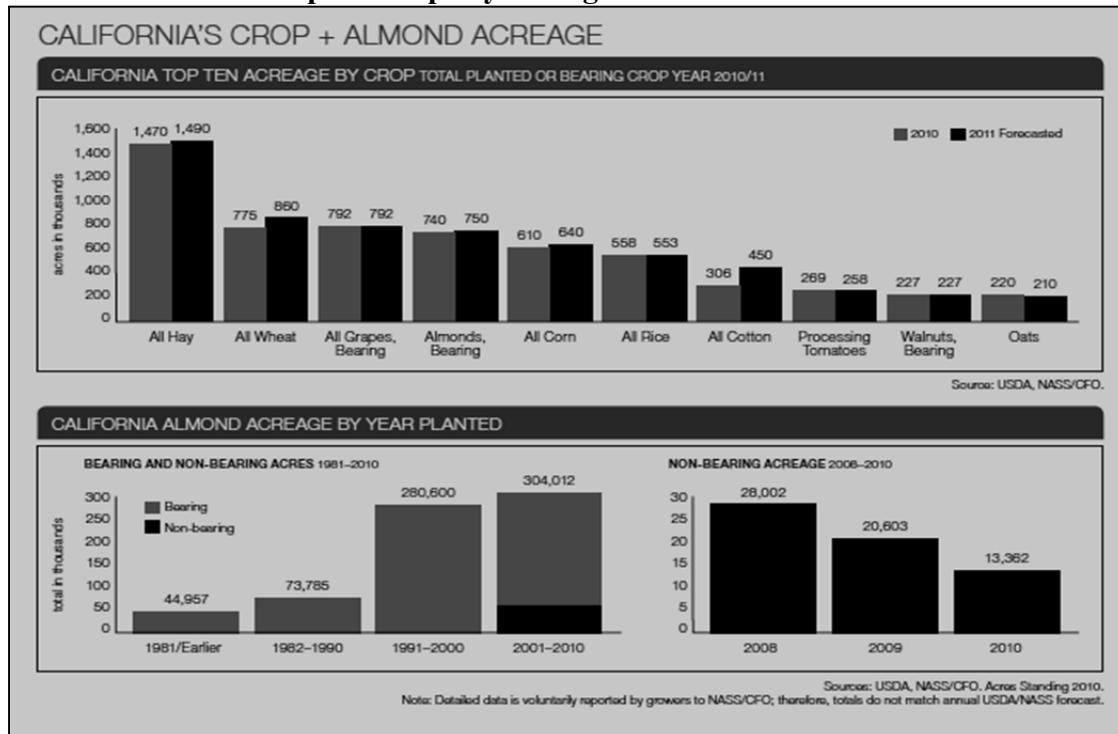


Weed control in nut crops

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The nut industry in California continues to grow in acreage, with almonds as the largest crop is estimated at 750,000 acres followed by walnuts, 227,000 and pistachios, 215,000 acres. The production areas occur in the San Joaquin and Sacramento valleys from Butte County in the north to Kern County in the south. Current acreage of major commodities in California is listed in Table 1.

Table 1. California top ten crops by acreage



Weed impacts on orchards

Weeds growing in newly planted orchards, specifically down the tree row compete for water and nutrients especially during the spring establishment period when roots begin to grow. Young orchards are more weed prone because of the smaller canopy that allows more light to reach the soil and stimulate weed germination and growth.

At this young stage, the impacts on tree growth can be most significant as roots are shallow occupying the same area as weed roots. Weeds also harbor rodent pest such as gophers, ground squirrels and voles feeding on roots and tender bark. During harvest, sweeping and pickup operations are hampered when weeds are growing in the tree row. Weeds can slow up the hulling process which increases time and cost.

Weed control techniques

Weed control must fit into an overall management system. Control programs depend upon grower practices, tree configuration and age, irrigation system, and soil type. Irrigation systems vary in design from drip, micro sprinklers, low volume impact sprinklers, furrow and flood. Each system has its own issues related to weed management from water distribution to plugging the orifices.

Soils with poor water penetration or surface seal may require frequent cultivation in row centers. Soil type and soil texture influence tillage practices, herbicide choices and applications rates. When planning your weed control program, consider the effects of herbicides on trees and environment and compare these with the effects of cultivation and weed competition, water penetration, water availability, ease of irrigation, soil structure and erosion, equipment needs, and fertilizer costs.

Chemical weed control

No single herbicide can control all vegetation. Chemical weed control does reduce mechanical trunk and root damage that can result from close cultivation especially on young trees. Combining (tank mixing) or alternating herbicides will enhance broad spectrum control of most weed species. Before selecting an herbicide or a combination of herbicides, consider the orchard weed history so you can choose the right type of herbicides.

New herbicides

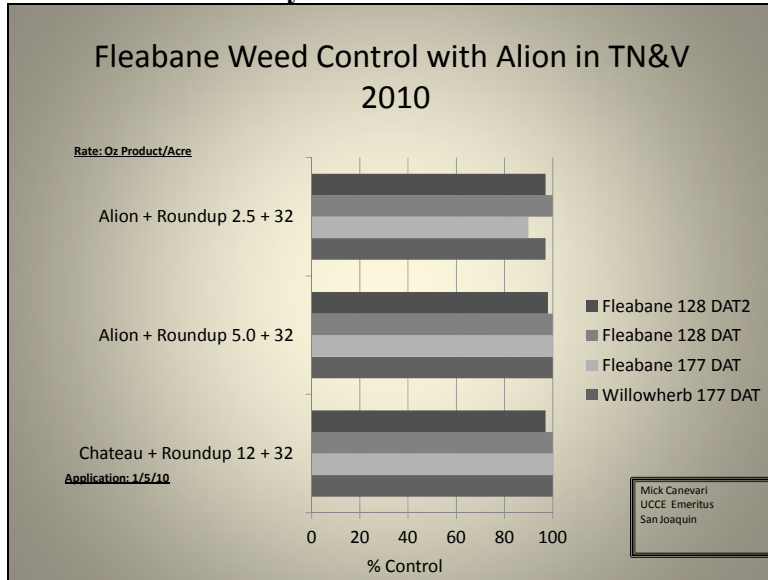
In recent years, several new herbicides have been registered for nut crops. These new active ingredient herbicides generally have reduced rates, many have activity pre and post emergent, and will control both grasses and broadleaf weeds. Most have an environmental profile that is safe to humans, wildlife and aquatic species, never the less, using best management practices are of paramount importance with all pesticides.

Shown below are several of the more recently registered herbicides for tree nuts with trial data. This list provides selected trials done by the author. Consult with the experts in your area to assist with specific conditions and recommendations.

Alion® Herbicide- Bayer

- *Indaziflam*- Preemergence herbicide
- Broadleaf and grasses
- Fruits & Nuts
- Mode of Action: Group 29 –Cellulose Biosynthesis Inhibitor

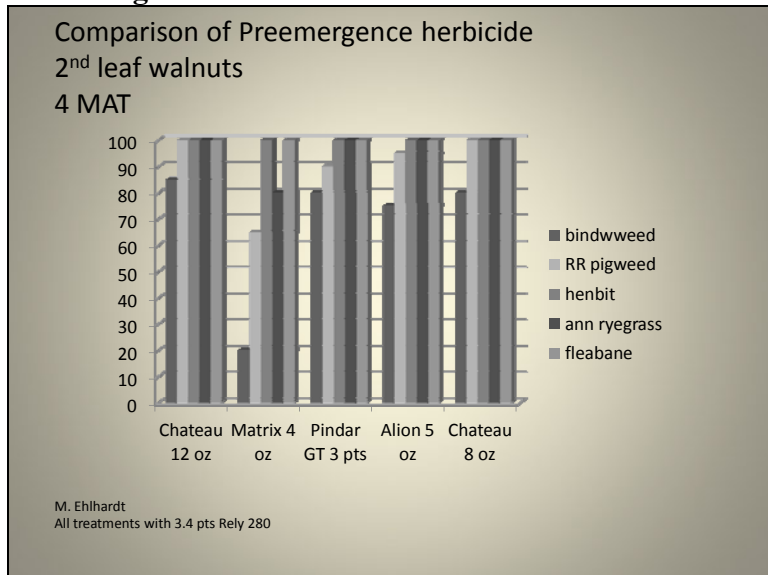
Alion control of hairy fleabane



Chateau® Herbicide- Valent

- *Flumioxazin* Fruits, nuts and vines
- Pre emergent herbicide for broadleaf and grasses
- Post emergent activity on small weeds
- Mode of Action: PPO inhibitor Group 14

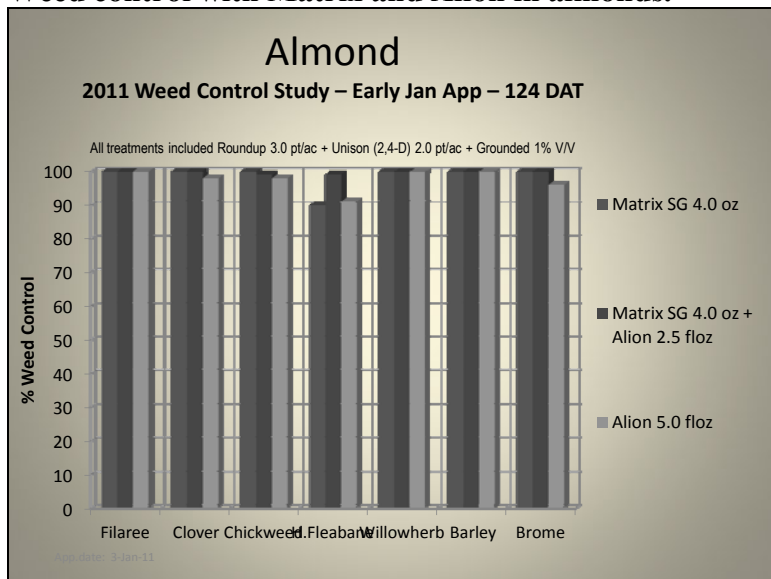
Pre emergence weed control in walnuts



Matrix® SG herbicide- Dupont

- Rimsulfuron (active ingredient)
- Mode of Action: Group 2 ALS inhibitor (sulfonylurea chemical class)
- Broadleaf weed and grass control, including fleabane and marestail
- Pre and Early Postemergence activity

Weed control with Matrix and Alion in almonds.

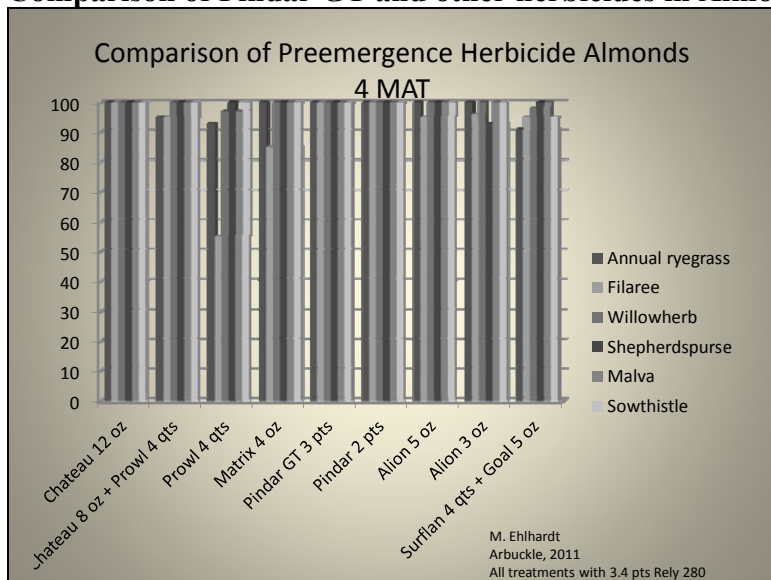


Pindar GT Herbicide- Dow AgriSciences

A premix of: *Penoxsulam*: ALS inhibitor active ingredient with broad spectrum weed control in tree nut crops and *Oxyfluorfen*: for broad spectrum residual and contact weed control.

- Burndown weed activity for many broadleaf and grass weeds
- Mode of Action- Group 2 & 14

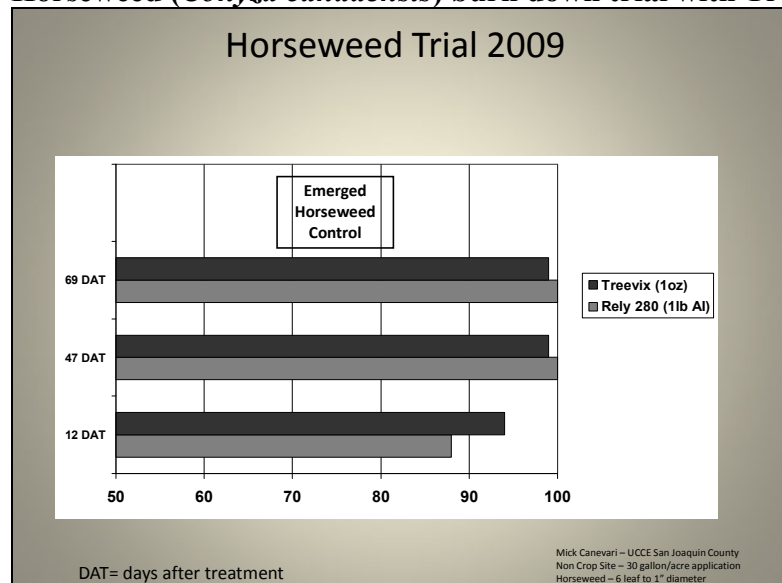
Comparison of Pindar GT and other herbicides in Almonds



Treevix™ BASF

- Saflufenacil – (active ingredient)
- Post Emergent burndown for Broadleaf Weeds
- Mode of Action - Group 14 PPO Inhibitor
- 1oz / Acre: PHI 7 Days for Tree Nuts
- Tank mix options: Glyphosate, Prowl® H₂O, Alion, Matrix®
- Rely® 280, Paraquat, Surflan, Chateau

Horseweed (*Conyza canadensis*) burn down trial with Treevix and Rely



Summary

Today there are many excellent residual herbicides available for growing nut crops.

- Matrix®, Alion™, Chateau®, Pindar™ GT “all” good products similar for residual weed control up to 150 days when applied in the winter months.
- Spring applications of residual herbicides Prowl & Surflan, can be tank mixed with new chemistries and better suited for summer weed spectrums and warmer temperatures.
- Newer post emergent herbicides include, Treevix®, Rely®, Shark® that are recommended with residual products. Glyphosate and Gramoxone can also be tank mixed to enhance weed spectrum control.
- With many different modes of action herbicides, a strategy for weed resistant’s becomes a manageable task.
- Generally newer pesticides are safer to humans, animals, and the environment however, caution should be made for crop safety and utilizing best management practices.