in the glasshouse. Seedlings on paddock soils were generally greener in colour than those on the uncultivated soils and showed a faster rate of root growth. In the same way, seedlings grown on infested, but uncultivated, brown and red-brown soils usually exhibited less P deficiency than those on adjacent, uncultivated mallee soils where skeleton weed was absent. However, seedlings on all these soils responded to the addition of phosphoric acid.

These results help explain the known distribution of skeleton weed infestations in south-eastern Australia.

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FLOWERING IN SKELETON WEED

Six-week-old skeleton weed seedlings were subjected to 0, 2, 4, and 6 weeks of vernalizing temperatures in the field during July and August. After vernalization, two groups of plants were left in the field, one in natural daylength, the other under continuous light (natural daylength supplemented by tungsten filament globes to supply 50-100-ft candles at the ground surface). The remaining plants in these treatments were transferred to cabinets maintained above 16°F and distributed among 9-, 12-, 14-, and 16-hour photoperiod treatments. In another experiment, vernalized and unvernalized plants were subjected to a total of 9 hours' light given either as 9 hours of daylight or as 8 hours of daylight plus a 1-hour dark interruption from fluorescent tubes about the middle of the dark period. Photoperiods generally consisted of a basic 9 hours of daylight supplemented as necessary with light from fluorescent tubes.

Flowering of unvernalized plants was suppressed by the 9-hour photoperiod, delayed in 12 hours' light, and accelerated by each subsequent increase in daylength. Time to budding was reduced from 208 to 65 days and leaf number from 233 to 71 by increasing daylength from 12 to 16 hours. Vernalization induced flowering in the 9-hour photoperiod and accelerated flowering in all other light regimes (from 166 days (200 leaves) to 62 days (71 leaves) in the 14-hour photoperiod, for example). In the second experiment, vernalized plants given 8 + 1 hours of light produced buds in 52 days (32 leaves), but at the time of writing, 105 days from starting, unvernalized plants were still vegetative. Vernalized and unvernalized plants given 15 hours of uninterrupted darkness remained vegetative also.

Plants left in the field under continuous light bolted about 6 weeks before those in natural daylight. Both series, however, flowered together. Average temperatures prior to bolting in both

groups were closely similar (12°C and 13°C respectively). Flowering, on the other hand, did not occur until temperatures rose above 21°C. These results suggest photoperiodic control of bolting and a probable threshold temperature requirement for flowering.

The results generally are consistent with the presence of three interacting processes:

1. the phytochrome or dark inhibitory process
2. the vernalization process
3. a light-independent temperature process

Indirect confirmation of the latter process, and an indication of the presence of a fourth or high-energy process, has been obtained by determining the regression of days on temperature (T) and light intensity (L), and of leaf number on temperature and light intensity. These are:

$$\text{Days} = 102.3 + 0.9L - 6.46T + 0.09T^2$$

$$\text{Leaves} = 39.0 + 0.24L - 4.43T + 0.14T^2 - 0.01TL$$

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COMPETITION BETWEEN CLOVER AND ST JOHN'S WORT

In southern Australia control of herbaceous perennial weeds by oversowing with a cool-season annual has been demonstrated experimentally and in agricultural practice. The principle is to increase the overall density of the community by the addition of a species with a contrasting habit of growth. Examples are St John's wort (Hypericum perforatum L. var. angustifolium DC) and skeleton weed (Chondrilla juncea L.) which have been controlled in certain parts of their ranges by Trifolium subterraneum L.

Since the ways in which the two species compete may be important in the management of clover-weed communities, a study was made of shoot and root competition between Hypericum and Trifolium, and of changes in their relative intensities with soil nitrogen levels and with varying proportions of the two species. The experiments were conducted in greenhouses using soil containers specially designed to separate shoots and roots of the two species and thus allow measurement of competition from shoots alone and roots alone. No attempt was made in these experiments to measure intraspecific competition; the basis of comparison was a 'stand' of one species of the same density as in the mixture.

In the first experiment, shoot and root competition were measured at equal densities of Hypericum and Trifolium. In the second, the two species were grown in different proportions,