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12. Herbicide Resistance and its Management



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12.1 Herbicide Resistance

Naturally occurring inheritable ability of some weed biotypes within a population to survive a herbicide treatment that would, under conditions of use effectively control the weed population (Rubin, 1991)



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Tolerance: The term tolerance refers to the partial resistance and presently the usage of the term is discouraged due to inconsistency in quantifying the degree of tolerance.

Gross Resistance: When a weed biotype exhibits resistant to two or more herbicides due to the presence of a single herbicide mechanism.

Multiple resistance: It is a situation where resistant plants possess two or more distinct resistant mechanisms to a single herbicide or groups of herbicides.



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12.1.1 Basic principles of herbicide resistance

1. Time, dose and method of application of herbicide variation
2. Variation in phenotypes of a population
3. Genetic variation by mutation or activation of pre existing genes



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12.1.2 Conditions favourable for development of Herbicide resistance

- a. Repeated use of same herbicide or use of herbicide with same mode of action due to the practices of monoculture
- b. Areas where minimum/zero tillage is followed
- c. Fields where farmers rely on only herbicides for high degree/level of weed control including nurseries, orchards
- d. Non-crop situations like road sides, railway tracks etc. where herbicides are repeated used may be at higher doses than cropped situation



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12.1.3 Resistance was exhibited in crop is due to

1. Herbicide metabolism by crops making them inactive
2. Absence of certain metabolic process in crops compared to weeds and thus tolerating the herbicides
3. Crops couples the herbicide molecule