Applying soybean oil to dormant peach trees alters internal atmosphere, reduces respiration, delays bloom, and thins flower buds

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Abstract:
Dormant 'Georgia Belle' peach [Prunus persica (L.) Batsch.] trees were sprayed in early February 1992 with single applications of 0%, 2.5%, 5.0%, 10.0%, or 20.0% (v/v) crude soybean oil. 'Redhaven' trees were sprayed in February 1993 with single applications of 0%, 2.5%, 5.0%, 10.0%, or 15% degummed soybean oil, Additional treatments of two applications of 2.5% or 5.0% oil were included each year, Both crude and degummed soybean oil treatments interfered with escape of respiratory CO2 from shoots and increased internal CO2 concentrations in shoots for up to 8 days compared to untreated trees, Respiration rates, relative to controls, were decreased for 8 days following treatment, indicating a feedback inhibition of respiration by the elevated CO2. Thus, an internal controlled atmosphere condition was created, Ethylene evolution was elevated for 28 days after treatment. Flower bud development was delayed by treating trees with 5% crude or degummed soybean oil. Trees treated with 10% crude or degummed soybean oil bloomed 6 days later than untreated trees. Repeated sprays of one half concentration delayed bloom an additional four days in 1992, but <1 day in 1993 compared to a single spray of the same total concentration, Application of soybean oil caused bud damage and reduced flower bud density (number of flower buds/cm branch length) at anthesis, In a trial comparing petroleum oil and degummed soybean oil, yields of trees treated with 6% or 9% soybean oil were 17% greater than the untreated trees and 29% more than petroleum treated trees, These results suggest that applying soybean oil delays date of peach bloom and may be used as a bloom thinner.