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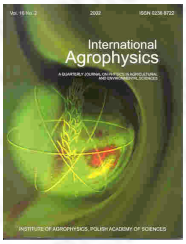

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Effect of wind on size and energy of small simulated raindrops: a wind tunnel study

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abstract A series of tests to evaluate the effect of wind on drop size distribution and impact energy were carried out in a wind tunnel with rainfall simulation facility. Horizontal wind speed of 5.7, 10.0, and 12.1 m/s was applied with high intensity rainfall (97.2 - 143.0 mm/h) with different raindrop size distributions created by adjusting the nozzle for the operating pressures. The median drop size d50 ranged from 1.00 to 1.63 mm. Drop size distribution changed with wind. The median drop diameter was becoming larger in wind-driven rain compared to windless rain. Wind accompanying rainfall increased the amount of sand splash from splash cups which indicated higher kinetic energy, especially with winds higher than 10.0 m/s. Differences in kinetic energy levels between winddriven and windless rain are ascribed to the higher impact velocity resulting from the vectorial sum of the applied horizontal wind speed and the initial drop velocity created by the spray nozzle, rather than to the change in drop size.

keywords wind speed, raindrop size, kinetic energy; raindrop impact velocity