Technologies for weed management in berries

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Berry weed management

- Weed management on bed tops
- Cover crop & weed management in the furrows
- Physical methods to control weeds
- Automation of weed removal & runner cutting
California strawberry herbicides

- Pretransplant
  - Chateau
- Post-transplant – over the top
  - Devrinol
  - Dacthal
  - Poast
  - Select Max
- Post-transplant – directed spray
  - Chateau
  - Gramoxone
  - Prowl
  - Shark
  - Supress (organic)
Fallow- applied herbicides

- Apply Chateau or GoalTender to a fallow bed on Sept. 15, then transplant Oct. 15.
- It is asking a lot of these herbicides last through the fall, winter, and spring without injury to strawberry.
In season
Two herbicide strategies

1. Inject herbicides through the drip system after transplanting to extend the soil residual activity

2. Utilize a slow release formulation or mechanism that releases herbicide over several months after transplanting.
Stinger applied by drip – Dec: season long weed densities
Drip applied herbicides

- Stinger appears to control weeds by this method, but carryover to rotational crops is a concern.
- GoalTender applied by drip application is probably worth trying.
Slow release herbicides

- If an herbicide applied before transplanting could be released slowly over a 6-9 month period then it could provide season long weed control
- BayFilm was an attempt at this
- Halosulfuron was embedded in the plastic and slow released
Bayfilm – embedded with halosulfuron
Bayfilm – installation
Bay film

- The problem with this product was that it was made for nutsedge control in tomato
- Halosulfuron is very injurious to strawberry
- Chateau or GoalTender would be much better choices for slow release herbicides in strawberry (nano encapsulation)
<table>
<thead>
<tr>
<th>Group</th>
<th>Herbicide</th>
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<tbody>
<tr>
<td>1</td>
<td>SELECTMAX* HERBICIDE</td>
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Valent

Active Ingredient
- Clethodim: 12.6%
- Other Ingredients: 87.4%
Total: 100.0%

Contains Petroleum Distillates

*(E)-2-[(1-[[[3-chloro-2-propenyl]oxy]limino]propyl]-5-[(2-ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one

Contains 0.97 lbs clethodim per gal
EPA Reg. No. 59639-132
EPA Est. 5905-GA-01

<table>
<thead>
<tr>
<th>Strawberry</th>
<th>4 days</th>
<th>9 to 16 fl oz</th>
<th>12 to 16 fl oz</th>
<th>NIS at 0.25% v/v</th>
<th>None</th>
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* Do not apply more than 16 fl oz/A in a single application.
* Do not apply more than 64 fl oz/A (0.5 lb ai/A) per season.
* For repeat applications make on a minimum of a 14 day interval.
Strawberry

- PHI - 7 days
- Maximum Single Application Rate - 2.5 pints/acre
- Maximum Seasonal Application Rate - 2.5 pints/acre
- DO NOT allow livestock to graze or feed treated field.
  DO NOT feed livestock anything from treated field.
- Aerial and ground application allowed.

EXCEPTION: DO NOT apply by air in California.
Select 16 fl oz/Ac: bed + furrow

Treatment (3/1/17)
Herbicides

- Herbicides allow you to control weeds when and where needed better than any fumigant.
- Herbicides allow you the freedom to use clear tarps.
New technologies

- There are many constraints to getting new herbicides labelled for strawberry
- Weed control devices appear more promising
Precision “Spray” Map Concept

Computer Image
Intelligent sprayers – lettuce thinning

Blue River, Salinas, CA 6.19.15
Robovator on 80 inch beds
WATER JET & HOT OIL

High pressure water stream
30,000-90,000 PSI

Canola oil >150°C
Challenges

- Need systems to differentiate weeds from crop
- Need a grid applicator that can selectively identify and remove weeds within a complex scene
Runner cutting

- Harvest Moon from Winchester, MA has patented a runner cutter.
Summary

- There is still potential for innovation with herbicides
  - Slow release formulations
  - Organic weed control
- Automation will play a larger role in the future by mechanizing tasks
  - Automated weed removal
  - Automated runner cutting