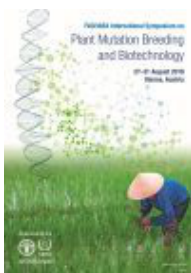


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IMPROVING FABA BEAN CROP FOR BIOTIC STRESS RESISTANCE THROUGH MUTATION BREEDING USING GAMMA IRRADIATION TECHNIQUE

Broomrape (*Orobanche* spp.) a parasitic weed produces serious damage to many legume crops and particularly may become a limiting factor for faba bean (*Vicia faba* L.) production in the Mediterranean basin. Currently, breeding for resistance to this pest remains as one of the most feasible and environmentally friendly methods for managing broomrape infestation. Agriculture has benefited from the use of radiation techniques, which provide plant varieties with unique characteristics. This investigation was carried out to produce new genotypes of faba bean resistant to orobanche foetida. At first, from a radiosensitivity test micro-mutations were scored for percentage of germinated seeds, plant growth parameters, morphological modifications, photosynthetic pigments and nutrients contents. According to the seeds percentage germination results, the LD50 was 150Gy. Further, we studied the cellular and enzymatic changes associated with resistance to *O. foetida* in selected faba bean mutant that were obtained through radio mutagenesis. Finally, correlation between gamma radio-induced free radicals and antioxidant profiles were studied. At this dose (150Gy?), gamma rays greatly induce morphological changes. These modifications in growth traits and morphological changes were accompanied with a marked modulation in the DNA profile. Experiments showed that low induction of seed germination is a major component of resistance in these new lines against *O. foetida*. This is confirmed by in vitro experiments with root exudates stimulant effect. In parallel, reduction in infection was accompanied by the continuously enhancement of the peroxidase activity, the polyphenol oxidase activity and the phenylalanine ammonia lyase activity in faba bean roots. These data suggest the contribution of these enzymes in faba bean resistance to *O. foetida* broomrape induced by the use of gamma rays. In conclusion, based on field and in vitro M 3 generation results, the studied samples produced by plant breeding program, are promising for the production of new varieties resistant/tolerant to plant parasites.

Country or International Organization

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