COOPERATIVE RESEARCH CENTRE FOR VITICULTURE

Nutrition and Irrigation Management in Shiraz Vine Productivity

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Management of grapevine vigour is central to achieving an optimal balance between vegetative growth and cropping level. It has been shown that nitrogen and irrigation management can be utilised for vine vigour control.

Field Trial 2003/04

A large drip irrigated field trial was set up in the Riverina during 2000 using Shiraz Vines

Three nitrogen (N) application treatments
- -N applied from bloom to veraison
- -N applied after harvest
- -N applied in a split application

Combined with three irrigation practices
- -Regulated deficit irrigation (RDI)
- -Partial rootzone drying (PRD)
- -Unstressed water control (CTL)

Results

Shoot growth rates between budburst and veraison were not shown to be influenced by nitrogen (data not shown) or irrigation (Fig. 1) treatments. Although there were no significant difference in pruning weights (Table 1), the RDI and PRD irrigation both showed a 15% reduction in pruning weights compared with CTL treatment. Also at budburst, starch levels in the wood tissue were observed to be higher in the CTL irrigation treatment (Table 1).

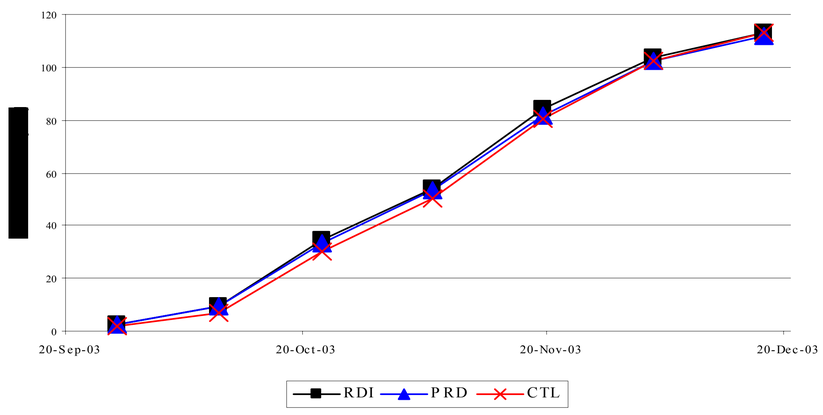

Figure 1. Early shoot growth under different irrigation practices

CTL irrigation treatment showed a 10% higher yield than the PRD and RDI treatments (Fig. 2). Split N application also showed 5% less yield compared with bloom to veraison and post harvest N applications (Fig. 2). However, in general, treatment effects on vine yield were minimal in the past season.

Table 1. Fruit yield, Pruning weights, and budburst wood starch levels under different irrigation practices

Irrigation	Yield (t/ha)	Pruning weights (t/ha)	Root Starch (% DW)	Shoot Starch (% DW)
CTL	23.8a	2.35a	25.80	10.56
PRD	21.7a	1.96a	19.64	11.05
RDI	21.5a	2.01a	19.37	9.88

RDI advanced ripening and reduced berry weights, compared with the PRD and CTL treatments. Colour was shown to be significantly higher in both the RDI and PRD irrigation treatments compared with the CTL. N application showed no effect on all berry factors (Table 2).

Table 2. Berry composition at harvest

Berry composition	CTL	PRD	RDI	Bloom-veraison N	Split N	Post harvest N
TSS (brix)	21.3a	21.3a	22.5b	21.7a	21.7a	21.6a
Weight (g)	1.17a	1.11a	0.97b	1.08a	1.06a	1.11a
Colour (mg/g fw)	0.73a	0.82b	0.83b	0.80a	0.79a	0.79a

Summary

A cooler than average spring resulted in the RDI treatment not reaching its critical water stress level until late December, when shoot growth was not affected. However this late water stress around veraison did advanced ripening and reduced berry weight resulting in increased colour over the CTL treatment. PRD, with 22% less water applied, showed no apparent differences in early shoot growth or berry size compared with the CTL irrigation treatment, yet PRD showed the increased colour levels observed in RDI. Only minor differences in N application treatments were shown during the past season.

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