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Effect of Broad-Spectrum Herbicides on Yield of Wheat in Eastern Uttar Pradesh

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ABSTRACT: Broad-spectrum herbicides do not discriminate between garden plants, lawn, and weeds. Some of the more popular broad-spectrum herbicides contain a substance called glyphosate, which has been banned from use in some areas. You shouldn't need a nonselective herbicide very often and if you do, use it with extreme caution. There are also acid-based broad-spectrum herbicides. These burn the leafy portion of the plant but do not always kill the roots and the plants eventually regrow. The best use for these organic products is on annual weeds. Even these acetic products should be used only as the label specifies. Runoff can leach into the ground and water supply. Wheat is an important staple food crop throughout the globe. India is the second largest producer of wheat after China. Being an agrarian state leading in area and production of wheat in India, Uttar Pradesh holds a prominent place in wheat production. The present study examines the growth and instability in wheat area, production and productivity in Uttar Pradesh state and tries to decompose weeds. The analysis revealed that throughout the whole period, there is positive significant growth rate in area, production and yield by the use of broad spectrum herbicides in Eastern UP.

KEYWORDS: Uttar Pradesh, Eastern, Herbicides, Wheat, Yield, Broad-Spectrum

I. INTRODUCTION

Wheat (*Triticum spp.*) occupies the prime position among the food crops in the world. In India, it is the second important food crop being next to rice and contributes to the total foodgrain production of the country to the extent of about 25%. Wheat has played a very vital role in stabilizing the foodgrain production in the Eastern Uttar Pradesh of India over the past few years.[1]

Classification of Indian Wheats:

1. Emmer Wheat (*Triticum dicoccum schub L.*) :

This type was reported to be grown in south i.e. Maharashtra, Tamil Nadu and Karnataka. This type is believed to be developed from *T. diccoides* koru., a wild form. It is also grown in Spain, Italy, Germany and Russia.

2. Macroni Wheat (*T.durum* Desf.) : The durum or macroni wheat, cultivation in India, is considered to be very old. It is a best wheat for drought conditions or under restricted irrigated conditions of Punjab, M.P., Karnataka, Tamil Nadu, Gujarat, West Bengal and H.P. It is used for semolina (suji) preparation.

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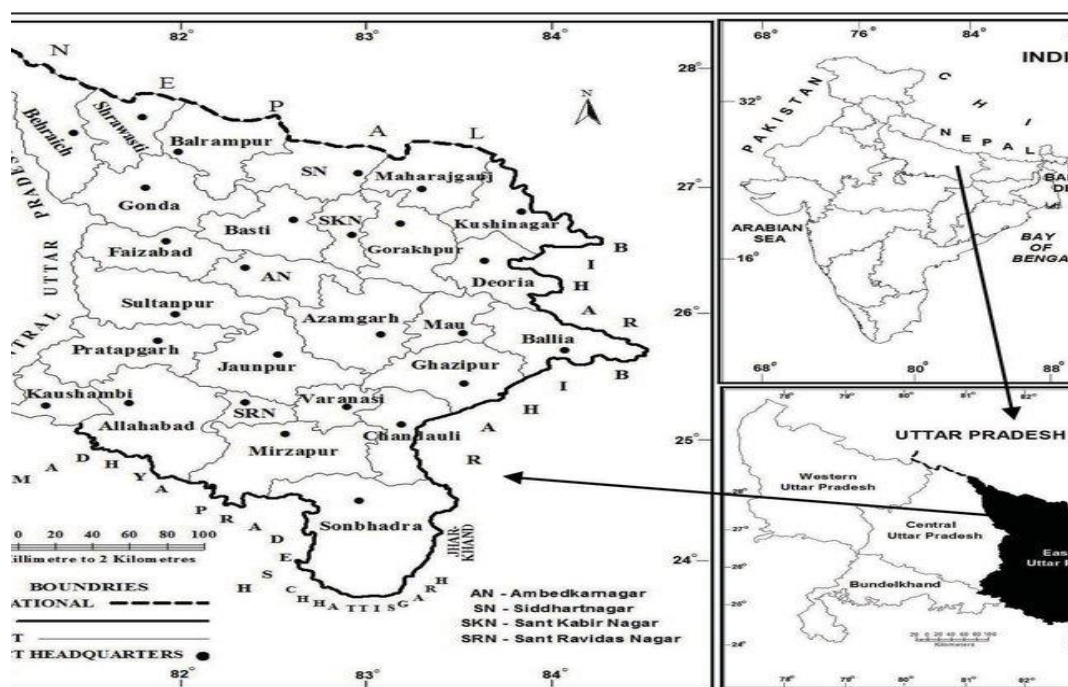
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3. Common Bread Wheat (*T. vulgare* Host) :

It is a typical wheat of alluvial soils of Indo-Gangetic plains i.e. Punjab, Uttar Pradesh, Bihar and parts of Rajasthan. The bulk of the Indian crop, therefore, consists of this type.



Eastern UP

4. Indian Dwarf Wheat (*T.spherococcum* Mihi.) :

This belongs to the club wheat of western countries. This is found in limited areas of M.P., U.P., of India and in Pakistan. These are characterised by very short and compact heads having a shorter grains.

5. *Triticum aestivum* :

This is the type presently grown in India in almost all the wheat growing zones. It is used mainly for bread purpose.

In eastern UP the basic wheat is *Triticum vulgare* and *Triticum aestivum*. [2]

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The ideal temperature requirement varies from plant type and stages of growth. The dwarf varieties require the following temperature for their growth and development:

| Growth stages | Temperature requirement |
|----------------------|--------------------------------------|
| Germination | 20 to 25 0 C mean daily temperature |
| Tillering | 16 to 20 0 C mean daily temperature |
| Accelerated growth | 20 to 23 0 C mean daily temperature |
| Proper grain filling | 23 to 25 0 C mean daily temperature. |

Wheat plants are sensitive to very cold or frost injury at any stage of growth particularly at reproductive growth if temperature is below 150

The wheat crop requires a well-pulverized but compact seed bed for good and uniform germination. Three or four ploughings in the summer, repeated harrowing in the rainy season, followed by three or four cultivations and planking immediately before sowing produce a good, firm seed bed for the dry crop on alluvial soils. For the irrigated crop, the land is given a pre-sowing irrigation (palewa or raund) and the number of ploughings is reduced. Where white ants or other pests are a problem, Aldrin 5% or BHC 10% dust at the rate of 25 kg/ha should be applied to the soil after the last ploughing or before planking in fields of eastern UP.[3]



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a) Sowing time:

Based on above temperature requirement it has been found that for indigenous wheat last week of October, for long duration dwarf varieties like Kalyansona, Arjun, etc. first fortnight of November and for short duration dwarf wheats like Sonalika, Raj 821 etc. second fortnight is the best sowing time. Under exceptionally late sown condition it may be delayed to latest by 1st week of December beyond which if area is very small transplanting may be practiced.

b) Seed rate:

Generally, a seed rate of 100 kg/ha has been found to be sufficient for most of the varieties like Kalyan Sona, Arjun, Janak, etc. which have moderate tillering and medium sized grains. But a higher seed rate of 125 kg/ha is desirable for late sown wheat and normal sown for varieties like Sonalika, Raj 821 etc. which have bold grains and shy tillering habits.

c) Spacing: :

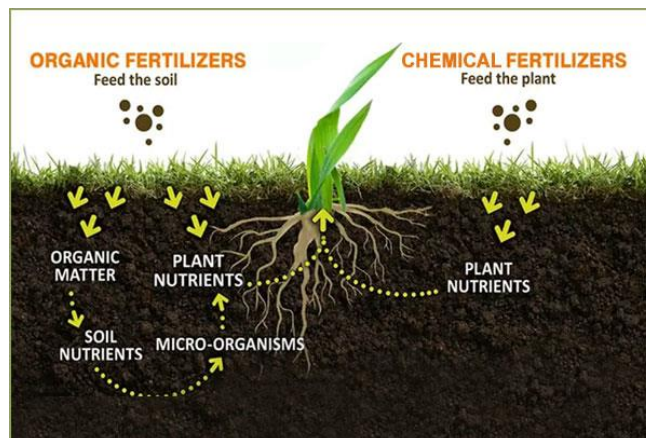
For irrigated, timely sown wheat, a row spacing of 15 to 22.5 cm is followed, but 22.5 cm between the rows is considered to be the optimum spacing. Under irrigated late-sown conditions, a row spacing of 15-18 cm is the optimum. For dwarf wheats, the planting depth should be between 5 and 6 cm. Planting beyond this depth results in a poor stand. In the case of conventional tall varieties, the depth of sowing may be 8 or 9 cm.[4]

d) Seed treatment:

The seed of loose smut-susceptible varieties should be given solar or hot-water treatment. If the wheat seed is used only for sowing, and not for human consumption or for feeding cattle, it can be treated with Vitavax.

II. DISCUSSION

It is desirable that 2 to 3 tonnes of farmyard manure per hectare or some other organic matter is applied 5 or 6 weeks before sowing. The fertilizer requirement of the irrigated wheat crop in eastern parts of UP are as follows:



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- a. With assured fertilizer supply:

Nitrogen (N) @8- - 120 kg/ha
Phosphorus (P₂O₅) @ 40- 60 kg/ha
Potash (K₂O) @ 40 kg/ha.

- b. Under fertilizer constraints:

N @ 60-80 kg/ha
P₂O₅ @ 30-40 kg/ha
K₂O @ 20-25 kg/ha.

Total quantity of Phosphorus and potash and half the quantity of nitrogen should be applied at the time of sowing. Remaining quantity of Nitrogen should be applied at the time of crown root initiation. For the late sown irrigated wheat crop, the NPK fertilizer dose recommended is:

N – 60-80 kg/ha
P₂O₅ – 30-40 kg/ha
K₂O – 20-25 kg/ha.[5]

Generally weeding is done after 1 ½ to 2 months after sowing or weedicides like 2,4 D, Avadex or Nitrofen (Tok E-25) for controlling *Chenopodium* sp, *Angallis* sp, *Asphodelus* sp, *Phalaris* sp. of weeds. The high yielding wheat varieties should be given five to six irrigations at their critical growth stages viz. Crown root initiation, tillering, jointing, flowering, milk and dough which come at 21-25 days after sowing (DAS), 45-60 DAS, 60-70 DAS, 90-95 DAS, 100-105 DAS and 120-125 DAS respectively. Off these irrigation at CRI stage is most important. Atlantis is a broad spectrum herbicide very effective for the control of grasses, sedges and broadleaf weeds in wheat. It is a combination herbicide based on Mesosulfuron-methyl and Iodosulfuron-methyl sodium. It is a novel safened sulfonyl urea based product for postemergent application in fields of eastern UP. In agreement with other herbicides of sulfonyl urea group, the primary target site of action is the enzyme acetohydroxyacid synthase (AHAS). Both the actives are phloem-xylem mobile in the target weed both via the foliage and via the soil, with clear predominance of foliar action. The visible symptoms of herbicide action are arrested growth within first few days after application and the appearance of chlorotic patches, followed by slow shoot necrosis. Susceptible plants stop growth almost immediately after post-emergence application. Plants will be completely killed in 4 to 6 weeks after application. The broad spectrum herbicides for control of complex weed flora in wheat in fields of eastern UP. Significantly lower weed density, dry biomass of weeds and higher grain and straw yields as well as net returns were achieved with application of pre-mix sulfosulfuron (75%)+metsulfuron methyl (5% WG) @ 32 g/ha POE, clodinafop (15%)+metsulfuron methyl (1% WP) @ 64 g/ha PoE and mesosulfuron (3%)+iodosulfuron methyl sodium (0.6% WDG) @ 14.4 g/ha PoE as compared to rest of the treatments. However, mesosulfuron (3%)+iodosulfuron methyl sodium (0.6% WDG) @ 14.4 g/ha PoE showed phytotoxic effect on wheat at seven days after application[6]

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III. RESULTS

a) Disease control: For controlling diseases following chemicals are used.
Preventive and control measures of the commonly occurring diseases in wheat

| Name of disease | Preventive measures | Name of chemicals | Rate |
|-----------------|--|---|---------------------------|
| Smut | 1. Use of healthy seeds 2. Roguing & burning of disease affected plants 3. Use of resistant varieties 4. Solar heat treatment | Seed dressing with Vitavax/Benlate/G 696 | 2-2.5 g/kg of seed |
| Rust | 1. Use of resistant varieties 2. Timely sowing | Zinc/Manganese | - |
| Bunts | Use of resistant varieties | Seed dressing with Agrosan GN/Vitavax | 2 g/kg of seed |
| Powdery mildew | | Dusting with yellow sulphur, Sodium thiosulphate, Karathane/Miltox or spraying with Benlate | - |
| Molya | 1. Deep summer ploughing 2. Adopt crop rotation 3. Soil treatment | Nemagon DECP 60% EC dripping with first irrigation water | 20 litres/ha 30 ml./ha |

a) Harvesting:

The rain-fed crop reaches the harvest stage much earlier than the irrigated crop. The crop is harvested when the grains become hard and the straw becomes dry and brittle. The harvesting is mostly done by sickle. The crop is threshed by treading with cattle on the threshing-flour or by power driven thresher.

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b) Yield:

The national average yield of wheat grain is about 12 to 13.8 quintals per hectare.

c) Storage:

The grains should be thoroughly dried before storage. The storage life of the grain is closely related to its moisture content. Grains with less than 10 percent moisture store well. The storage pits, bins or godowns should be moisture-proof and should be fumigated to keep down the stored – grain pests including rats. Zinc phosphide is very effective against rats.



IV. CONCLUSION

The broad spectrum herbicides for control of complex weed flora in wheat in fields of eastern UP. Significantly lower weed density, dry biomass of weeds and higher grain and straw yields as well as net returns were achieved with application of pre-mix sulfosulfuron (75%)+metsulfuron methyl (5% WG) @ 32 g/ha POE, clodinafop (15%)+metsulfuron methyl (1% WP) @ 64 g/ha PoE and mesosulfuron (3%)+iodosulfuron methyl sodium (0.6% WDG) @ 14.4 g/ha PoE as compared to rest of the treatments. However, mesosulfuron (3%)+iodosulfuron methyl sodium (0.6% WDG) @ 14.4 g/ha PoE showed phytotoxic effect on wheat at seven days after application.[7]

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