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Bringing The Forest Back Into Balance: The Mountain Pine Beetle Infestation

Conifers face several biotic and abiotic stresses throughout their lifetimes as stationary organisms and have developed multiple defenses, including the arguably most important and effective, oleoresin production. Oleoresin, comprised of volatile and nonvolatile terpenes, is toxic to the insect, and can overcome the vectored fungi. Resin production has been stimulated through methyl jasmonate (MeJa) spraying, ethylene application, ground watering and fertilization. Therefore, 7 treatments and a control were tested on 3 Lodgepole pine seedlings each at the Cherry Creek High School Greenhouse for increased resin production: MeJa spray, MeJa ground, Ethylene (via ethephon), MeJa spray and ethylene, MeJa ground and ethylene, fertilizer, and increased watering. The treatments also will be tested on a common forest plant, kinnikinnick, to test for adverse reactions (rated 1-10). Resin production was measured through the observation of the formation of resin ducts (TD's) through light microscopy and terpene extraction. Based mostly on TD formation, MeJa ground, combined with ethylene was chosen as the most viable and effective treatment, along with a weak fertilizer application. This is based on the increased formation of TD's, since the resin extraction with acetone results were inconclusive. This treatment method is highly advantageous when compared to insecticides due to the low soil mobility and toxicity of the chemicals after they enter the soil. This method is currently being brought to the attention of the Colorado State Forest Service for use around homes in high-risk fire areas near beetle infested.