Likely if above*

