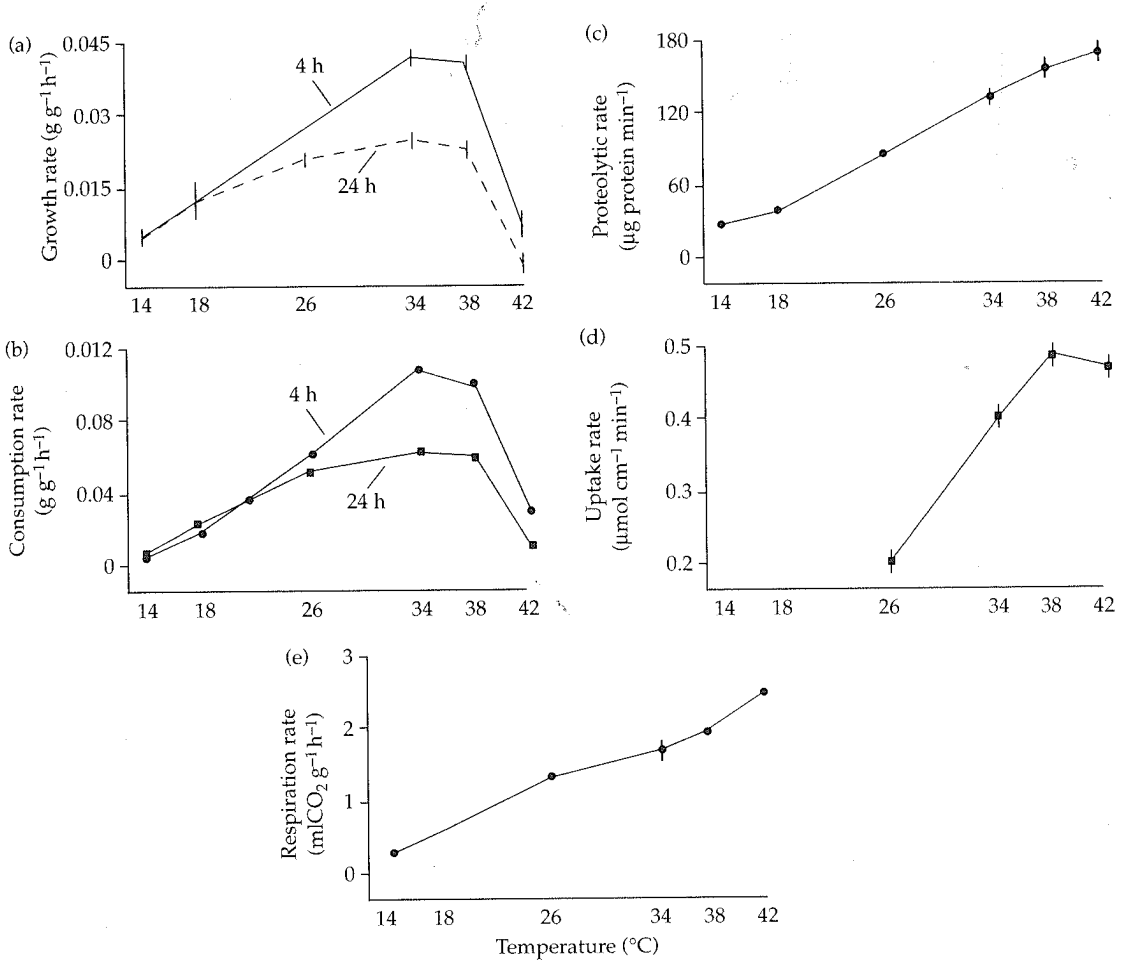

Figure 2.17 The thermal sensitivity of growth and feeding in *Manduca sexta* caterpillars, illustrated by performance curves measured over the temperature range 14–42°C for (a) mass-specific growth rate, (b) mass-specific consumption rate, (c) proteolytic digestion rate, (d) methionine absorption rate, and (e) mass-specific respiration rate.

Note: Growth and consumption rates (a and b) were measured over 4 and 24 h.

involved. Stamp (1990) measured growth of caterpillars (*M. sexta*) as influenced by interactions between temperature, nutrients, and a common phenolic, rutin. Numerous interactions were found, the most important being that the effects of diet dilution and rutin on larval growth rate were a function of temperature. More time was spent moulting at low temperatures and when rutin was included in the diet, resulting in lower growth rates. In temperate regions, interactions of temperature, food quality, and natural enemies are most likely to affect gregarious spring-feeding caterpillars. In contrast, solitary behaviour reduces predation risk but forces caterpillars to forage in microhabitats that are suboptimal in terms of food quality and temperature (for review see Stamp 1993).

Finally, the interplay between temperature and nutrition is critical in the context of global climate change. Reduced foliar nitrogen is a consistent response of plants grown in enriched CO_2 atmospheres (Ayres 1993; Lincoln *et al.* 1993; Watt *et al.* 1995). Insect performance may be altered by the