

Section IV.
Biological and Cultural control

POPULATION DYNAMICS OF THE TWOSPOTTED SPIDER MITE
ON AZUKI BEAN IN RESPONSE TO IRRIGATION SYSTEMS
AND PLANTING METHODS

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Two irrigation systems, rill and overhead sprinkler and two planting methods, single and triple seed per hill planting, were evaluated at IAREC, Prosser, WA, to determine the population dynamics of TSSM, during the summers of 1992 and 1993.

The sprinkler irrigation + triple seed planting treatment resulted in the highest spider mite population whereas the rill irrigation + single seed planting treatment resulted in the lowest population of TSSM. Since TSSM have a propensity for colonizing the underside of azuki leaves, sprinklers above the canopy did not adversely impact their population dynamics. In comparison, a higher rate of water application is used in rill, which might cause a more humid atmosphere under the canopy where mites inhabit. It is known that relative humidity as well as temperature play an important role in the population dynamics of spider mites.

Significant differences exist between the two planting methods under the sprinkler irrigation system. The planting of three seeds per hill creates a denser canopy than the single seed planting method. The three seeds per hill planting method often used in Japan is more conducive to TSSM populations than the single seed per hill method. Yield was inversely proportional to the number of mites accumulated by the crop.

In conclusion, this experiment indirectly confirms that field temperature and relative humidity directly affect TSSM population dynamics. TSSM population dynamics is closely related to the irrigation system, with sprinkler irrigation exhibiting higher population than rill.