

Pear Scab Influenced by Sprinkler Irrigation Above the Tree or at Ground Level

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ABSTRACT

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The incidence of pear scab, caused by *Venturia pirina*, was monitored in a high-density orchard of Bartlett and Anjou pear trees. Replicated plots were irrigated by sprinklers above the trees or at ground level. Infection nearly doubled between 1 June and harvest in late August in plots irrigated from sprinklers above the trees but did not increase significantly in plots irrigated at ground level.

Infections caused by the pear scab fungus *Venturia pirina* Aderh. are common in southern Oregon on pear blossom parts and young fruit after 24 hr or more of spring rain. Further appearance of this disease is often retarded during the typically dry summer months. However, the advent of sprinkler irrigation above the tree for frost protection and retention of the system to deliver summer irrigation water have resulted in an altered orchard environment in which conditions may be conducive to scab infection throughout the summer (2).

Disease severity has increased in other crops after sprinkler irrigation (6), and severity of pear scab was mentioned as likely to increase with sprinkler irrigation above the tree (1). This study monitored the incidence of fruit scab in Bartlett and Anjou pear trees irrigated by sprinklers above the tree and at ground level.

MATERIALS AND METHODS

A high-density, 0.5-ha block of mixed Bartlett and Anjou pear trees was divided into six replicated blocks, three of which received sprinkler irrigation above the tree and three at ground level. Sprinklers delivered about 4.25 mm of water per hour during an 18-hr period biweekly from 1 June until 30 August.

During the summer of 1979, 100 fruits were selected at random in each of the six blocks and visually evaluated for scab lesions on 1 June and before each irrigation application from 15 July through harvest. At harvest, 175–315 fruits per block were evaluated from Bartlett (23 August) and Anjou (28 August) trees. Numbers of fruit with scab lesions from each treatment and sample date were compared and means separated using least significant difference (LSD).

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Between 15 March and 9 May 1979, 122 mm of rain fell in 28 days. Anjou and Bartlett trees were in full bloom on 2 and 7 April, respectively. Between 9 May and 16 August, only 8.6 mm of rain fell in 4 days. During the final 7 and 12 days before harvest of Anjou and Bartlett pears, respectively, 23.4 mm fell in 6 days.

During bloom, dodine (Cyprex) was applied as a 4% dust at 44.8 kg/ha by air and as a 65% wettable powder at 3.36 kg/ha by ground sprayer.

RESULTS AND DISCUSSION

In plots irrigated above the tree, the incidence of fruit scab on Bartlett pears increased from 11.3% on 1 June to 19.6% at harvest; on Anjou it increased from 10.3 to 20.3% (Fig. 1). The incidence of scabby fruit in plots irrigated at ground level did not change significantly. Fruit scab increased an average of 1.7% after each irrigation application above the tree.

A film of moisture on the fruit surface

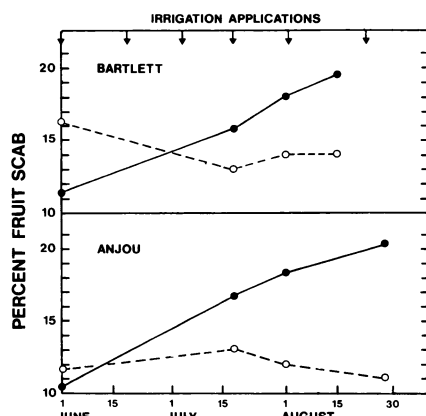


Fig. 1. Effect of sprinkler methods on incidence of scab in Bartlett and Anjou pear, 1979. ● = irrigation above the tree, and ○ = irrigation at ground level. Irrigation water was applied at 4.25 mm/hr for 18 hr. Differences in percentage of diseased fruit when irrigated above the tree or at ground level were significant ($P = 0.05$) after 18 July in Bartlett (LSD = 4.6) and Anjou (LSD = 2.15).

adequate for conidial germination and infection was apparently provided by sprinkler irrigation above the tree. This is in accordance with the predictions of Mills' tables for apple scab, which are considered reasonably accurate for pear scab (1), wherein each 18-hr irrigation at midsummer temperatures would constitute an infection period (3). At the mean temperature of 14.2 C for May 1979, 10-hr wetting would be required for light primary (ascospore) infection and 21 hr for heavy primary infection. The mean temperature for July and August 1979 was 21.9 C, of which 9 hr would be required for light primary infection and 18 hr for heavy primary infection.

Secondary infection from conidia, which would probably be the only type of inoculum disseminated during July and August, was thought by Mills and LaPlante (3) to require about one-third less time than primary infection. Later studies by Roosje (5) and Moore (4) indicate, however, that as much or slightly more time is required for secondary infection. Because rainfall was minimal during the summer of 1979, moisture for infection periods was provided primarily by irrigation water. Infections after rain 7 and 12 days before harvest of Anjou and Bartlett pears, respectively, would probably not have produced visible lesions by harvest (2).

These data imply that when pear scab is present in the spring, increased incidence of fruit scab may be avoided during the summer by lowering sprinklers to ground level after frost danger has passed. In further studies, we will assess the timing of irrigation above the tree to minimize scab infection periods and will compare fungicide application before and after irrigation.

LITERATURE CITED

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