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Effects of Various Phytohormones on Haploid Wheat Production in Wheat x Maize Crosses

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Abstract: The effects of phytohormones on the production of haploid wheat were examined in the intergeneric crosses between Japanese wheat cultivar (*Triticum aestivum* cv. Zenkojikomugi) and maize (*Zea mays* cv. Pioneer P80 Lisa). The detached wheat spikes pollinated with maize were cultured in a solution containing sucrose and sulfuric acid supplemented with 2,4-dichlorophenoxyacetic acid (2,4-D), indole-acetic acid, naphthalene acetic acid, kinetin or 6-benzylaminopurine at 0, 0.1, 1, 10, 100 or 1000 mg L⁻¹. Haploid embryos obtained were cultured on agarose-solidified B5 medium. The frequency of plant regeneration was significantly affected only by the treatment with 100 mg L⁻¹ 2,4-D. Thus, the detached spikes were cultured in the medium containing 2,4-D at 0, 25, 50, 75, 100, 125, 150, 175, 200 or 400 mg L⁻¹. The treatments with 50 mg L⁻¹ 2,4-D increased the embryo size, but the treatments with above 75 mg L⁻¹ 2,4-D inhibited the development of the embryo. The percentage of florets developing into haploid plants was increased by the treatment with 100 mg L⁻¹ 2,4-D. Therefore, the concentration of 2,4-D in the spikes treated with 2,4-D at 50, 100 and 150 mg L⁻¹ were measured by gas chromatography. The concentration of 2,4-D in the seed was increased to 9.24 ppm by the treatment with 100 mg L⁻¹ 2,4-D, a further increase of 2,4-D concentration in the medium having no effect. On the other hand, the concentration of 2,4-D in the glumes and

rachis increased up to 12.72 and 41.55 ppm by the treatment with 100 and 150 mg L⁻¹ 2,4—D, respectively. The treatments with 2,4—D at a concentration higher than 100 mg L⁻¹ inhibited embryo development. The present results suggested that 2,4—D at the concentrations from 50 to 100 mg L⁻¹ would be optimum for haploid wheat production using maize.

Keywords: [2,4—Dichlorophenoxyacetic acid](#), [Haploid](#), [Intergeneric cross](#), [Phytohormone](#), [Plant regeneration](#), [Triticum aestivum](#), [Zea mays](#)

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