VINES, A SIMULATION MODEL OF VINE GROWTH AND WATER USE IN AUSTRALIAN VINEYARDS

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AIM

Develop a simulation model for evaluation of:

- Irrigation strategies
- Canopy management
- Impact of stresses

DESIGN CONSIDERATIONS

Widespread applicability

Use a minimum of readily attainable data

Reliably predict results and experiences

Easy to use

FEATURES

Model simulates

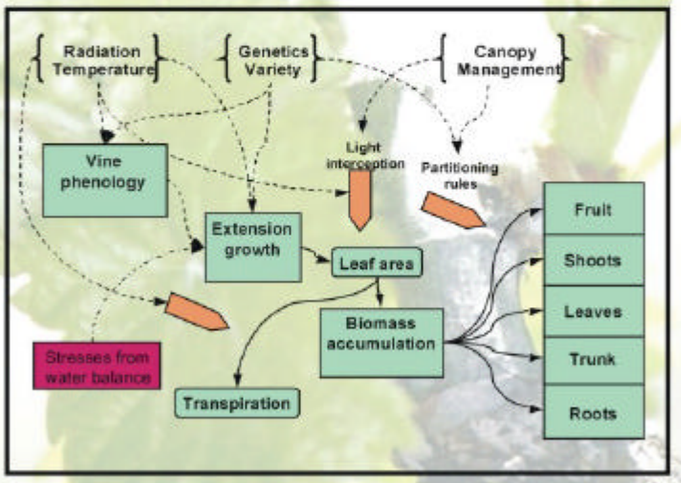
Soil related processes

- water balance
- salt balance
- water tables
- aeration

Vine related processes

- phenology
- extension growth
- biomass accumulation and partitioning

MODEL SCHEMATIC



MODEL DEVELOPMENT

Key experiments

- Mt Helen, central Victoria
- Merbein, northern Victoria
- Historical data sets

Minimum data set from experimental sites

- Daily weather
- Soils characteristics
- Vine management
- Vine growth and development
- Yield performance

MODEL OUTPUT

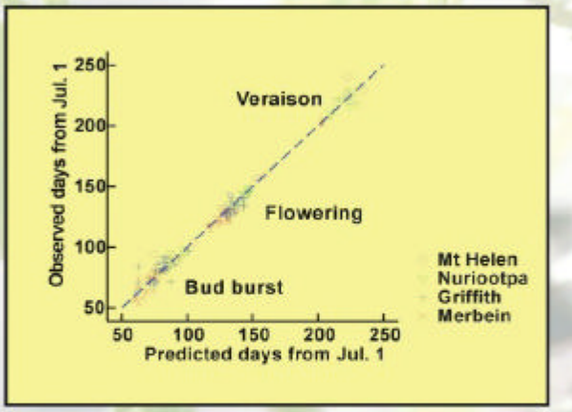
Crop and soil status at main development stages

RUN NO. 1 MIN PRUNE RDI UNTHINNED CRITVD = 30.0

DATE	CROP AGE	GROWTH STAGE	BIOMASS kg/ha	LAI	LEAF NUM.	ET mm	RAIN mm	IRRIG mm	SWATER mm	CROP kg/ha	STRESS H2O	STRESS SL
1 JAN	0	Start Sim	0	.00	.0	1	0	0	250	0	.00	.00
23 MAY	133	End Veroal	0	.00	.0	47	76	0	341	0	.00	.00
11 OCT	274	Bud Burst	12	.01	.1	97	122	0	347	0	.00	.00
3 DEC	327	First Flow	1261	1.27	9.6	150	133	0	242	0	.00	.00
11 DEC	335	End Set	1682	1.74	12.1	160	133	0	203	0	.00	.00
25 JAN	380	Veraison	6269	5.92	15.0	221	197	4	108	0	.24	.00
17 MAR	431	Fruit Ripe	7279	3.09	15.0	249	198	16	100	0	.68	.00
12 MAY	487	Leaf Fall	7125	.23	15.0	273	250	16	183	0	.26	.00
12 MAY	487	End Simuln	7125	.19	15.0	273	250	16	183	0	.26	.00

Yield = 10300 kg/ha 6.9 kg/vine

Simulated phenology experiments (7 varieties)



OUTCOME

Decision support for evaluation of

- Irrigation management scenarios
- Vine management scenarios
- Sites evaluation for future viticultural production
- Sustainability of viticulture

CSIRO PLANT INDUSTRY

Grape and Wine Research and Development Corporation

AGRICULTURE VICTORIA