

Cultural Context for the Implementation of Integrated Pest Management on Mushroom Farms in Pennsylvania: Perceived Control Matters

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I. Introduction

Integrated Pest Management (IPM) is an ecosystem-based framework aimed toward prevention and reduction of pests and pathogens in the environment¹. Although IPM is widely recognized for its potential to reduce carbon emissions, the extent to which it is successfully implemented is currently unknown². Moreover, there are cultural, behavioral, and biological challenges that sometimes prevent IPM from being achieved. In this study, we focus on the U.S. commercial mushroom industry, which invests heavily in IPM for the agricultural production of white and brown *Agaricus bisporus* (button) mushrooms¹. However, IPM implementation is challenged by the fact that farmworkers are responsible for carrying out all scales of the highly labor-intensive IPM system. Over 90% of mushroom farmworkers in the U.S. identify as Hispanic or Latino, and are Spanish-speaking and foreign born³. Notions of equity, social behavior, and belief-in-practice models suggest that language and cross cultural communication could influence the degree to which IPM is understood, used, and perceived as “doable”^{4, 5}.

Study Objective

This study examines the extent to which IPM is implemented by Hispanic/Latino mushroom farmworkers in Chester County, PA – a region responsible for over 63% of U.S. commercial mushroom production⁶. Relationships between implementation and barriers are also assessed, including perceived control and nativity.

Hypothesis

Commercial mushroom farmworkers in Pennsylvania face specific cultural barriers to the implementation of IPM. We discerned that workers with low perceived control would not implement IPM. Further, we predicted that foreign born workers would have lower perceived control.

II. Methods

An in-person, paper-pencil survey was conducted among 105 Latino mushroom farmworkers in Chester County, Pennsylvania. We measured IPM implementation by creating a composite score of 6 key IPM behaviors (wearing freshly washed clothes, closing doors, reporting mushroom diseases, avoiding mushroom diseases, covering holes in growing houses, and washing tools). Similarly, perceived control was measured using a composite score of 4 key indicators of self-efficacy (perceived control over preventing the spread of flies from one growing house to another, perceived control over the spread of mushroom diseases and pathogens from one growing house to another, perceived control over being able to avoid a areas showing signs of disease, and perceived control over wearing freshly laundered clothing to work each day). A Likert Scale was used for IPM implementation and perceived control (1=...5=...). Nativity was measured using a binary option of Foreign Born (FB) or U.S. Born (USB). Summary statistics and χ^2 tests were used to analyze results.

III. Results

Table 1: Demographics

Category	n	%
Education		
<8th	59	56
9th-11th	24	23
HS/GED	15	14
Some college	7	7
Age		
Under 30	29	27
30-39	27	26
40-49	24	23
Over 50	25	24
Nativity		
Foreign born	96	91
US born	9	9
English Proficiency		
Little	35	33
Some	41	39
Well	29	28
Income		
Below 20,000	13	12
20,000-29,999	25	24
Above 30,000	52	50
Don't remember	15	14
Pay		
Hour/salary	59	56
Yield/combo	45	43
Nonresponse	1	1
Gender		
Male	95	90
Female	10	10

Figure 1: Nativity Distribution

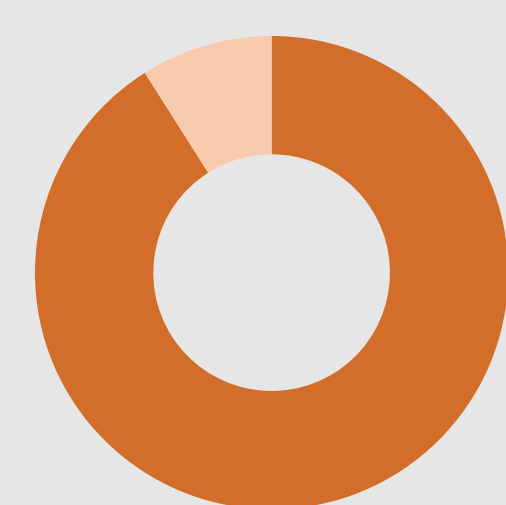


Figure 1: Nativity Distribution

Table 2: Responses

Category	n	%
IPM Implementation		
Full IPM	51	49
Moderate IPM	32	30
No IPM	17	16
Nonresponse	5	5
Perceived Control		
High	43	41
Moderate	48	46
Little	14	13
Nonresponse	0	0

All farmworkers self-identified as Hispanic or Latino. The vast majority were foreign born (91%), and male (90%) (other characteristics are described in Table 1). Nearly half of farmworkers indicated that they implement full IPM, and 41% indicated high perceived control over being able to implement IPM (see Table 2 for full results). The relationship between perceived control and IPM implementation, shown in Figure 2, was statistically significant ($\chi^2=12.28$, $p=0.015$).

However, as seen in Figure 3, there was no statistically significant relationship between nativity and perceived control ($\chi^2=0.3845$, $p=0.825$).

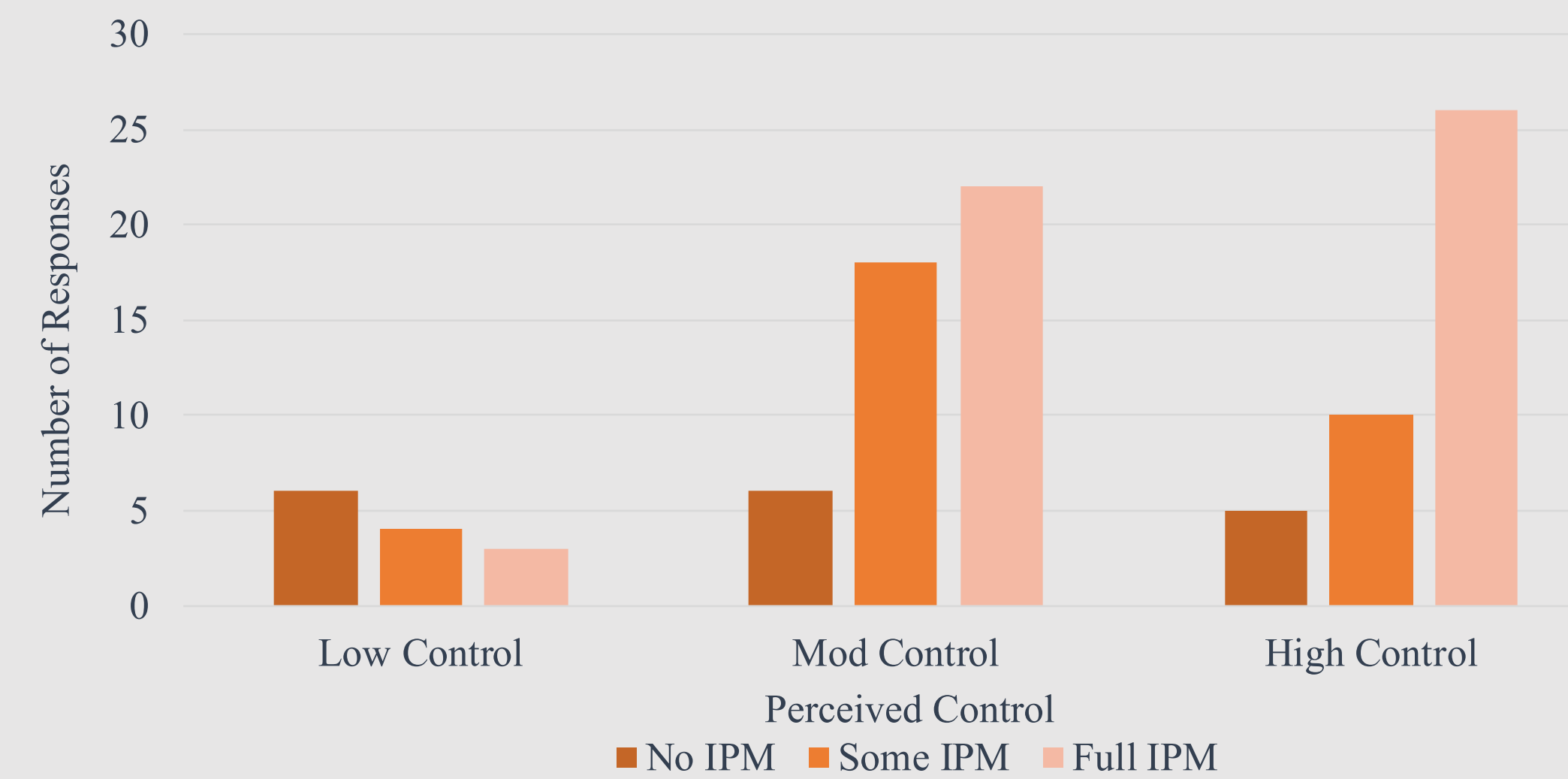


Figure 2: IPM Implementation by Perceived Control

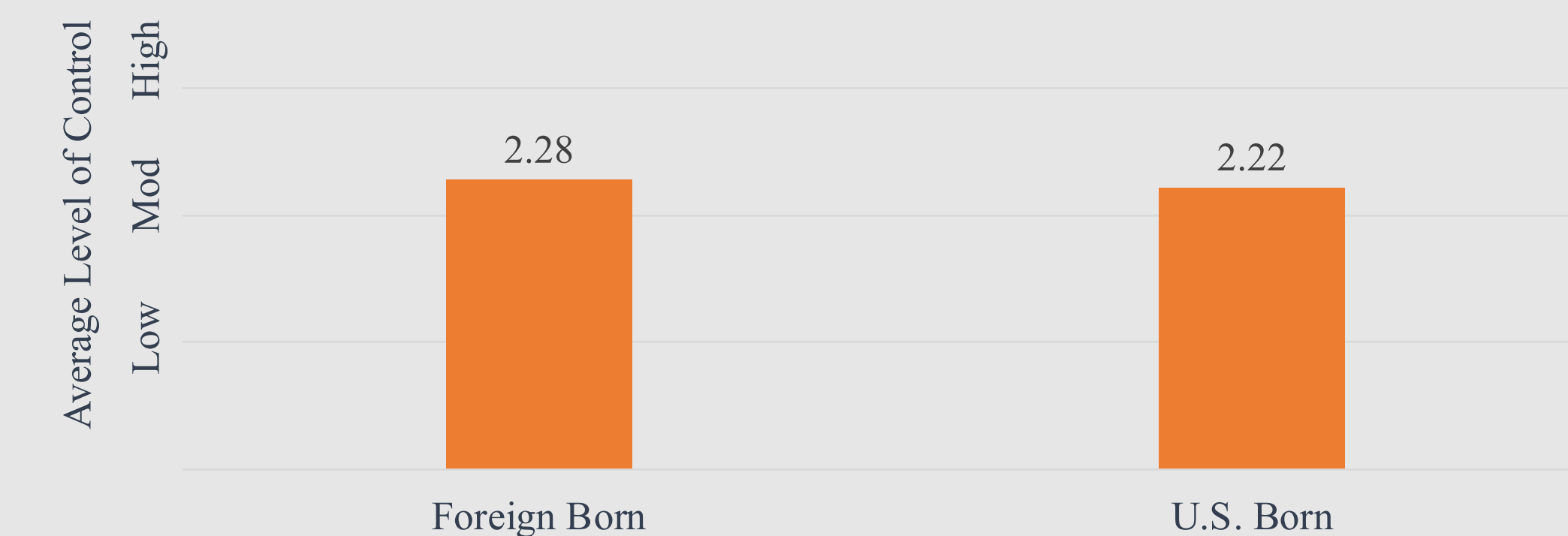


Figure 3: Perceived Control and Nativity

IV. Conclusions and Significance

We found that there was a relationship between perceived control and IPM behavior. However, perceived control is not explained by nativity. For future studies, we suggest examination within individual components of IPM. When examined, we found that workers reported the most control over cleaning their clothing, with varying degrees of perceived control over other IPM components (Figure 4).

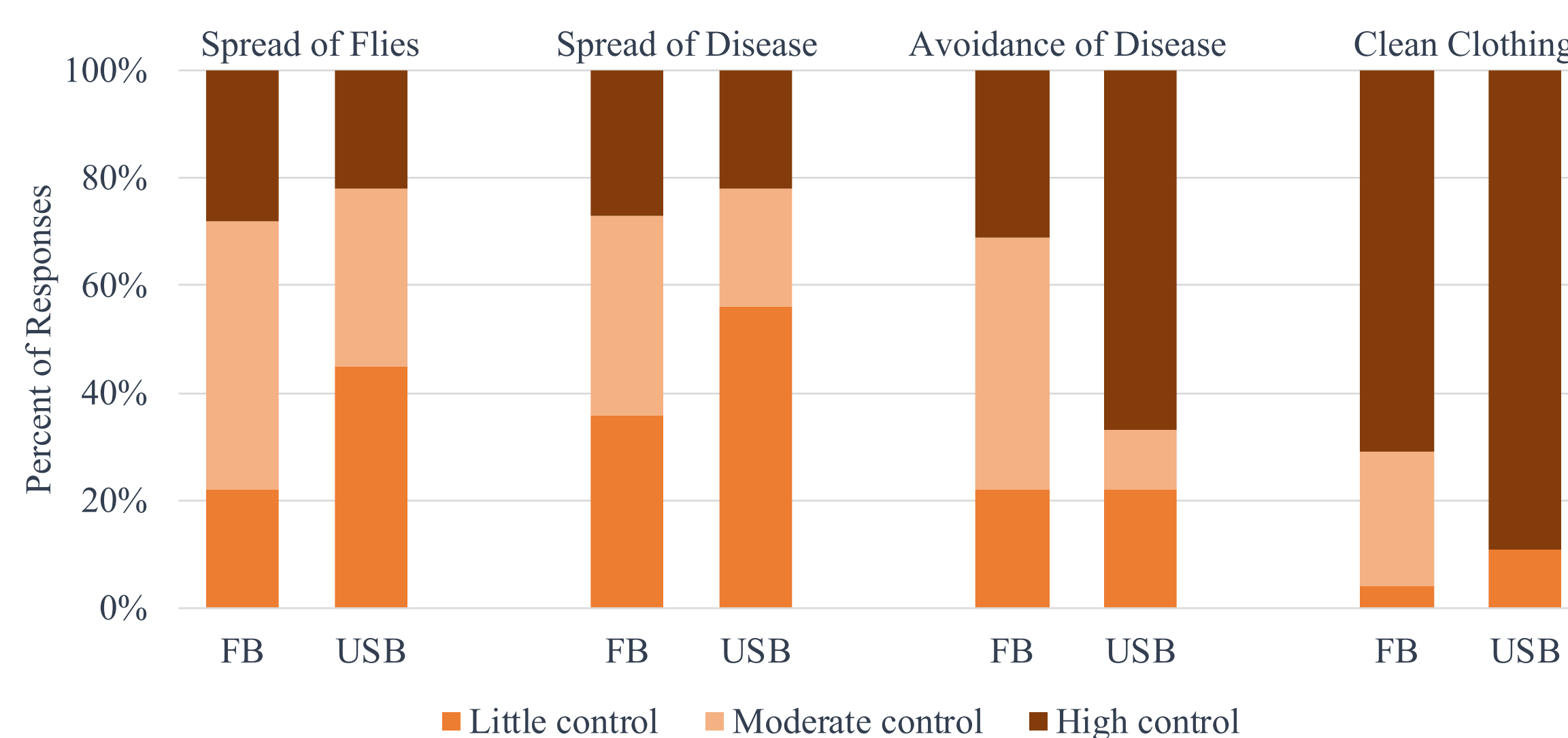


Figure 4: Individual Levels of Perceived Control and Nativity

V. Future Directions

Next steps might include seeking to further understand why workers feel less control over their ability to implement some IPM behaviors compared to others. Understanding the fullness of relationships between perceived control and IPM could help create better training for workers, and ultimately increase the extent to which IPM is fully implemented.

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