

2008 Irrigation and Nutrient Management Meeting and Cover Crop Field Day

• Meeting Accreditation:

- CDPR: A-0470-08 3.0
- WQ: 080219-004-NPEIR 3.0 am
- 080219-004-NPEIR 1.0 pm
- CCA: 7372 4.5

- 0.5 Nutrient
- 3.0 Soil/Water mgmt
- 1.0 Crop mgmt

8:00 *Improving Water Use Efficiency and Water Quality in Lettuce*

Mike Cahn, Irrigation Farm Advisor, Monterey County

8:30 *Water Quality Status and Implications for the Conditional Waiver*

Kirk Schmidt/Sarah Greene, Central Coast Water Quality Preservation Inc.

9:00 *Low Residue Cover Crops for Vegetable Winter Beds to Improve Water Quality*

Richard Smith, Vegetable Crop and Weed Science Farm Advisor, Monterey County

9:30 *How Vegetable Growers Can Meet Water Quality Targets*

Tim Hartz, Extension Vegetable Specialist, UC, Davis

10:00 **Break**

10:30 *How Irrigation Systems Impact Survival of E. coli*

Steve Koike, Plant Pathology Farm Advisor, Monterey County

11:00 *Wind Energy for Irrigation Pumping*

Case van Dam, UC Davis, California Wind Energy Collaborative

11:30 *Solar Energy for Irrigation Pumping*

Erik Bakke, Sun Technics Energy Systems, Inc, Sacramento

12:00 **Conclusion**

Travel to lunch and Field Demonstration Site

Strawberry Furrow Bottom Cover Crop Field Trial Demonstration
Dole Strawberries –
End of Jensen Road (Between Watsonville and Moss Landing)

12:45 *Lunch – on Site*

Pizza lunch provided by CAFF

1:30 *Field Demonstration and Discussion*

***Impact of Furrow Bottom Cover Crops on
Runoff, Water Quality and Yield of Strawberries***

Mike Cahn, Mark Bolda and Richard Smith

2:30 *Conclusion*

Sponsors

- **University of California Cooperative Extension**
- **Community Alliance with Family Farmers (CAFF) (provided lunch)**
- **Resource Conservation District (RCD)**
- **Agriculture and Land-Based Training Association (ALBA)**
- **Kuida Ag (provided donuts)**

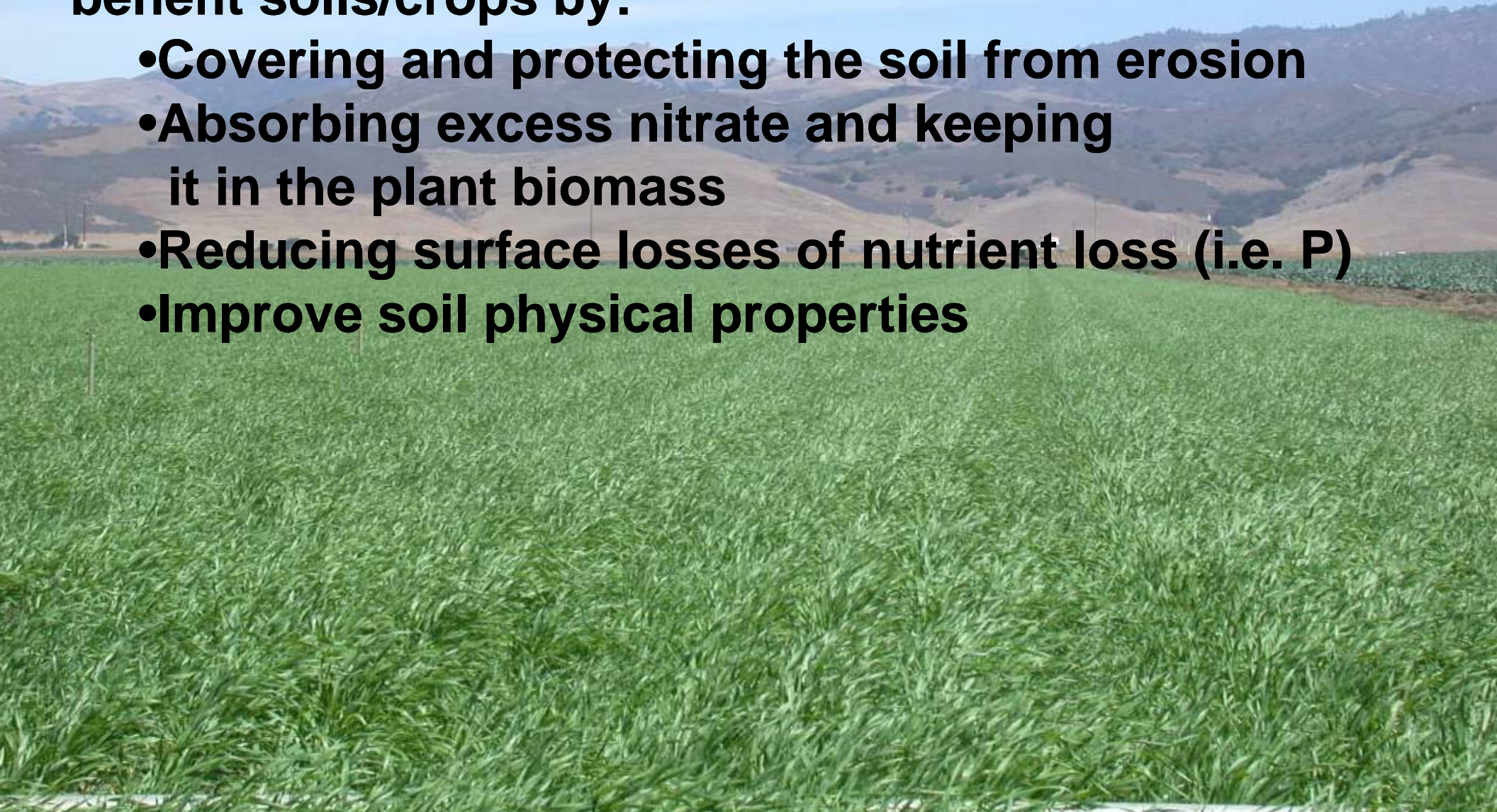


Low Residue Cover Crops for Winter Vegetable Beds to Improve Water Quality

**Richard Smith and Michael Cahn, Farm Advisors
University of California Cooperative Extension
Monterey, Santa Cruz and San Benito Counties**

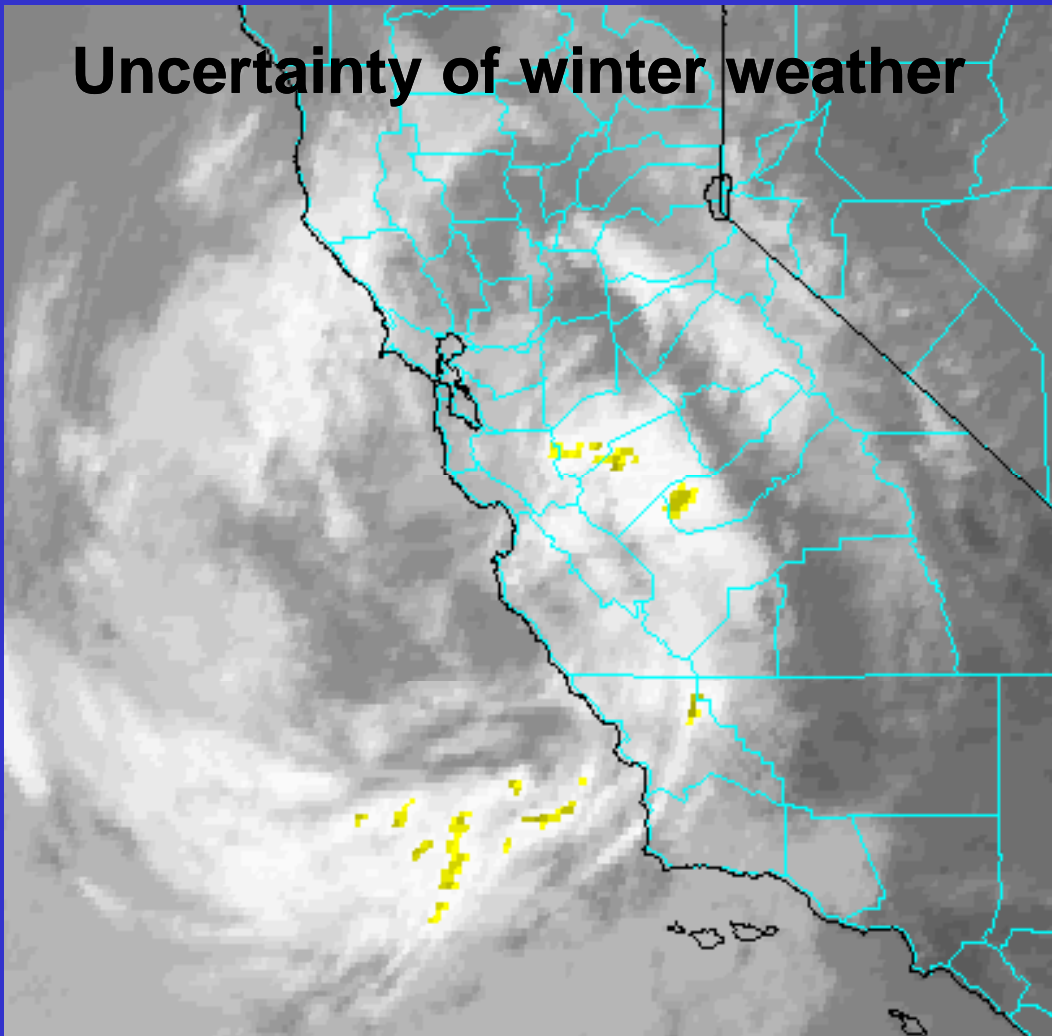
Cover cropping and winter rotations (i.e. cereals and sugar beets) are age old agricultural practice that benefit soils/crops by:

- **Covering and protecting the soil from erosion**
- **Absorbing excess nitrate and keeping it in the plant biomass**
- **Reducing surface losses of nutrient loss (i.e. P)**
- **Improve soil physical properties**



The benefits of cover crops are acknowledged, but there are impediments to their use

Uncertainty of winter weather




- High land rents
- Risk of missing spring planting schedules
- Lost opportunity for growing cash crops
- Direct cost (\$150 to \$200/A)
- Working wet soils in spring



**Around 5% of Vegetable
Acreage in the Salinas Valley
is Cover Cropped in Winter**



**Water Quality Issues are Driving the
Need for Reducing Sediment and
Nutrient Loads Leaving Agricultural
Fields**

A photograph of a vast field of green winter cover crops, likely a grass or legume, stretching to the horizon under a clear sky. The text is overlaid on the image in white, bold font.

Winter cover crops are grown at a key time to when sediments and nutrients are at risk for loss by winter storm runoff

We began looking at alternative winter cover crop strategies to find ways use cover crops while minimizing disruptions to growers operations

Low-Residue Cover Crops 2005 – 2007

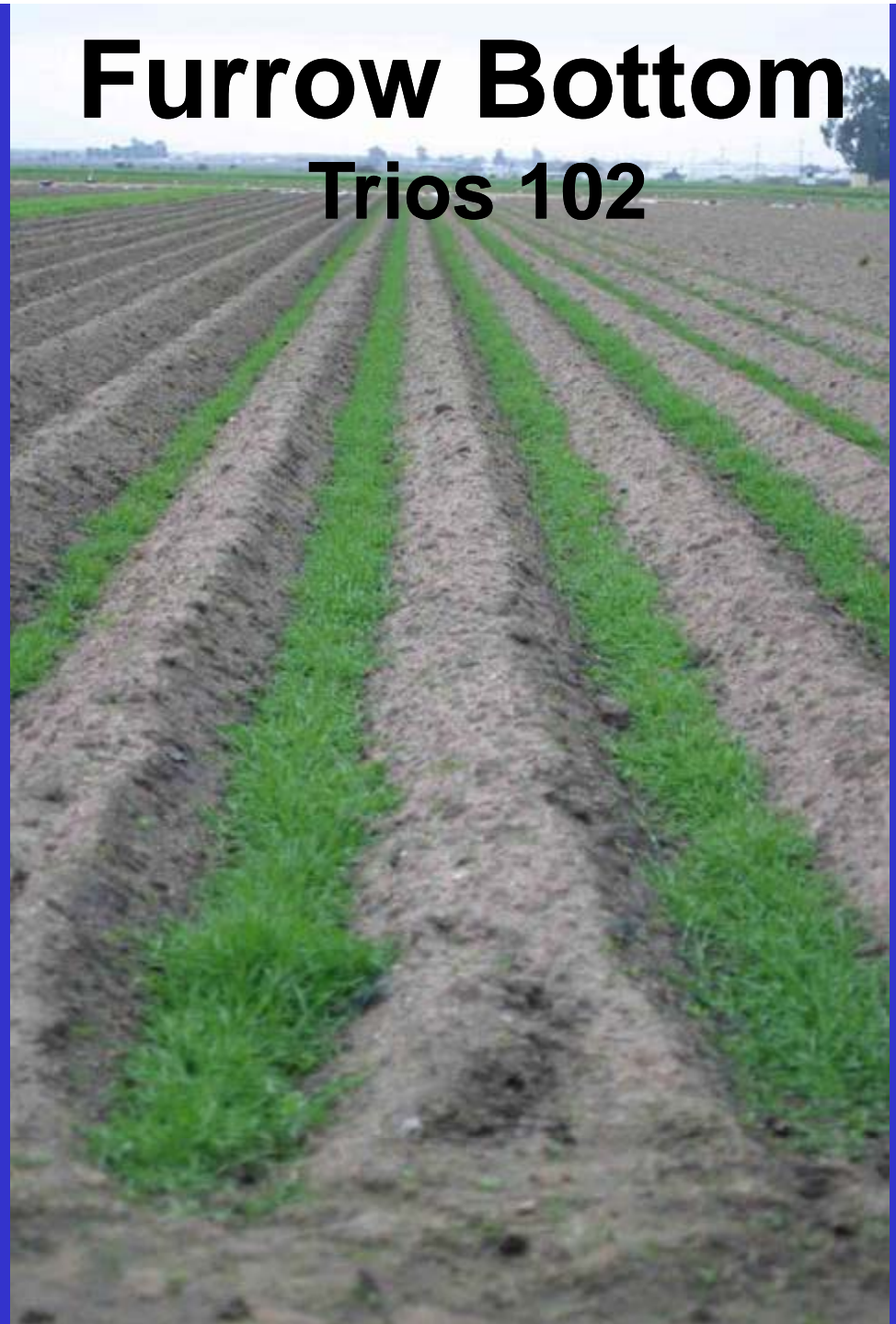
Funded by Regional Water Board PGE Funds

- **Furrow bottom cover crop**
 - Trios 102 winter dormant triticale
 - Would not grow too vigorously during the winter, but hopefully, enough to cover the soil, reduce runoff and filter water
- **Compared with the standard full cover crop**

Winter Runoff Trials

Full Cover Crop

**Furrow Bottom
Trios 102**





Runoff Quantity and Quality Monitoring

Full Cover Merced Rye and Furrow Bottom Trios 102

2006 Comparison

Treatment	Biomass T/A	Percent N In Tops	N in tops Lbs/A
Full Cover Merced Rye	2.48	2.13	106
Furrow Trios 102	0.29 12%	4.16 195%	24 23%

Sediment and Nutrient Concentrations in Run-off 2006-07

Treatment	Turbidity	Total-P	Total-N
Full Cover	917	1.9	3.0
Furrow	2377	3.3	5.7
Bare	4449	4.4	8.0

Furrow Bottom Cover Crops

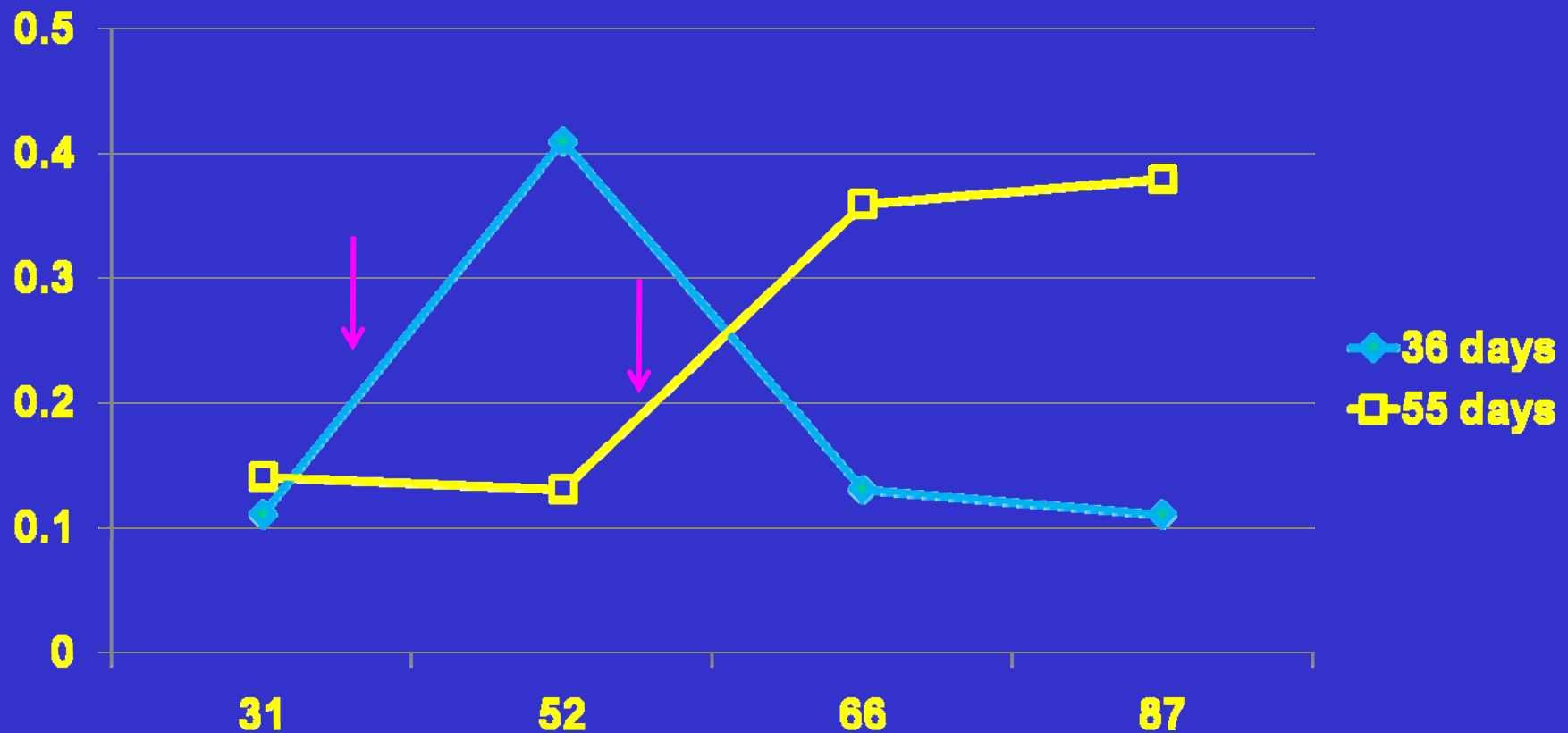
- They provide an intermediate step to reducing nutrient and sediment loss
- There is room for improving their performance
- There is a need for evaluating methods of incorporation of the cover crop and winter weed control

Full-Cover Low-Residue Cover Crops

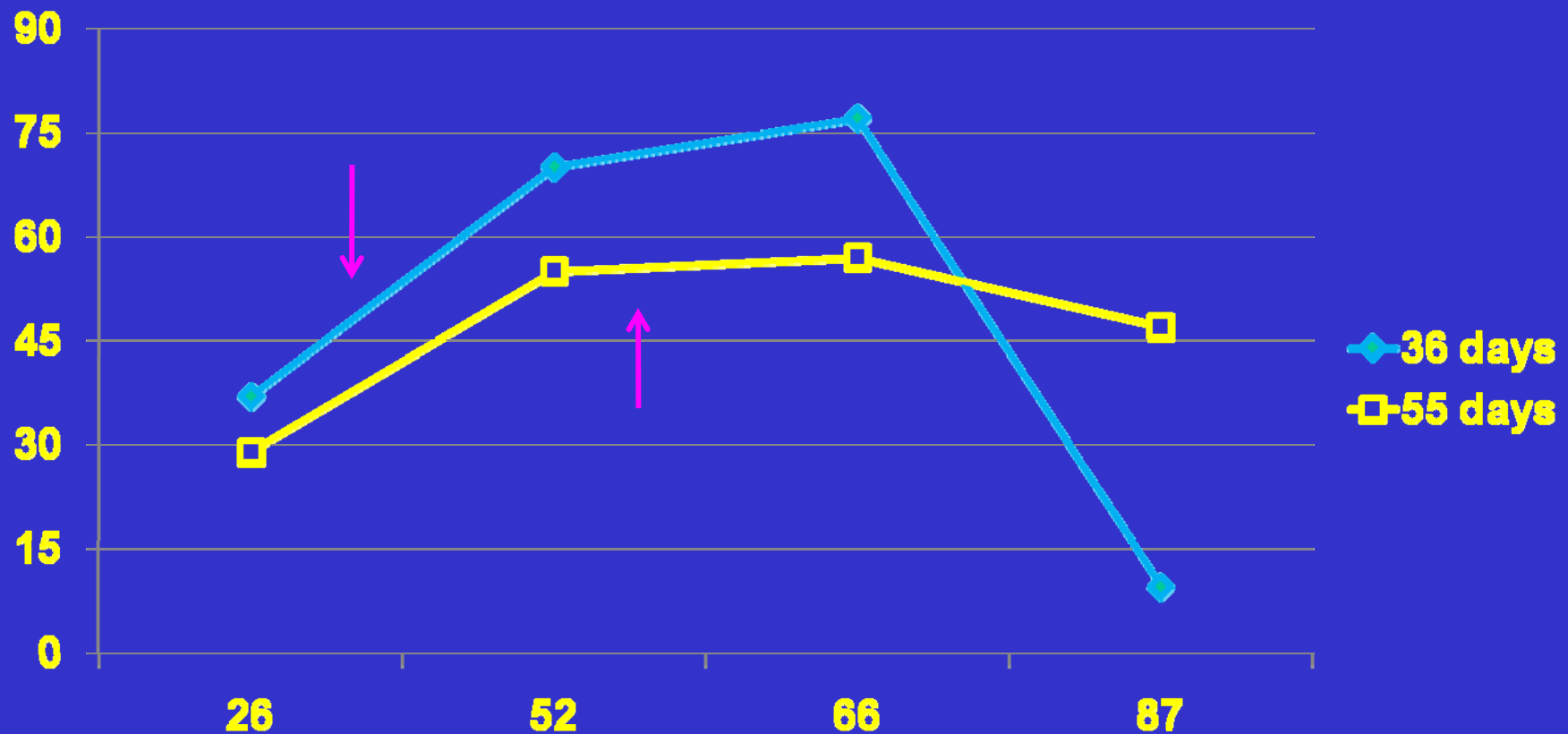
- Full cover low-residue cover crops may provide more complete coverage of the soil**
- In 2007 we initiated evaluations of standard covers (i.e. Merced rye) planted over the entire bed and killed at various stages to manage the level of residue to keep it at acceptable levels**



Biomass of Cover Crop on Two Kill Dates



Percent Ground Cover of Cover Crop on Two Kill Dates



**Kill Date: 36 days after planting
0.1 T/A and 9.5% Ground Cover**

The image shows a close-up view of dark brown soil. The soil is covered with a dense network of thin, dry, brown plant roots and stems, which appear to be dead or dormant. The overall appearance is that of a field after a kill date, with very little green vegetation remaining. The text is overlaid in bright yellow, bold font in the upper left quadrant.

0.1 T/A and 9.5% Ground Cover



**Kill Date: 55 days after planting
0.4 Tons/A and 45% Cover**

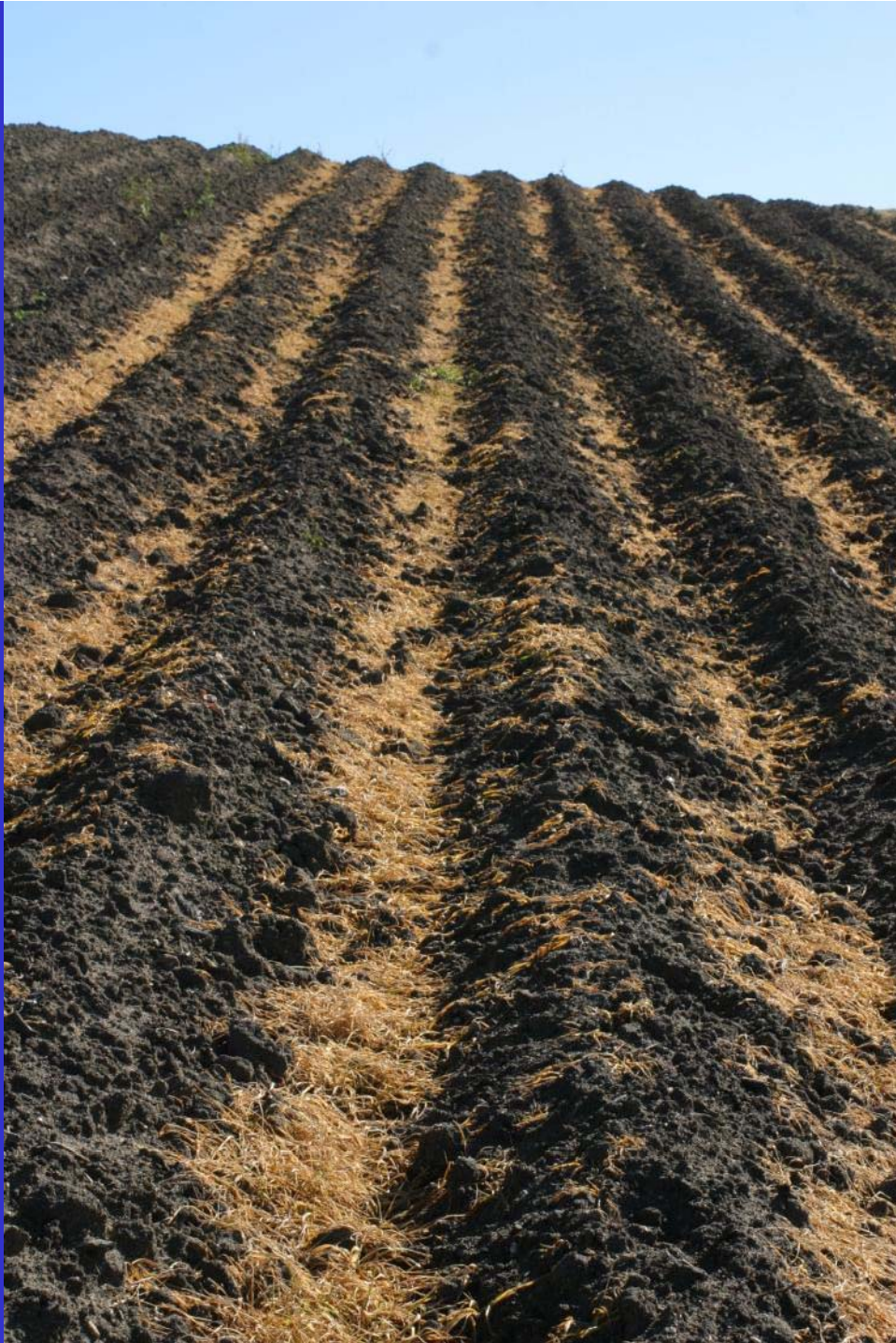


0.4 T/A and 45% Ground Cover

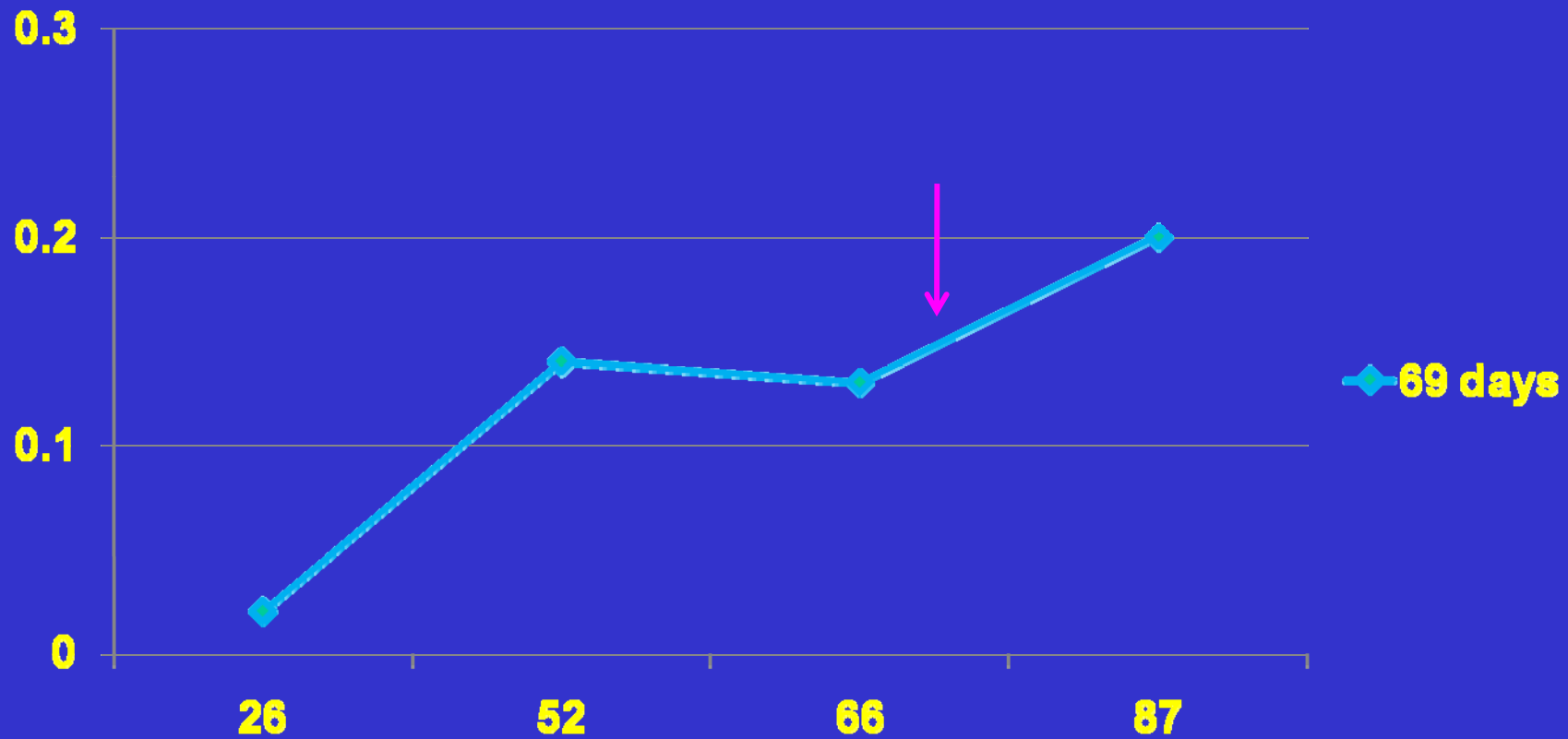


Trios 102

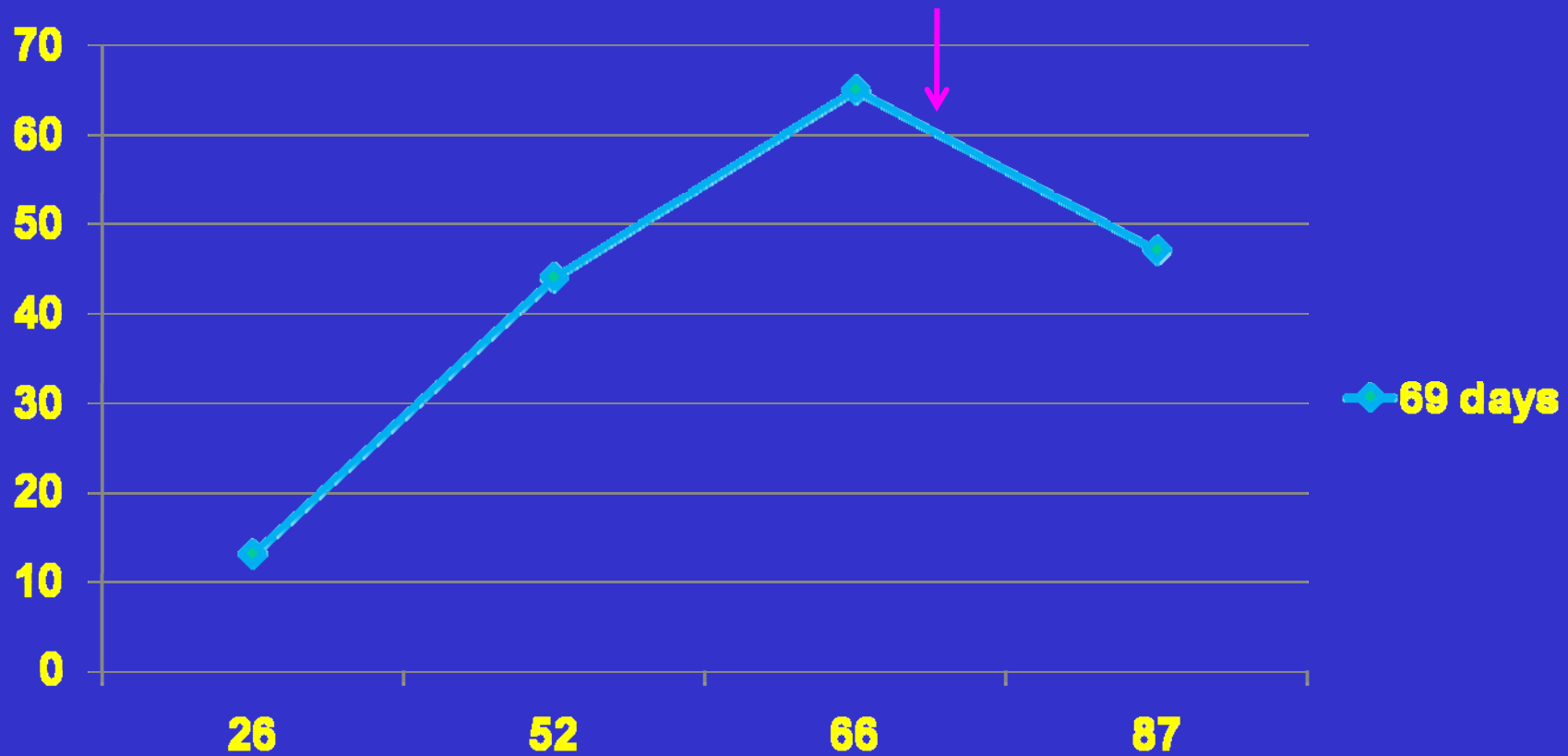
In furrow bottom



Biomass of Furrow Bottom Trios 102



Percent Ground Cover of Furrow Bottom Trios 102





**Killing the Cover Crop
May Reduce its Ability to
Retain Nutrients**

Nutrients in Runoff from Furrow Bottom Cover Crops in Strawberries 2007

Cover Crop	Total-P	Total-N	Potassium
Bare	3.6	6.5	2.5
Barley	3.2	5.3	11.4
Trios 102	1.9	2.3	3.2

Full-Cover Low-Residue Cover Crops

- **Fast growing cover crops will need to be killed sooner, which may cause them to 'leak' nutrients to the system**
- **Slow-growing cover crops do not need to be killed as early; they may grow too slow in the beginning**
- **We are working with a grower to get feedback on the acceptability of the amounts of residue in the field and their impact on working the beds in preparation for planting**

Summary

- **The low-residue cover crop strategies are not a complete solution to solving water quality issues for runoff leaving vegetable production fields**
- **They may provide a useful technique to reduce sediment and nutrient movement from winter fallow production fields runoff while allowing the grower to maintain their planting schedule**

**Thank You for
Your Attention**

