

THE SPOTTED WING DROSOPHILA: DOES A CORRELATION EXIST BETWEEN MONITORING AND DAMAGE IN RASPBERRY IN QUEBEC?

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PROBLEMATIC

- In Quebec, Spotted Wing Drosophila (SWD) is a major pest of berries and insecticide sprays are recommended during harvest to protect fruits.
- The suggested threshold is of one fly per trap because tolerance of growers is low.
- However, the link between adults in baited traps and damage to fruits is unknown.
- When season is long and phytosanitary applications limited, delaying spray could help to protect harvest later in the season.
- The objective of this project is therefore to determine whether there is a correlation between trap catches and fruit damage while comparing two different method of assessing level of SWD infestation (salt test and fruits incubation) to ultimately decide if spraying should be delayed or not.

SPECIFIC OBJECTIVES

1. Determine if there is a significant correlation between SWD adults captured in the field and number of larvae/pupae recovered in **salt test** made with fruits harvested the day of trap collection or three days later.
2. Determine if there is a significant correlation between SWD adults captured in the field and number of adults recovered through fruits **incubated** in cup for 15 days whereas fruits were harvested the day of trap collection or three days later.

MATERIALS AND METHODS

FARMS AND EXPERIMENTAL SET-UP

- Five farms in three regions (Quebec)
- Both summer and fall raspberry plot in the same farm
- At least 10 rows of each type of raspberry
- JP-trap baited with yeast and sugar
- Three traps in edge and three traps in the center of the plot
- Traps spaced of at least two rows
- JP-trap collected one time per week
- Fruits harvested two times per week
- A minimum of six weeks of sampling all along the season

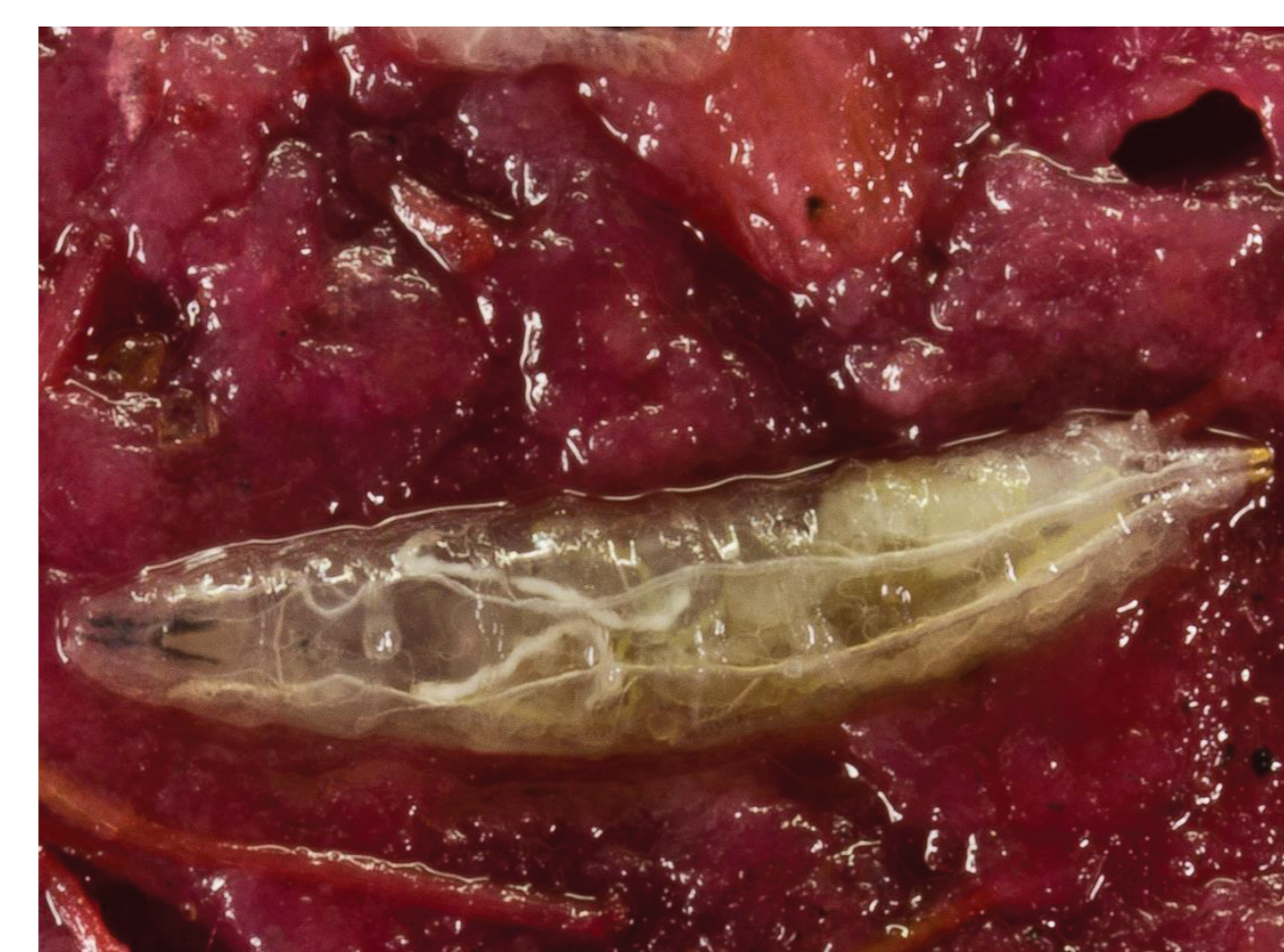


VARIABLES MEASURED

- Adult population: number of SWD males and females in trap every week in each farm.
- Larvae/pupae in fruits: number of larvae/pupae in 120 fruits harvested in the six meters near each traps by a salt test.
- Adult produced per fruits: number of adults in 30 fruits harvested in the six meters near four traps and incubated individually in Solo cup.

STATISTICAL ANALYSIS

The number adults observed in the traps was correlated with fruit infestations (salt test) or adults produced (fruits incubation) when fruits have been harvested the same day as traps collection or three days later (PROC CORR, SAS Institute).



RESULTS AND CONCLUSION

- In general, SWD arrival is observed in the last 2-4 weeks of harvest in summer raspberries and typical pattern observed on farms is represented in Figure 1.
- With salt test, the first larvae/pupae in the fruit were observed 3 to 19 days after the first adult catch and often remain at low levels in summer raspberry (Figure 2).
- Correlations between larvae/pupae number and females or both sexes collected are significant and strong regardless of the number of traps placed in the field (Table 1 and Figure 3).
- Correlations are stronger between adults and fruits harvested the same day than the baited trap collection. This is probably due to short eggs and first larval instar developmental time.
- Correlations are significant but less strong with adults emerged from fruits incubated which underlined that salt test is the best test to evaluate fruit infestation.
- Fruits incubated showed that females lay more offspring in fall raspberry than summer raspberry probably due to high SWD population abundance (Figure 4).
- Experiment was repeated in 2017. Analysis are in process and equation of the relation will be determined.

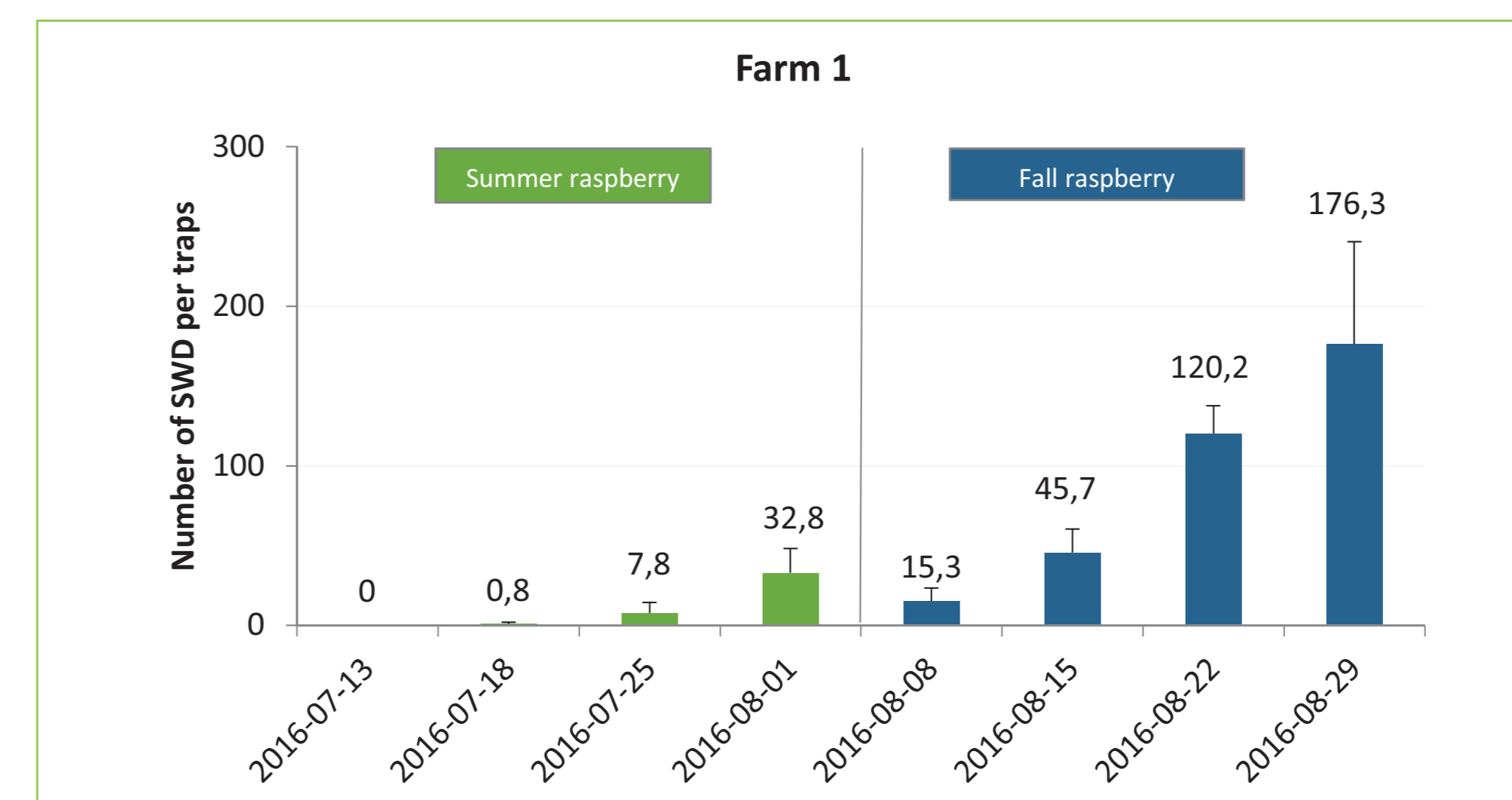


Figure 1: Number of SWD adult observed on farm 1 on summer and fall raspberry.

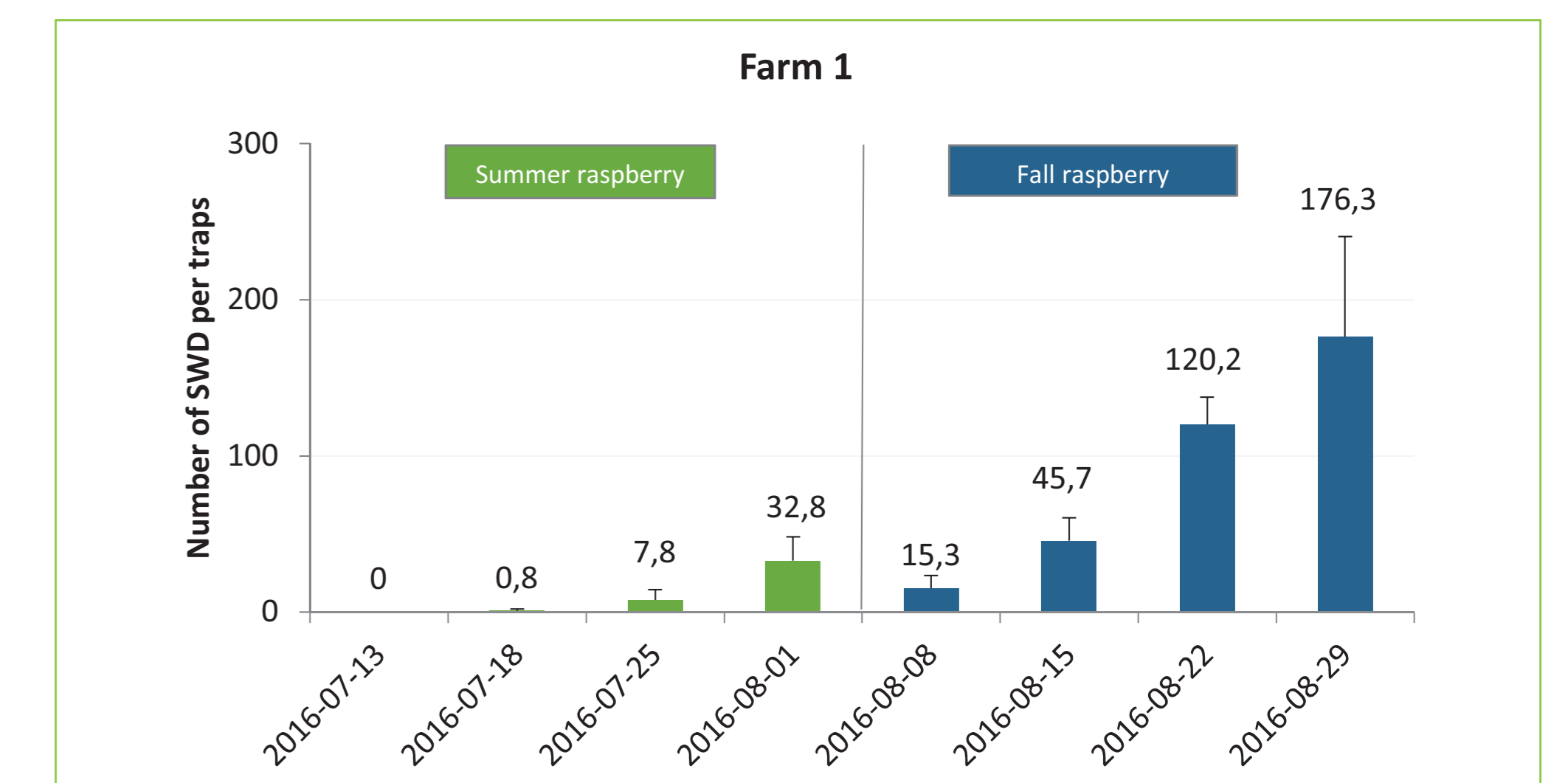


Figure 2: Number of larvae/pupae observed in 120 fruits on farm 1 in summer and fall raspberry.

Relatively to day of trap collect	Salt test for 6 traps		Salt test for 2 traps		Fruits incubated	
	Same day	3 days later	Same day	3 days later	Same day	3 days later
Females	R ² =0.88391 p<0.0001	R ² =0.82372 p<0.0001	R ² =0.88158 p<0.0001	R ² =0.82713 p<0.0001	R ² =0.70946 p<0.0001	R ² =0.85450 p<0.0001
Males	R ² =0.74095 p<0.0001	R ² =0.72533 p<0.0001	R ² =0.78276 p<0.0001	R ² =0.78990 p<0.0001	R ² =0.61502 p<0.0001	R ² =0.75883 p<0.0001
Both	R ² =0.86772 p<0.0001	R ² =0.79739 p<0.0001	R ² =0.88436 p<0.0001	R ² =0.82702 p<0.0001	R ² =0.71120 p<0.0001	R ² =0.86071 p<0.0001

Table 1: Correlation between adults and number of larvae/pupae in fruit observed by salt test or number of adults issued from incubated fruits. Correlation were made with data from six traps or two traps to reflect trap number recommendation.

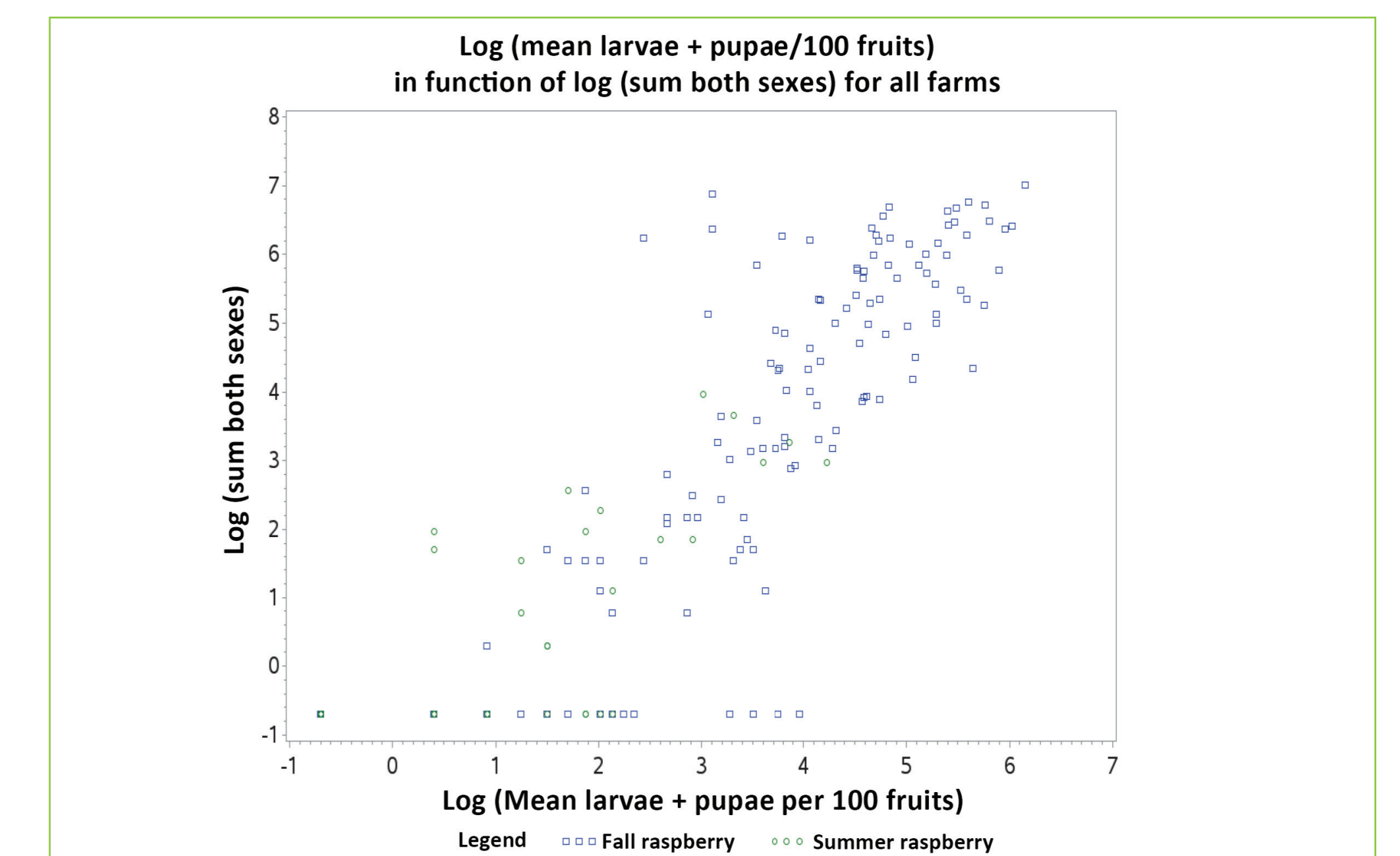


Figure 3: Relationship between mean larvae + pupae per 100 fruits and trap catches (both sexes).

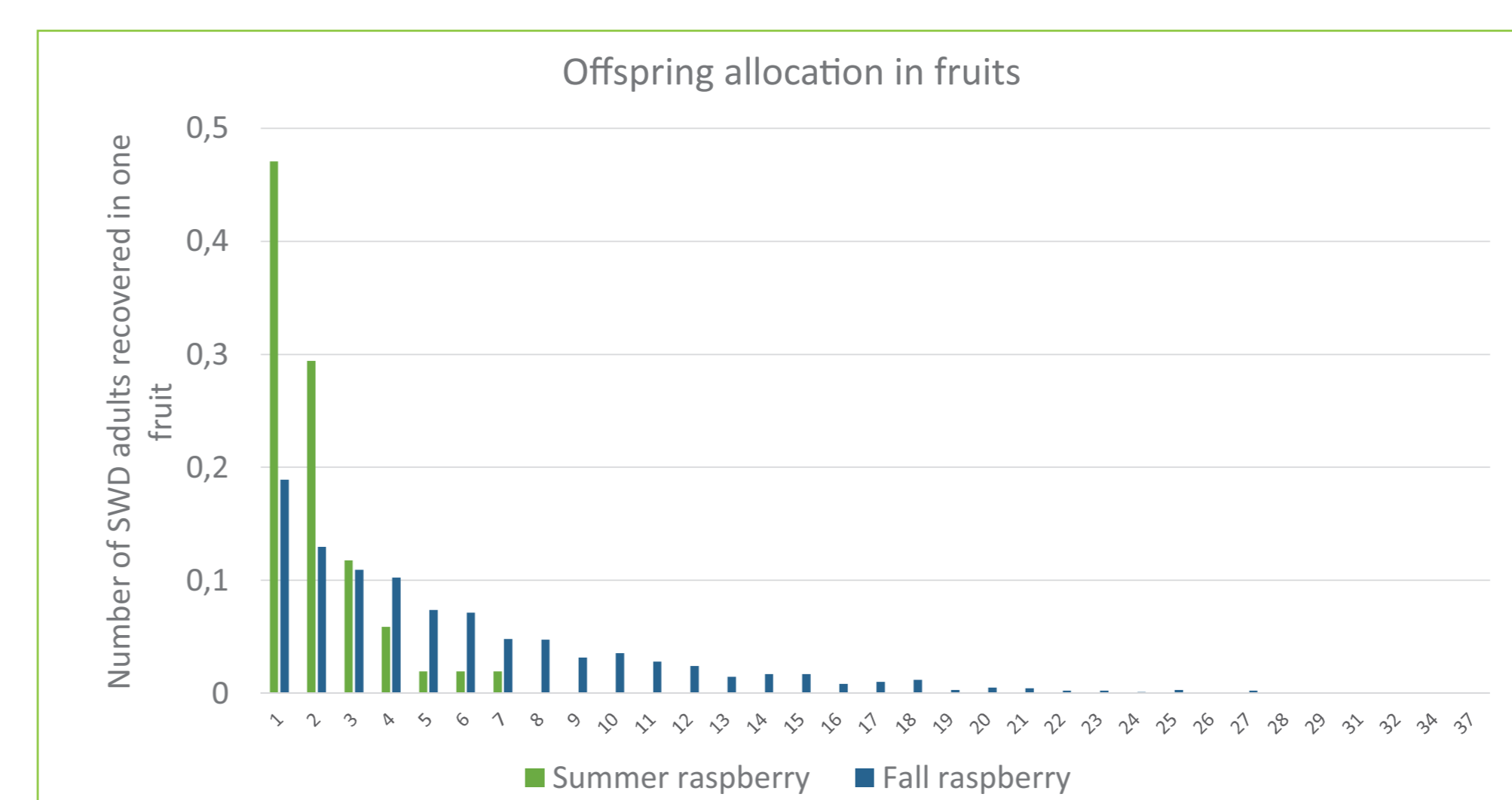


Figure 4: Distribution of the number of adults produced per fruits in function of raspberry.

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