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TANK MIX APPLICATION OF HERBICIDES AGAINST COMPLEX WEED FLORA MANEGEMENT

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Weeds are generally vigorous growers and their requirements for nutrients are often larger than the crop plants. As weed compete with crop plants and adversely affect photosynthesis and plant productivity. Moreover, weeds harbour diseases and insect pests that attack on crop plant. Many weed species are host to fungus and bacterial diseases thus, rendering their enemies is more difficult to control. Maize is cultivated in *Kharif* season and due to continuous rain, maize field heavily infested with complex weed flora including grassy, broadleaf weed and sedges which cause grain yield losses of 20 to 100 % (Dass *et al.* 2012). In general, critical stages of crop weed competition in maize crop range from 30 to 45 days from sowing (Kamble *et al.* 2005). Controlling weed in maize during this period presumes most importance for realizing higher yield, because weeds emerge fast and grown rapidly then crop competing with the crop severally for growth resources *viz.*, nutrients, moisture, sunlight and space during entire vegetative and early reproductive stage of maize. They also transpire lots of moisture and absorb large quantities of nutrients from the soil. Further, wider spacing in maize allows faster growth of variety of weed species which reduce the photosynthesis efficiency, dry matter production and distribution to economical parts and thereby reduce sink capacity of crop resulting in poor yield (Vaid *et al.* 2010)

The loss of yield due to weed in maize varies from 28 to 93%, depending on the type and intensity of weed flora and duration of crop weed competition (Sharma and Thakur, 1998). To minimize losses due to weeds, several methods are available such as mechanical, cultural, biological and chemical. Farmer exhausted by carrying out cultural operation for control of weeds but there is a chance to regrowth of the weeds under these practices therefore, they moving toward other alternative method of weed management. In this respect weed management through chemical weed control is a better supplement to conventional methods and forms an integral part of the modern crop production. Because it's quick, more effective, time and labour saving method rather than to rely on intercultivation and hand hoeing or pulling out of weeds.

In recent years, the use of herbicides has become popular over mechanical methods, because of the concomitant increase in crop yield due to timely and effectively weeds management at critical growth stage. More than 400 chemicals are available today to tackle the ever-growing weed problems in agriculture. The limitation is that most of these herbicides are efficient against the limited spectra of weeds, while crop experience competition from complex weeds flora. Besides, single herbicide having narrow-spectrum of activity and continuous application result in weed flora shift and they turn minor weeds into major weeds.

Bhadu and Kumar (2017). Tank Mix Application of Herbicides Against Complex Weed Flora Management

Continuous use of single herbicide over the past 10 to 12 years has already created certain newer problems. The weed species which were either minor or non-existent earlier have now become more dominant to pose second generation weed problems. The control of more persistent, perennial weeds with the existing range of herbicides is not satisfactory. All these point towards the need to adopt herbicide combination. The simultaneous application of more than one herbicide in a mixture is increasingly becoming a standard practice in most weed management strategies.

The infestation of the various weed increase day by day in the agriculture specially where the farmers are using single mode of action herbicide like atrazine, pendimethalin, 2,4-D which control certain types of weed flora and remain as such in field, so in order to widen the weed control spectrum. It is desirable to use different mode of action of new herbicides molecules like topamezone and tembotrione, beside this certain herbicide are persist in the soil for a few months to a few years depending upon the chemical and concentration used. Knowledge of the persistence and residual effect of herbicides in soil is essential to use them safely, effectively and to programme non-hazardous chemical weed management schedules.

In different crops, weed control up to later stage of crop growth is advisable for that herbicides are applied at different phase of its growth (PE, EPoE, PoE, LPoE,) and another option is that herbicide treatment combine with cultural practices (hand weeding or interculturing) give long-lasting weed control.

Conclusion:

Cultivation of crops faces diverse type of weed flora, consisting of grasses, broad-leaved weeds and sedges. They usually grow faster than field crops and absorb available water, nutrient earlier than the crops and suppress growth of crops. Effective control of weeds had increased the grain yield and reduces the losses of valuable resources in agriculture. Single application of pre- and post emergence herbicide is ineffective in controlling the weed flora in crop ecosystem. Under such situations, application of herbicide either as tank mixture or in sequence may be useful for broadspectrum weed control in crops.

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