

Economic Efficiency of Mineral Oil-Insecticide Combinations in the Management of PVY

Pragati Dahal, Kelie Yoho, Erik Wenninger, Christopher McIntosh

Introduction

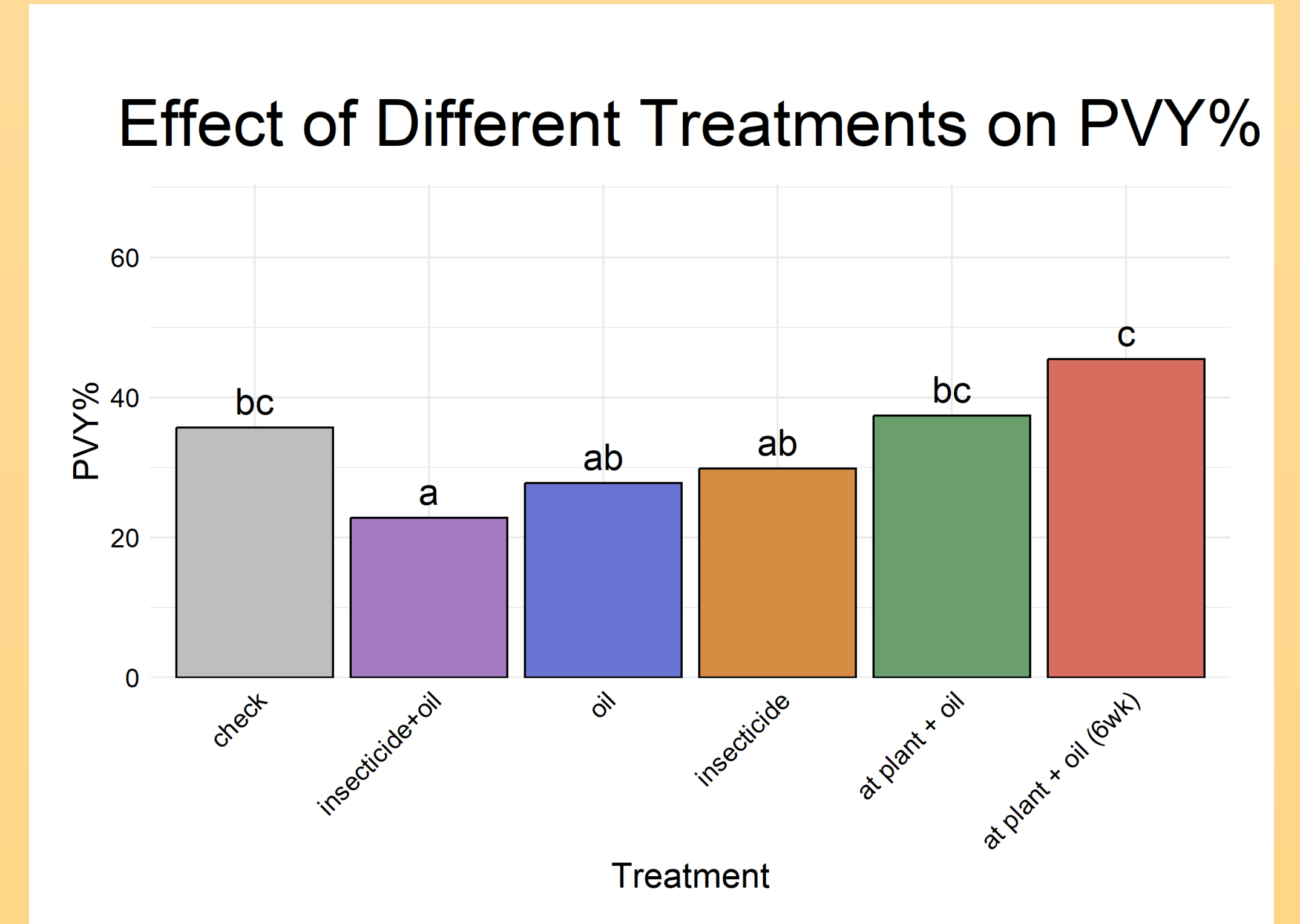
- PVY is a major pathogen in potato production.
- Infection can severely impact tuber yield and quality, particularly when the virus is seed-borne.
- It causes significant yield losses and seed lot rejections during certification.
- Primarily transmitted non-persistently by numerous aphid species.
- Because of this nature of transmission, most insecticides are ineffective at controlling such viruses.
- As a result, insecticides are often supplemented by other in-season management strategies.
- One of the strategies include the application of mineral oil.
- Research has demonstrated that mineral oil is effective in control of non-persistent viruses such as PVY.
- Mineral oil are compatible with natural predators and the absence of known aphid resistance.
- Studies suggest that combination of insecticide with mineral oil may enhance protection against PVY.
- However, there is limited study on the economic viability of this approach.



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Results

Impact on PVY



- The results indicate that the combination of insecticide and oil was the most effective treatment for reducing PVY infection
- Similarly, Oil alone and insecticide alone also provided a favorable outcome but was less successful than the oil and insecticide combination.

Data

- Data on yield and PVY incidence were collected from 2020 to 2023 from field trials done in the University of Idaho Kimberly Research and Extension Center.
- Price data of potato is obtained from USDA. Average price of years 2019 to 2023 is used.
- Cost of chemicals were obtained directly from the supplier.

Impact on Yield

- The results indicate that all treatments, including oil, insecticide, and their combinations, produced yields similar to or lower than the untreated check.
- This suggests that the treatments were ineffective in improving yield compared to the check.

Table 1: Effect of different treatments on potato yield

Treatment	Yield(cwt/acre)	group
Check	449.81	a
Oil	442.82	a
Insecticide	427.72	a
Insecticide + Oil	414.66	a
At Plant + Oil (6wk)	382.67	ab
At Plant + Oil	342.02	b

Objectives

- To compare the economic efficiency of different combination of insecticide and mineral oil.
- To determine the most cost-effective option.

Methodology

- Analysis for economic viability of the treatments were done using partial budgeting.
- Post hoc pairwise comparisons were conducted using least square means with Fisher's LSD adjustment for multiple comparisons.



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Economic Impact

- Since there is no increase in yield, there is no significant boost in revenue with the treatments.
- However, the use of chemicals incurs additional costs, including the cost of the chemicals and their application.

Conclusion

- These treatments may not be cost-effective for improving profitability of commercial growers.
- On the other hand, for seed potato growers, the combination of insecticide and oil presents a promising option for reducing PVY infection, as it is the most effective treatment in this study.
- By minimizing the risk of PVY, this treatment can help maintain seed quality and prevent the spread of the virus, ultimately leading to healthier seed potatoes.