

On-farm evaluation of pre-harvest application of acid clay in organic apple orchards to reduce post-harvest apple diseases

Introduction

In organic production, control methods against post-harvest diseases are limited, as the use of synthetic pesticides pre- and postharvest, as well as the use of 1-methylcyclopropene (1-MCP) during storage are prohibited. To evaluate alternative control measures compatible with organic production, additional acid clay treatments were tested right before to harvest.

Methods

Trials were conducted in 2023 and 2024 on six organic apple farms with the varieties Bonita, Gala, and Topaz. Depending on precipitation, 1–2 applications of acid clay were applied up to three days before harvest. The incidence of post-harvest diseases was assessed after 2.5, 4.5, 6, 7 and/or 8 months of storage.

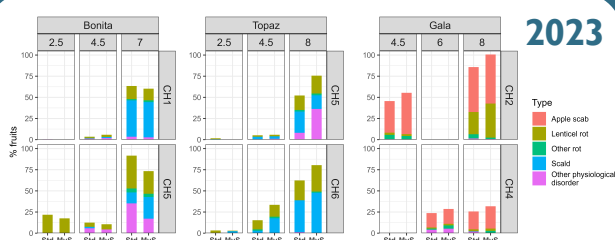


Fig. 1: Types of fungal diseases and/or physiological disorders 2023. Std=Standard organic, MyS=Myco-Sin. Assessment after 2.5, 4.5, 6, 7, and/or 8 months of storage.

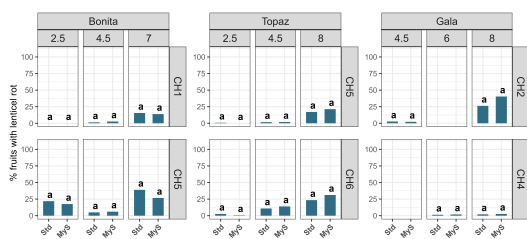


Fig. 2: Percentage of fruits with lenticel rot 2023 after 2.5, 4.5, 6, 7, and/or 8 months of storage. Std=Standard organic, MyS=Myco-Sin.

Table 1: Orchard characteristics, Myco-Sin sprayings, and harvest date 2023.

Farm	Variety	Planting year	Pruning distance	Planting distance	Irrigation	Myco-Sin treatments (Std)	Additional Myco-Sin treatments (MyS)	Precipitation from last treatment to harvest	Precipitation within 2 months before harvest	Total precipitation until harvest	Harvest day
CH1	Bonita	2018	long	1 m x 3.2 m	none	6	2	0 mm	32 mm	640 mm	07.10.23
CH2	Gala	NA	long	1 m x 3.5 m	none	NA	2	NA	139 mm	507 mm	06.09.23
CH4	Gala	2008	short	1 m x 3 m	drip	21	2	0 mm	212 mm	649 mm	08.09.23
CH5	Bonita	2022	short	1 m x 4 m	none	10	2	0 mm	127 mm	560 mm	07.10.23
CH5	Topaz	2022	short	1 m x 4 m	none	10	2	0 mm	127 mm	560 mm	07.10.23
CH6	Topaz	2020	short	NA	None	NA	2	0 mm	158 mm	560 mm	28.09.23

Results

- No effect of additional Myco-Sin spraying(s) observed
- Lenticel rot was higher in 2024 compared to 2023
- Disease pressure varies according to the orchard
- More lenticel rot on Topaz and Bonita compared to Gala

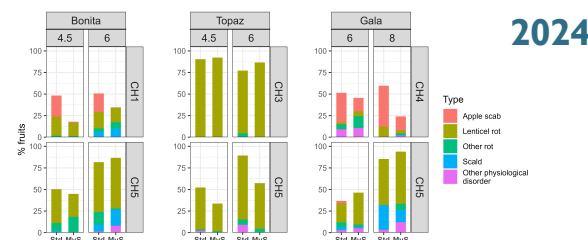


Fig. 3: Types of fungal diseases and/or physiological disorders 2024. Std=Standard organic, MyS=Myco-Sin. Assessment after 4.5 and 6 months of storage.

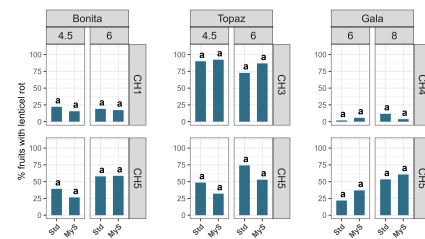


Fig. 4: Percentage of fruits with lenticel rot 2024 after 4.5 and 6 months of storage. Std=Standard organic, MyS=Myco-Sin.

Table 2: Orchard characteristics, Myco-Sin sprayings, and harvest date 2024.

Farm	Variety	Planting year	Pruning distance	Planting distance	Irrigation	Myco-Sin treatments (Std)	Additional Myco-Sin treatments (MyS)	Precipitation from last treatment to harvest	Precipitation within 2 months before harvest	Total precipitation until harvest	Harvest day
CH1	Bonita	2018	long	1 m x 3.2 m	none	9	1	8 mm	178 mm	870 mm	30.09.2024
CH3	Topaz	1997	long	1 m x 3.2 m	drip	9	1	~ 35 mm ¹	218 mm	1000 mm	04.10.2024
CH4	Gala	2008	short	1 m x 3 m	drip	22	1	~ 20 mm ¹	255 mm	1000 mm	09.09.2024
CH5	Gala	2020	short	1 m x 4 m	none	11	1	~ 30 mm ¹	344 mm	900 mm	09.09.2024
CH5	Bonita	2022	short	1 m x 4 m	none	11	1	~ 120 mm ²	279 mm	900 mm	05.10.2024
CH5	Topaz	2022	short	1 m x 4 m	none	11	1	~ 120 mm ²	279 mm	900 mm	05.10.2024

¹ within the last three days prior to harvest. ² producer omitted an additional spray

Conclusion

- 2023: total annual precipitation was rather low, dry weather before harvest might not have promoted lenticel rot
- 2024: Myco-Sin washed-off before harvest, one spraying might not have been sufficient, all precipitations might have to be covered until harvest to reduce lenticel rot development

Project partners



Agroscope



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