

Managing irrigation in vineyards during dry winters and springs

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Introduction

Reduce winter rainfall limits water availability in early-spring and advances the onset of vine water deficit. Existing recommendations for managing vineyard irrigation during dry winters are to maintain soil moisture up to budburst; but these practices do not fully restore yield. In this study we further evaluate irrigation practices with the aim to maintain vineyard productivity during dry seasons.

Methods

- A factorial trial combining two methods of application (D, one lateral, or, TD, three laterals of drippers) and two timings (Bb, budburst, or, Bb-sett, budburst to fruit setting) was established at the SARDI's Nuriootpa Research Station SA (**Fig 1**).
- Rainout shelters were deployed in the field to exclude May to August rainfall (230 mm; **Fig 2**).
- Uncovered vines that received natural rainfall were compared with sheltered vines receiving reduced irrigation in winter (~76 mm) and supplementary irrigation (~154 mm) from budburst to fruit setting (**Fig 1**).
- Vine development, growth (yield and pruning weight) and fruit and wine composition were assessed during three seasons (2018-21).

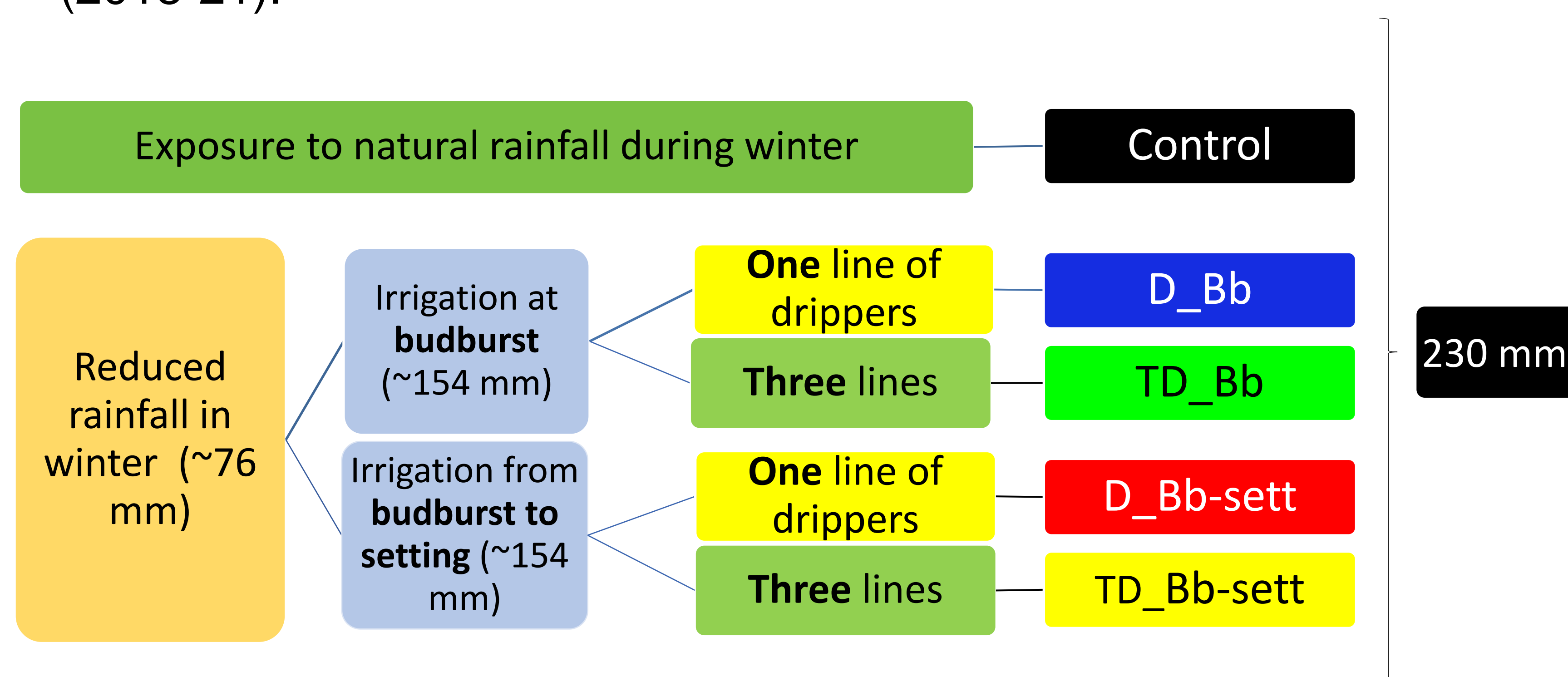


Fig 1. Schematic representation of treatments. The value on the right correspond to water applied on each treatment.



Fig 2. Shelters were moved from a previous trial in April 2018. Plastic films were removed at the first signal of bud development.

Results

- Yield of Control vines was always lower than in the remaining treatments regardless of the combination of method and timing of application.
- Single-lateral irrigated vines yielded approx. 30% more than Control and 12% more than vines irrigated with multiple laterals.
- Single-lateral irrigation increased canopy size (measured as LAI and pruning mass) more when applied from Bb-sett than at Bb, but canopy size was not increased when the irrigation was applied with multiple laterals due to higher evaporation in the mid-row.
- Vines irrigated from Bb-sett yielded approx. 26% more than Control but only 3% more than vines irrigated around Bb.
- There was a hierarchy on the response on the yield component to the methods and timing of irrigation given by berries per bunch >> berry mass > bunch number.
- Irrigation applied at Bb was a better option to maintain phenolic composition in the fruit similar to the Control than when applied from Bb-sett.

Conclusion

Shifting irrigation from winter to spring was more effective at maintaining or improving yield compared to Control vines, as long as some soil moisture was maintained through winter. Irrigation across the floor of the vineyard using additional laterals or extending irrigation around the time of fruit setting offered few productivity benefits. Following these guidelines will maximise vineyard productivity in response to dry winters.