

Farming and Pesticides within the EU: an Almond Farmer's Perspective.

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Farming and Pesticides within the EU: The Challenges

Ongoing shifts in pesticide policy have directly impacted our farm operations by:

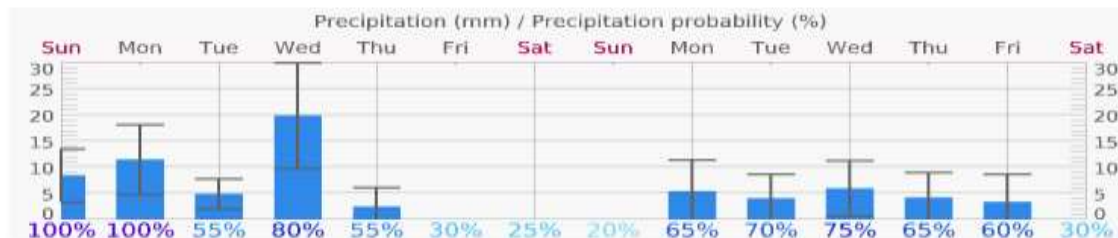
- Reducing modes of actions, which reduces rotation and flexibility;
 - Increased risk of resistance;
 - Fewer tools to manage new and emerging diseases;
 - Review: Hillocks, 2012.
- Increasing reliance on biologicals which have been shown to be inconsistent in performance when needed the most (e.g. high pressure year);
 - Unbiased research trials (<https://cfn-fungicides.ucr.edu/>)
 - Overly biased chemical company sales pitches.
- Delaying registration of new, reduced risk chemistries that are used world-wide, reducing farm competitiveness;
 - Registrations differ from major food competitors (e.g. California, Brazil, North Africa)
 - Several reduced risk, low ai products used within USA/Japan/Australia that are not registered within EU due to market size and member state registration difficulty.
- General lack of technical information in languages of our farm employees.
 - Lack of knowledge on when and how to apply pesticides lead to poor timing, increased crop risk and operational cost;
 - Currently there is very little information available about proper timing provided by unbiased services.



Farming and Pesticides within the EU: Opportunities

Optimizing pesticide use efficiency for each class:

- Insecticides:
 - Better use of reduced risk, more target-specific pesticides (e.g. chlorantraniliprole v/s pyrethroid v/s chlorpyrifos)
 - Use of biological predators, biological agents, or peptides;
 - But need flexibility to manage invasive pests.
- Fungicides/Bactericides:
 - Better model development for diseases common within crops;
 - More EFFECTIVE biological agents that provide CONSISTENT control;
 - Persistence of the product to last several storms.
- Herbicides:
 - Innovations to manage weeds within tree rows (e.g. computer vision with lasers/tillage);
 - Availability of lower active ingredient pre-emergents to help manage challenging weeds;
 - All of this is several years away – just starting to be used within specialty crops;
- Post-harvest disease control:
 - Within tree nuts, we fumigate stockpiles to reduce insect infestation and corresponding aflatoxin contamination;
 - Innovative, cost-effective ways of fumigation with ozone or other products;
 - Creation of aflatoxin detoxifying agents to reduce levels of contamination.



Weather forecast for
March 20th-April 3rd, 2022

Farming and Pesticides within the EU: The Weaknesses

Europe is food insecure, and the continent is fully reliant on imports. This national security risk is increased by pesticide policies and practices, which:

- Create competitive disadvantages due to increased broad regulation, reduced availability of active ingredients, and very slow registration process;
 - Registration is needed by individual countries in addition to the EU, meaning that 5-10 years is needed to register any new pesticide for a crop, requiring extensive investment, which squelches innovation and start-ups;
 - System needs to be nimbler to manage invasive or emerging pests (e.g. Asian citrus psyllid, presence of murder hornets) and emerging/diversified crops (e.g. almonds in Portugal).
- Lack understanding of problems experienced by farmers and a belief that they can always be solved without intervention.
 - Belief that farmers “want to spray” even though every spray costs me 1.5% of my total annual OPEX;
 - Creates an environment in which dialogue is overshadowed by the amplified message that pesticides are bad and aren’t needed.
- Provide very little information to farmers by any unbiased source:
 - Pesticide dealers often have more information than farmers, leading to an unbalanced relationship;
 - Not knowing when or what chemical to apply.



Changes in culture often occur faster than regulations associated with pesticide use.

Farming and Pesticides within the EU: Local Experience

Almond culture within Europe has a considerable history (several 1000 years), but modern, irrigated orchards are relatively new.

- Irrigation has increased yield efficiency, allowing farming to provide economic returns (just like any business);
- Within our operations, we utilize better management practices, including insect trapping for DD timing (e.g. Anarsia/PTB), use of reduced risk/natural insecticides, cover crops to reduce weed pressure and increase plant health/biocontrol, and winter sanitation to remove overwintering pests and diseases.
 - With these practices, we ensure environmental sustainability, reducing pest pressures and save money - every spray we choose not to make, we save ~60 euros/ha
 - However, annual crop losses due to diseases and insects are estimated to be around 7% (e.g. Prune Rust and Green Aphid, and kernel damage from Anarsia);
 - Reducing chemical applications further has significant risk – for example, we decided not to spray for Green Aphid in mid-May 2021 which caused significant defoliation on ~500 trees. These trees failed to flower in 2022, reducing yield an additional 1.5%;
 - This problem is compounded by lack of information to guide timings.
- International groups provide limited guidance and local operators are hungry for information;
 - Many operations are establishing trials, but there is very little sharing;
 - There is a small group of us who meet regularly and share information – successes and failures;
 - Would be great to have this formalized with individuals who work within the field but are not affiliated with industry.

