Growth responses of annual medics to temperature

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The effects of temperature on the growth of a crop depend on the plant density, the amount of dry matter present, the solar radiation and the genotype. Since it is difficult to measure growth responses to temperature in the field due to associated variation in light flux density and temperature, controlled environment chambers are often used for this purpose. The experiment reported here aimed to quantify the effects of three contrasting temperatures (10, 15 and 20?C) on the growth rates of two annual medic cultivars widely used in southern Australia namely M. *scutellata* cv. Sava and M. *truncatula* cv. Paraggio, also two annual medic genotypes from the colder areas of West Asia viz. M. *rigidula* Sel.#716 and M. *rotata* Sel.#1943 to see if these four medics differ in cold tolerance.

Methods

Small swards were established in pots (0.0225m^{-2}), at 17.4g m^{-2} sowing rate. Seedlings were inoculated with appropriate *Rhizobium meliloti* and irrigated daily with a nutrient solution free of mineral N. Harvests were made every 7 days at first and later every 3 days. Growth curves were constructed by linear regression. The light flux density in the growth cabinet was 4O0? mole quanta m^{-2}S^{-l}with a day length of 12h.

Results and discussion

Table 1. Growth rates (g m^{-2}day^{-1}) for medic genotypes grown at three temperatures for varying periods.

Genotype	Growth rates at temp. 10°C	15°C	20°C	Main effects and interaction
Sava	3.9	5.2	7.1	Temp: 20>15>10°C
Paraggio	5.7	5.9	6.5	Genotype:Paraggio>Sel.#716> Sava>Sel.#1943
Sel.#716	6.1	6.7	4.2	
Sel.#1943	4.0	4.3	6.3	Genotype x Temp:Significant
Days from sowing	87	58	51	

Growth rate was significantly influenced by temperature and genotype: however, there was a significant interaction between genotypes and temperature. Sel.#716 was depressed in growth rate by a temperature of 20?C. While these results show that early growth of medic swards is generally favoured by moderate or high temperature (15?C or 20?C), it is clear that there is some variation between genotypes in response to temperature which indicates possible cold tolerance or a cold-escape mechanism. It is concluded that M. *rigidula* Sel.#716 is the most cold tolerant of these four medics and it may have a role in southern Australian farming systems.

1. Cocks, P.S. (1987). Annual Report: Pasture, Forage and Livestock Program, ICARDA, Syria, 288p.