**Low-Temperature Effects**

Far greater damage to crops is caused by low than by

high temperatures. Low temperatures, even if above

freezing, may damage warm-weather plants such as corn

and beans. They may also cause excessive sweetening

and, on frying, undesirable caramelization of potatoes

due to the hydrolysis of starch to sugars at the low

temperatures.

Temperatures below freezing cause a variety of

injuries to plants. Such injuries include the damage

caused by late frosts to young leaves and meristematic

tips (Figs. 10-3A–10-3C) or entire herbaceous plants,

the frost killing of buds of peach, cherry, and other trees,

and the killing of flowers, young fruit, and, sometimes,

succulent twigs of most trees. Frost bands, consisting of

discolored, corky tissue in a band or large area of the

fruit surface, are often produced on apples, pears, and

so on after a late frost (Fig. 10-3D). Low winter temperatures

may kill the young roots of trees and may also

cause bark splitting and canker development (Figs. 10-

3E and 10-3F) on trunks and large branches, especially

on the sun-exposed side, of several kinds of fruit trees.

Cross sections of limbs may show a black ring or a

blackheart condition in the wood. Fleshy tissues, such

as tomato fruit, canola pods, and potato tubers, may be

injured at subfreezing temperatures (Figs. 10-4A–

10-4C). In potatoes, the injury varies depending on the

degree of temperature drop and the duration of the low

temperature. Early injury affects only the main vascular

tissues and appears as a ring-like necrosis; injury of the

finer vascular elements that are interspersed in the tuber

gives the appearance of net-like necrosis. With more

general injury, large chunks of the tuber are damaged,

creating the so-called blotch-type necrosis. Subfreezing

temperatures, especially in poorly drained areas where

ice formation and thawing are common, may severely

injure and may kill turf grass and young wheat plants

(Figs. 10-4D and 10-4E).