The effects of mulch (*Olea europea* and *Pinus halepensis*) on burned soils

A preliminary study in Adriatic coast (Croatia)

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July 2019 (burned area)

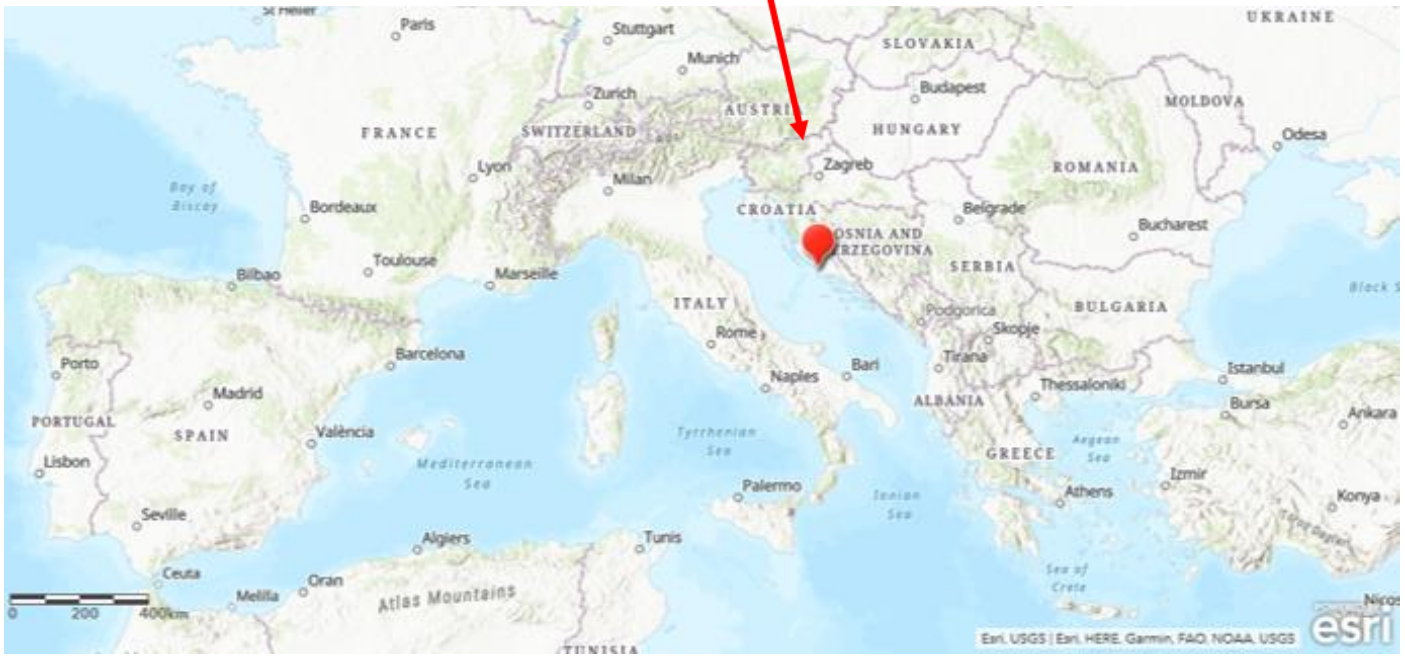
Photo: [Fire-fighting association Šibenik city]

Study area

- The **wildfire** occurred 28 July 2019
- Affected area ~ 900 ha

- Location: **Croatia**, near Šibenik city (Adriatic coast)
- 43°45'"N 15°56’”E, 105 m a.b.s.l.
- Slope ~ 8 °
- Soil type: *calcocambisols*
- The mean annual temperature - 15.8 °C
- The annual precipitation - 800 mm

July 2019 (burned area)



Experimental design

- **Tretments:** two mulch applications (*Olea europea* and *Pinus halepensis*), and Control, unmulced tretment

- **Soil Sampling**
- 45 soil samples (15 per treatment) at each sampling date
- Soil depth: 0-5 cm
- **25 days after fire** (August 2019) before mulch application, then **3 months** (November 2019), and **6 months** (February 2020) **after fire….**

- **Laboratory analyses**
- pH, SOM (soil organic matter), MWD (mean weight diameter), SWR (soil water repellency)

- **Statistical analyses**
- Kolmogorov-Smirnov and Levene tests
- Two-way ANOVA (*post hoc* Tukey test, $p < 0.05$)

August 2019 (burned area)

August 2019 (*Pinus halepensis* tretment)

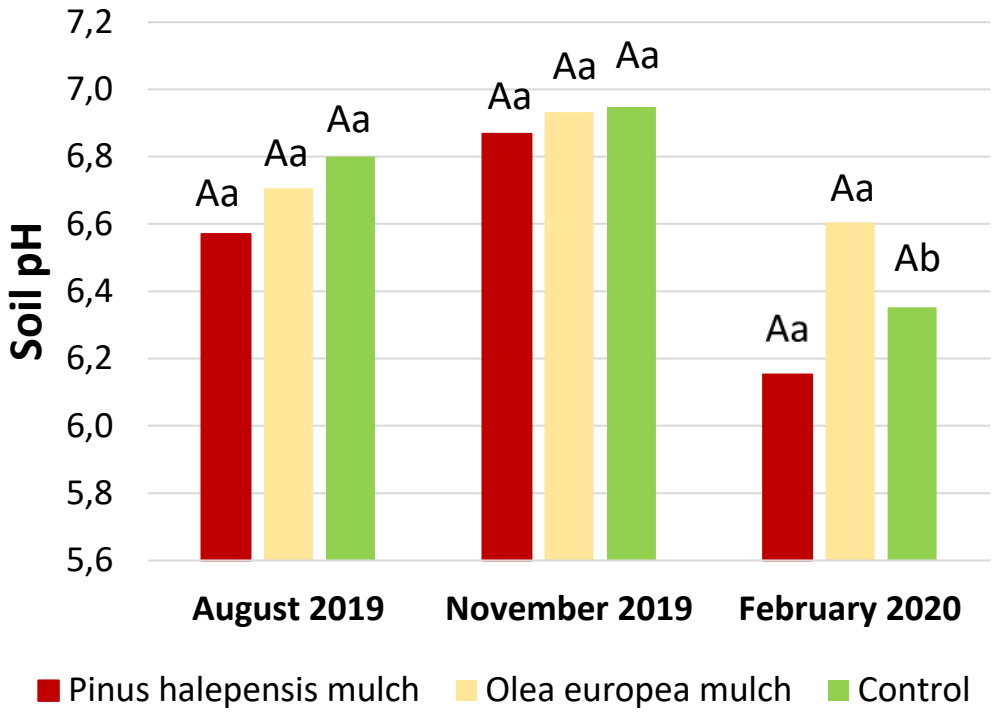
August 2019 (*Olea Europea* treatment)

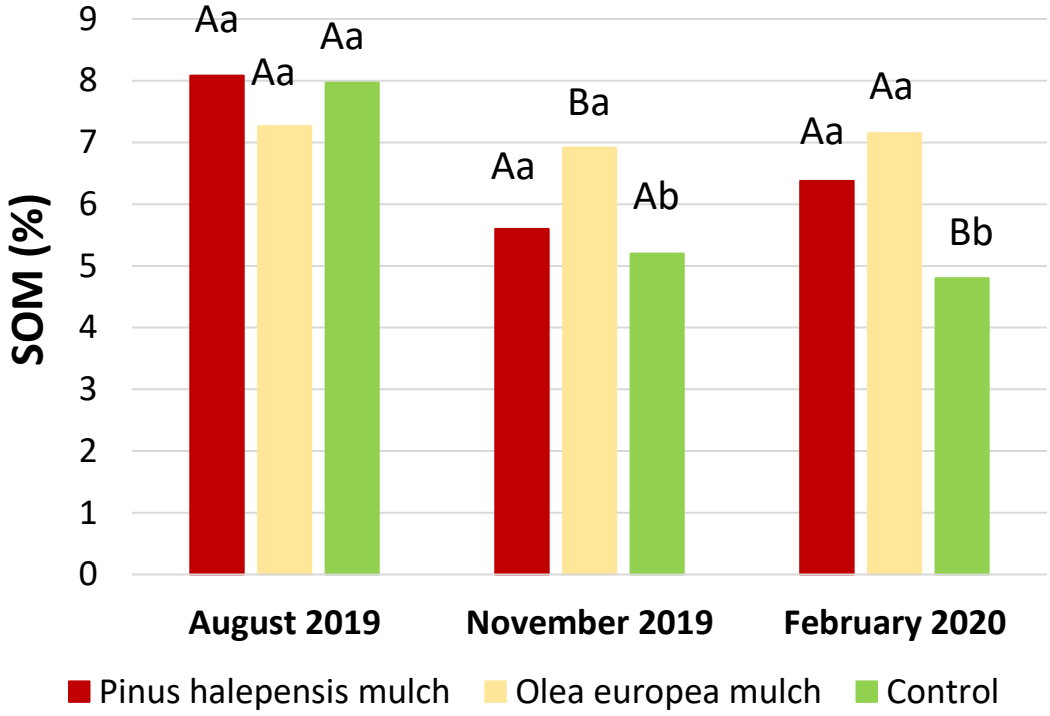
August 2019 (burned area)

November 2019 (burned area)

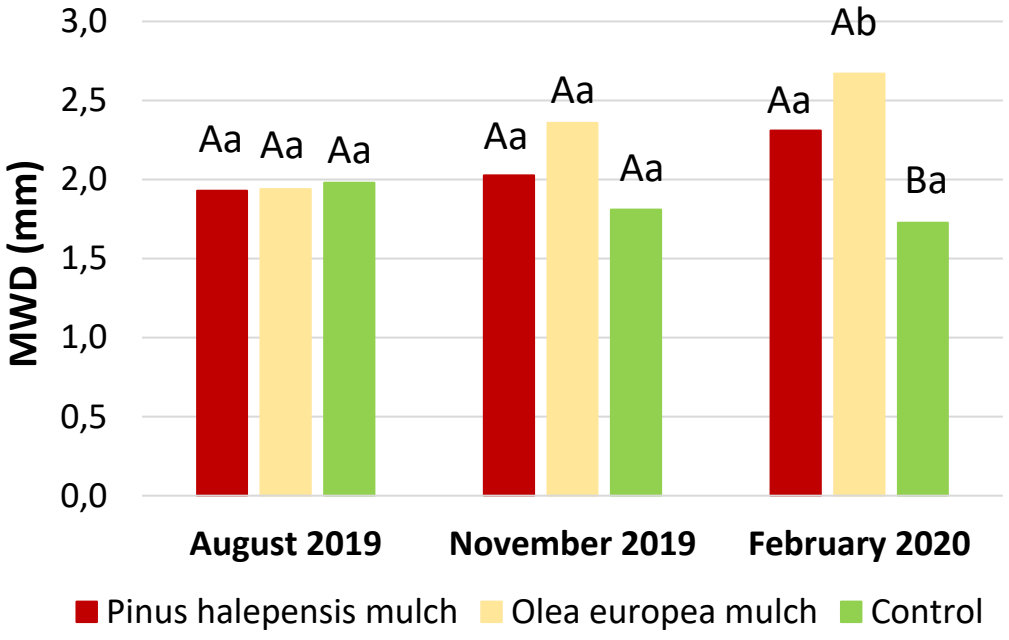
February 2020 (*Olea Europea* treatment)

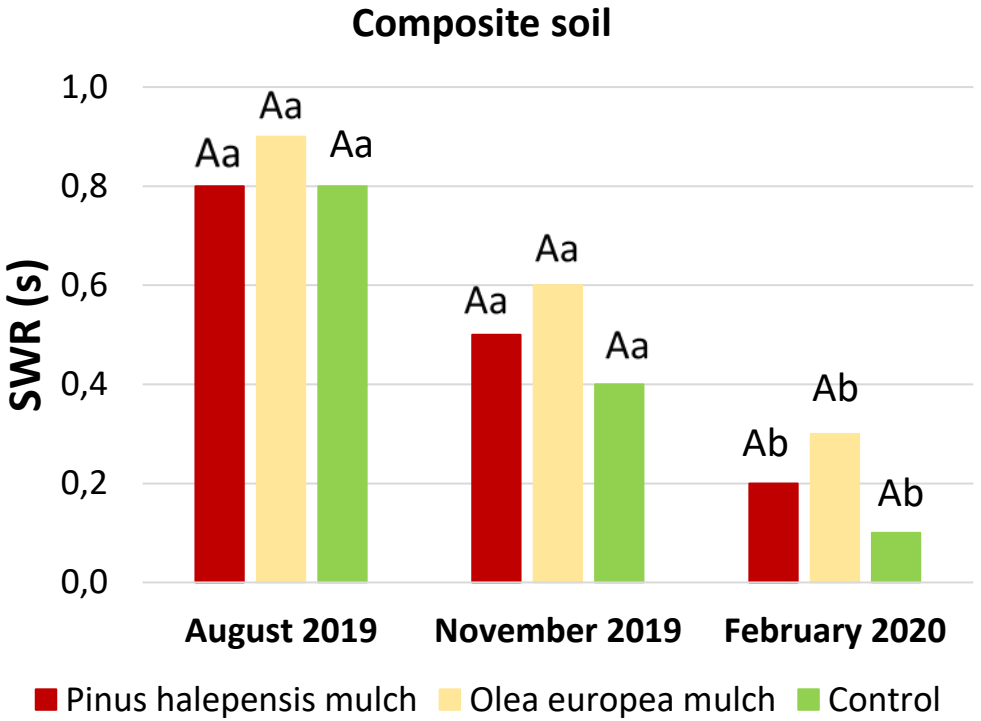
Results



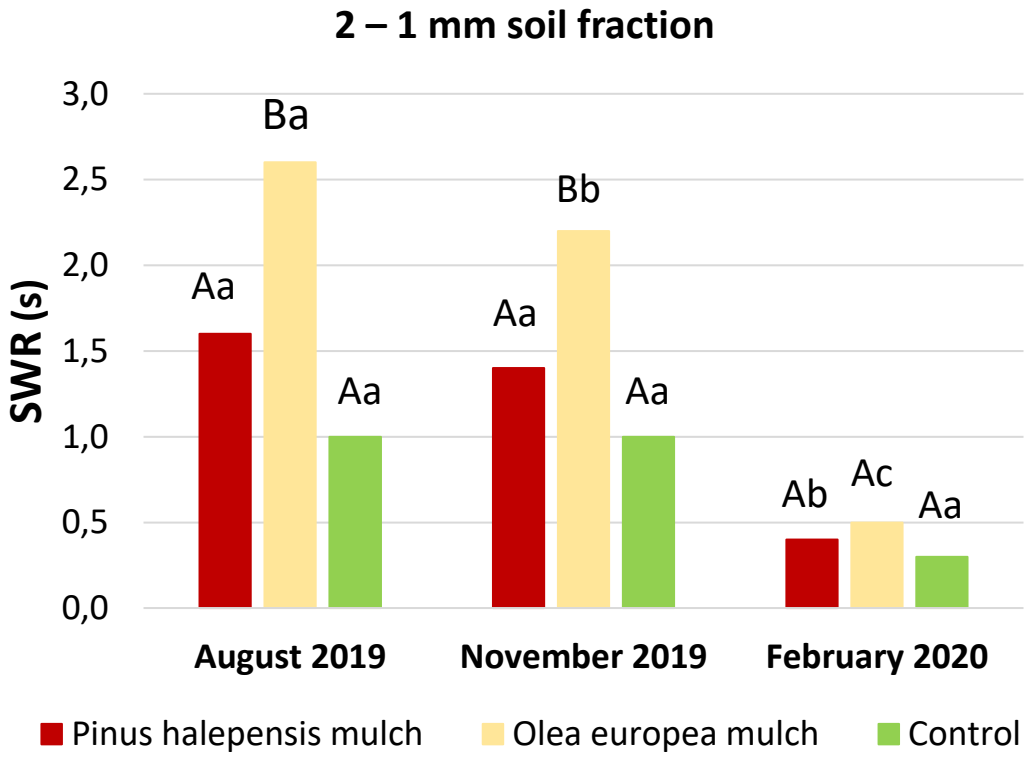


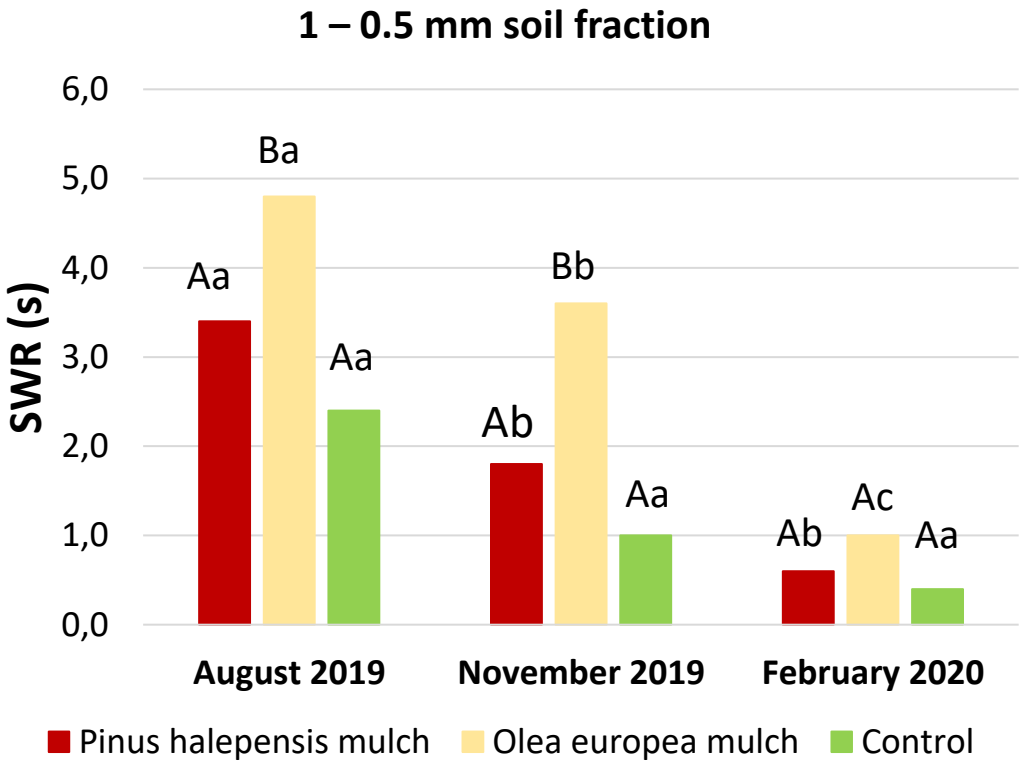
Mean values followed by the different uppercase letter are statistically significant different within the same date; mean values followed by the different lowercase letter are statistically significant different within the same treatment, (n=15), (SOM; soil organic mattrer).





Mean values followed by the different uppercase letter are statistically significant different within the same date; Mean values followed by the different lowercase letter are statistically significant different within the same treatment, (n=15), (MWD; Mean weight diameter of soil aggregates, SWR; soil water repellency).





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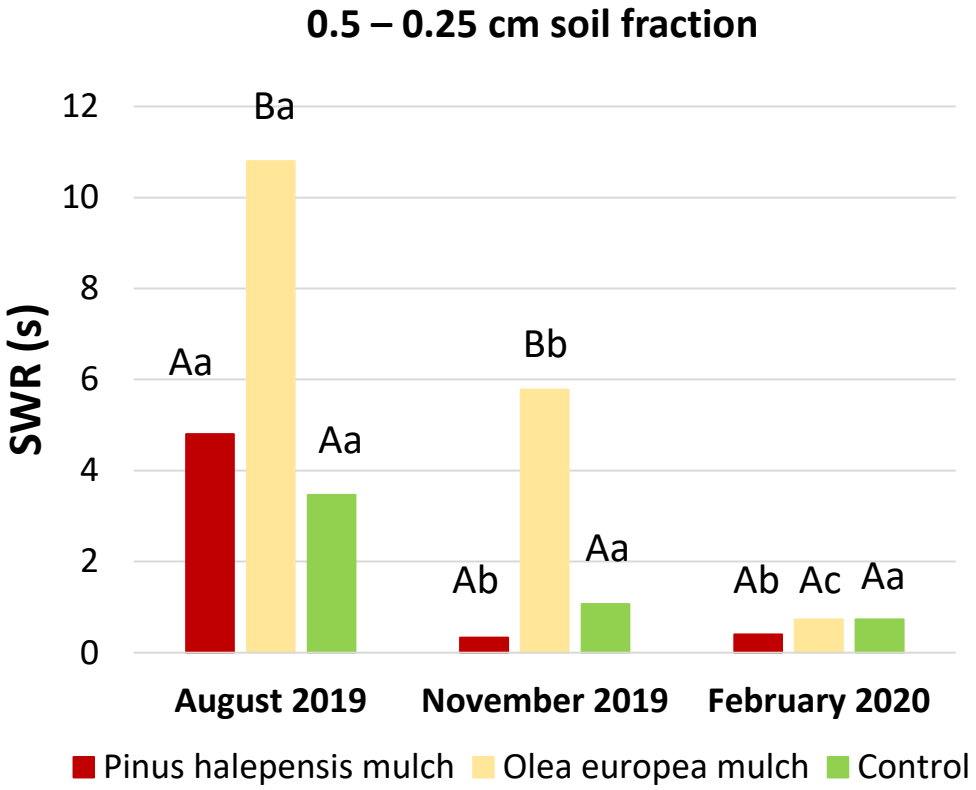

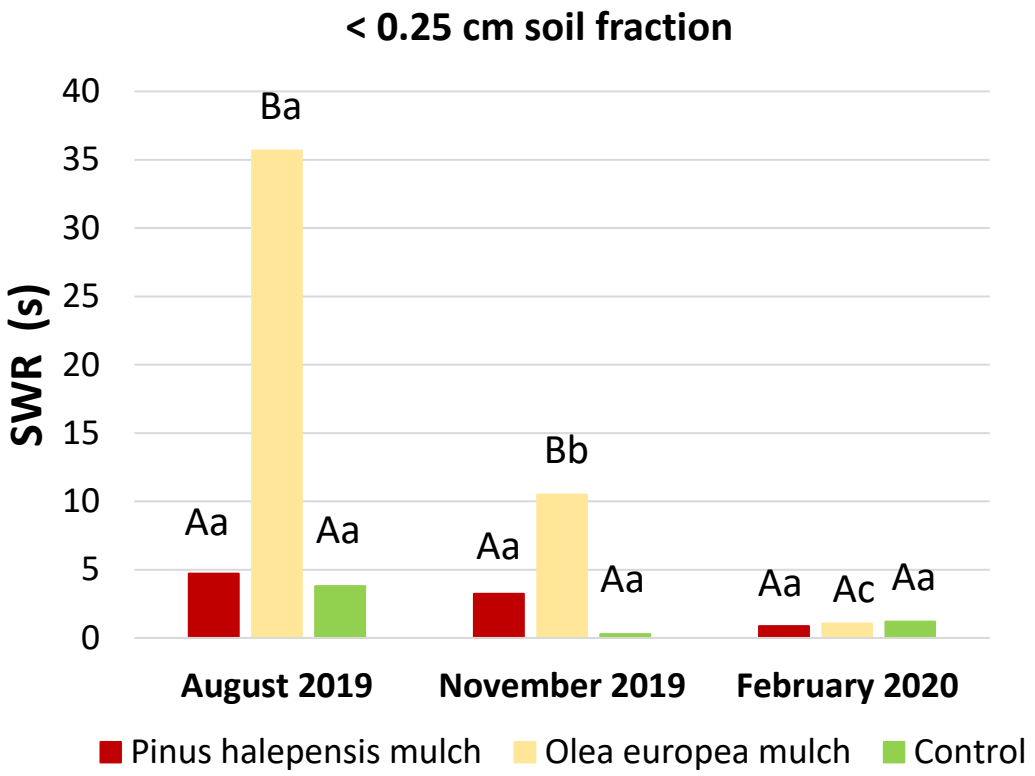

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Conclusions

- Soil pH decreased in all treatments although significant only in control 6 months after fire
- Higher SOM before mulch application (25 days after fire) were attributed to the ash influx in the soil
- Significant decrease in SOM was noted in control treatment 6 months after fire
- The MDW increased under both mulch treatments, although only significant for *Olea europea* treatment
- A linear decreasing trend was noted for SWR in all treatments in post-burn period
- Mulch treatments showed significant effects on burned soil 6 months after fire, however this period is limiting to get overall conclusion

⟶ Future sampling and analysis will be conducted in nexts months to estimate the effect of *Olea europeae* and *Pinus halepensis* mulch on **soil properties**, and additionally on **hydrology and water quality**

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