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The Effect of Air Pollution on Microsporogenesis, Pollen Development and Soluble Pollen Proteins in *Spartium junceum* L. (Fabaceae)

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**Abstract:** Air pollution induces abnormality in anthers, reduction of pollen grains' numbers and male sterility. Anthers of *Spartium junceum* L. (Spanish broom) were collected at different stages of development from control (less polluted) and polluted areas (mainly SO<sub>2</sub>, NO<sub>2</sub>, CO, hydrocarbons (HCs) and airborne particulate material (APM)). Structure and development of anther walls and pollen grains were studied and compared. Groups of the control pollen grains were exposed to the polluted air of Tehran for 10 and 20 days. Under pollution stress some anthers became abnormal and shrunken. The tapetum layer had a precocious growth in the microspore mother cell stage and a precocious digestion at the tetrad stage. In some anthers pollen grains were smaller, attached together, shrunken and deformed compared to control ones. The pollen grains collected from polluted areas as well as the ones exposed to gaseous pollutants showed collapse and thinning of the exine. Agglomeration of polluted particles on the pollen surface induced cellular material release under humid conditions. Total soluble protein content and SDS-PAGE patterns did not show significant difference in polluted pollen grains compared to control ones.

**Key Words:** Air pollution, anther development, cellular material release, microsporogenesis, pollen structure, soluble proteins, *Spartium junceum*

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