

Turkish Journal of Botany

Turkish Journal

of

Botany

Comparative Effects of Kinetin, Benzyladenine, and Gibberellic Acid on Abscisic Acid Inhibited Seed Germination and Seedling Growth of Red Pine and Arbor Vitae

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Abstract: The effects of kinetin, benzyladenine (BA), and gibberellic acid (GA 3) on abscisic acid (ABA) inhibition of seed germination and seedling growth of red pine (*Pinus brutia* Ten.) and arbor vitae (*Thuja orientalis* L.) were studied. For this purpose, the seeds of these two species were germinated in Petri dishes containing ABA and the mixtures of its with kinetin, BA, and GA 3 alone or in combination at 20°C for 12 or 15 days for arbor vitae and red pine, respectively. The inhibitory effect of ABA on percentages of the seed germination and hypocotyl emergence, the time course of the germination, and the radicle and hypocotyl elongation of the seedlings was overcome very successfully by GA 3 alone in comparison with kinetin, BA, and the combinations of these two cy-tokinins alone with GA 3 . Kinetin or BA alone did not mostly fail to overcome ABA inhibition on the mentioned parameters. There were the cases that also the combinations of these cytokinins with GA 3 were successful or not. GA 3 alone was the most successful hormone at all the cases in general.

Key Words: Germination, abscisic acid, gibberellic acid, kinetin, benzyladenine, *Pinus brutia* Ten, *Thuja orientalis* L.

Turk. J. Bot., **22**, (1998), 1-6.

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