



BIODEGRADABLE PLASTIC MULCHES FOR STRAWBERRY PRODUCTION: EXPERIENCES AND OPINIONS OF GROWERS IN THREE REGIONS OF THE UNITED STATES

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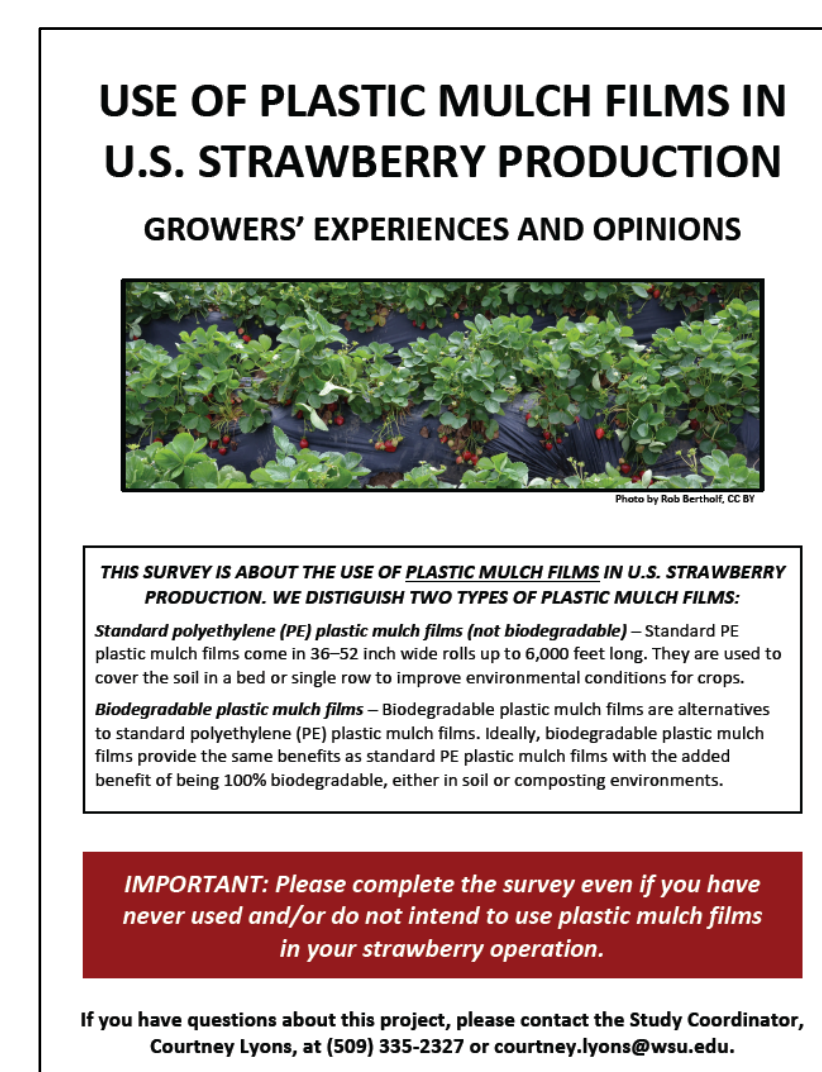
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INTRODUCTION

Polyethylene plastic mulches provide specialty crop growers with many agronomic benefits, but the disposal process can be financially and environmentally costly. Biodegradable plastic mulches (BDMs), which ideally provide similar agronomic benefits, may be an appealing alternative. Biodegradable plastic mulches can be tilled into the soil or composted at the end of the growing season, reducing the labor and environmental costs associated with plastic removal and disposal. Although available since the 1980s, BDMs have not been used widely by specialty crop growers in the United States (U.S.). Because of the prevalence of raised bed plasticulture for strawberries, we hypothesized that certain segments of the U.S. strawberry grower population might be 'early adopters' of BDMs. The purpose of our study was to explore strawberry growers' experiences with and opinions about BDMs in three U.S. regions: California, Pacific Northwest (Oregon, Washington), and Mid-Atlantic (New York, Pennsylvania).

SURVEY METHODS

- Strawberry growers surveyed in CA, NY, OR, PA, WA
- 16-page questionnaire + online version
- Four contacts during February–April 2016
- 21% response rate
- Surveys completed by 220 strawberry growers
 - 32 growers in California
 - 58 growers in Pacific Northwest (OR/WA)
 - 130 growers in Mid-Atlantic (NY/PA)



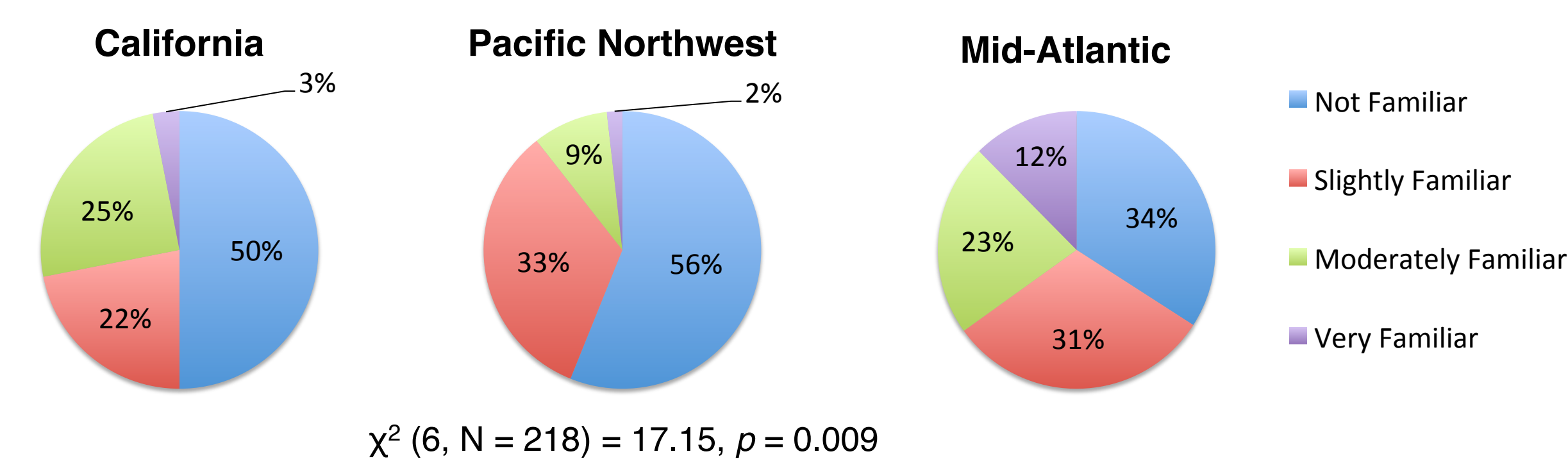
FARM CHARACTERISTICS

Farm Characteristics in 2015 ^a	California	Pacific Northwest	Mid-Atlantic
Total acres of strawberries (mean) ***	125 acres	15 acres	3 acres
Grew some certified organic strawberries (% respondents) ***	61%	41%	5%
Percentage of gross farm income from strawberries (mean) ***	53%	23%	10%
Used hill system for conventional strawberries (% respondents)	71%	42%	44%
Used matted row system for conventional strawberries (% respondents) *	29%	55%	64%
Used polyethylene plastic mulch in some or all strawberry fields (% respondents) ***	88%	23%	51%
Fumigated strawberry fields (% respondents) ***	62%	7%	7%
Percentage of conventional strawberries grown for fresh market (mean) ***	90%	64%	100%
Used direct-to-consumer marketing for conventional strawberries (% respondents) ***	28%	69%	98%

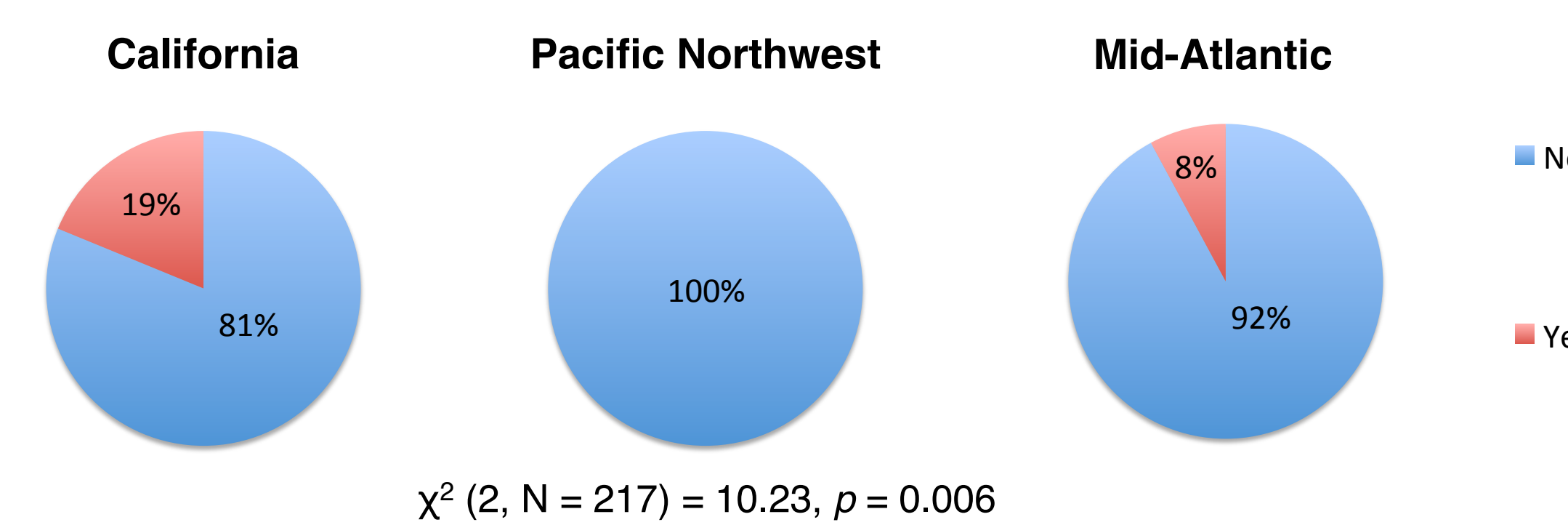
^a One-way analysis of variance (ANOVA) used for continuous variables. Chi-square (χ^2) test used for categorical variables. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

BIODEGRADABLE PLASTIC MULCHES

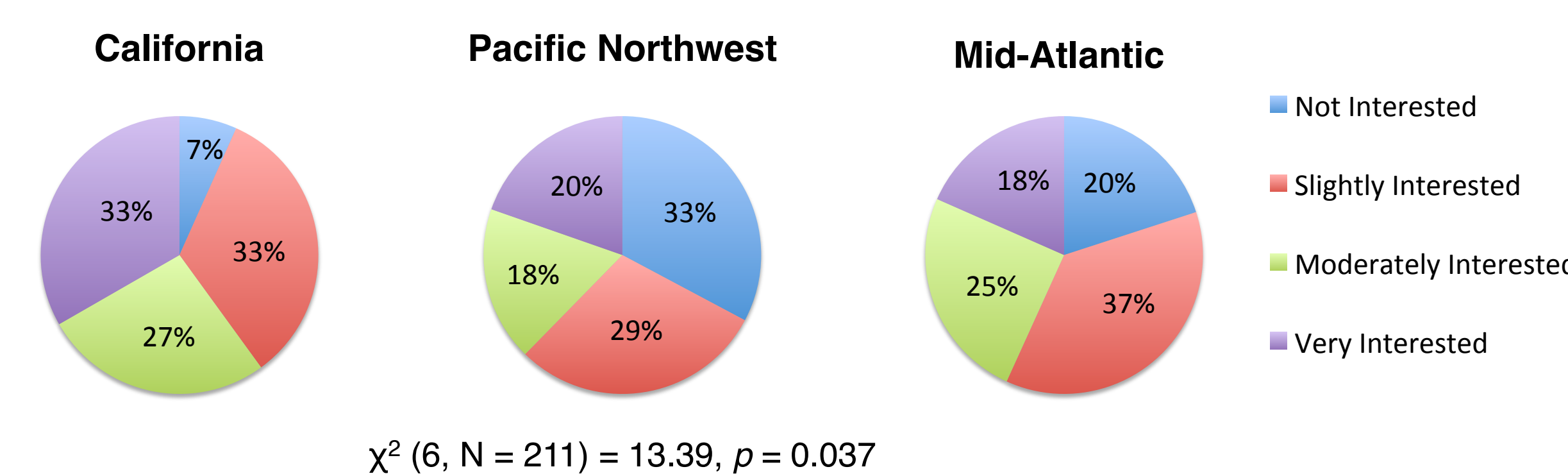
How familiar are you with BDMs?



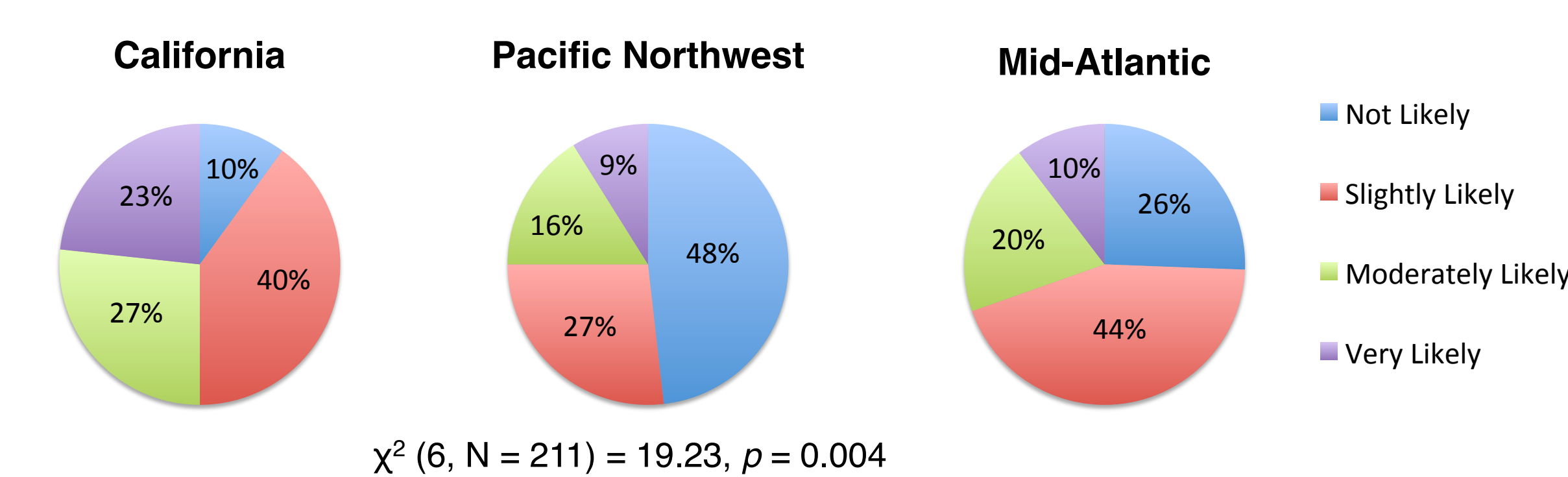
Have you ever used BDMs in your strawberry fields?



How interested are you in learning more about BDMs?



How likely are you to use BDMs in the next five years?



Strawberry field in Carlsbad, CA (Photo by Rob Bertholf)

BDM TRAIT PREFERENCES

Growers were asked "If you could design a biodegradable plastic mulch to meet your strawberry farming needs, how important would each of the following traits be?" The traits with the highest scores are presented below.

California	Pacific Northwest	Mid-Atlantic
1. Compatible with irrigation equipment	1. Remains intact until very end of growing season	1. Can be laid with plastic mulch layer
2. Remains intact until very end of growing season	2. Compatible with irrigation equipment	2. Compatible with irrigation equipment
3. Can be laid with plastic mulch layer	3. Can be tilled into soil at end of growing season	3. Remains intact until very end of growing season
4. Completely biodegrades in soil within one year	4. Compostable on-farm at end of growing season	4. Can be tilled into soil at end of growing season
5. Available in black	5. Produced with 100% bio-based materials	5. Completely biodegrades in soil within two years

ADOPTION SCENARIOS

Growers were presented with seven hypothetical scenarios and asked about the likelihood of considering the use of BDMs in their strawberry fields. We found no statistically significant regional differences, except for Scenario 6. Aggregated results are presented below.

Hypothetical Scenarios	% Moderately or Very Likely
1. Price of BDMs drops significantly.	56
2. University research indicates BDMs do not harm the soil.	52
3. BDMs readily available at local agricultural input supply stores.	51
4. Use of BDMs improves GAP or sustainability audit score.	49
5. Consumers willing to pay premium for products grown with BDMs.	43
6. Specific BDMs approved for use in certified organic production.	38
7. BDM use required by processor, wholesale buyer, or retailer.	34

CONCLUSION

We found statistically significant differences across the three regions for nearly all variables, suggesting that U.S. strawberry growers are not a homogeneous group with regards to experiences with and opinions about BDMs. Regional differences in farm characteristics and strawberry production practices likely influence growers' interest (or lack of interest) in and subsequent adoption (or rejection) of BDMs. As more BDMs enter the market in the coming years, we recommend site-specific education and outreach approaches that target different segments of the U.S. strawberry grower population.

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