Handbook on Herbicide Recommendations

Anil Dixit
Jay G. Varshney

Directorate of Weed Science Research
Maharajpur, Adhartal, Jabalpur (MP)

The author in no way would be responsible for the fall-out or undesirable consequences of the herbicides listed in this book in the forms of toxicity/damage of crops, animals and/or humans, which is quite possible in the event of wrong selection, inappropriate dose used. The recommendations made here should not be a generalized one across climates, soils, locations/countries or crops etc., rather they should be prior evaluated under filler trials in the specific situations for adoption.

Handbook on Herbicide Recommendations

Anil Dixit and Jay G. Varshney

Directorate of Weed Science Research
Maharajpur, Adhartal, Jabalpur 482 004 (MP)

Correct Citation
Dixit Anil and Jay G. Varshney (2009).
Handbook on Herbicide Recommendations. p.58

Published By
Director,
Directorate of Weed Science Research,
Jabalpur

Compiled and edited by
Dr. Anil Dixit
Dr Jay G. Varshney

DTP work
Sh. Sandeep Dhagat

Cover Design
Dr. Anil Dixit

Year of publication
July, 2009

Address
Directorate of Weed Science Research
Maharajpur, Adhartal, Jabalpur (MP) - 482004
Telephone : 0761 - 2353101, 2353934
Fax : 0761 - 2353129
Gram : WEEDSCIENCE
e-mail : nrcws@sancharnet.in
Web site : www.nrcws.org

Preface

Herbicides, since their discovery after the second world war have revolutionised agriculture in the world. The global consumption of herbicides exceeds the consumption of all other pesticides put together. The current level of herbicide consumption is India approx 20000 MT. Herbicides have been accepted as modern tool in weed management. Herbicides reduce labour requirement enormously and are easy and convenient to use. In India, although the herbicide use is low (about 20% of total pesticides), it is expected to grow steeply in view of labour becoming more expensive and unavailable during peak time.

Unlike other pesticides, herbicides are specific to crops and therefore be chosen and used properly for maximum returns, This publication is meant to provide general information on herbicides that are commercially available in the country. The information contained in this publication is collected from various sources and by putting all information in one place; we expect that this will be a good source for reference for all those who are interested in herbicide and herbicide use in the country. Researchers, teachers and students engaged in herbicide research, will particularly find this publication very useful.

Information on herbicide use in the *Handbook* is not meant to serve as recommendations. Herbicide application is to be taken up only as per the label claim by the manufacturer.

We would like to thank Mr Sandeep Dhagat, for their help in preparation of this publication. We express our gratitude to herbicide industry for readily sharing the information on their products.

July, 2009

Anil Dixit
Jay G. Varshney

INTRODUCTION

The chemicals used for killing or inhibiting the growth of plants are known as *herbicides.* They are also sometimes erroneously referred to as 'weedicides' which is literally correct. However, technical term is herbicide, as it kills not only weeds but also crops, if not properly used.

Herbicides are classified based on

a) *Selectivity* - Selective or non-selective herbicide

b) *Translocation* - Contact or translocated (non-systemic or systemic)

c) *Time of application* - Pre-plant, pre-emergence or post-emergence

d) *Target of application* - Soil applied and foliage applied

e) *Chemical structure* - Various groups like inorganic salts, phenoxy alkanoic acids, amide derivatives, substituted ureas, triazines, etc.

Herbicide formulation

Formulation means the form in which the herbicide is available in the market. It may be either solid or in liquid form. The common formulations of herbicides are indicated below:

Liquid formulations

The majority of herbicides are formulated in liquid form. Liquid formulations are usually available in two forms.

Soluble liquid (L)/water-soluble liquid (WSL)/ water-soluble concentrate (WSC):

This is easily soluble in water. Dilution and spraying are easy with these formulations.

For example, glyphosate is usually formulated as WSC form.

Emulsifiable concentrate (EC)

An emulsion is a uniform mixture of two liquids. The herbicides that are not soluble in water are dissolved in an organic solvent in a concentrated form, which when mixed with water, gives an emulsion.

Solid formulations

Dust (D)

Dust is in fine powder form. Although many insecticides are available in dust form, but this not a common formulation for herbicides.

Wettable powder (WP)

Herbicides of minimal solubility in water, oil and common solvents are formulated as wettable powder. When mixed with water, particles of wettable powder get uniformly distributed resulting in a suspension. They do not dissolve in water. A wettable powder formulation consists of the finely ground herbicide, diluent like clay particles and surfactants (wetting agents).

Granule (G)

Granules are produced by spraying the herbicide on granulated inert materials so that the herbicide is coated on them. Granular formulation of herbicides are preferred when spraying is cumbersome. For example, preemergence herbicides formulated as granules are preferred in puddled rice fields.

Water soluble powder (WSP)

The herbicide formulated as 'water soluble powder' will dissolve in water (e.g. sodium salt of 2,4-D) and result in a solution.

Active Ingredient

In a herbicide formulation, the chemical that is directly responsible for the herbicidal effect is called active ingredient (ai.). **In** other words, active ingredient is that part of a formulated product that is responsible for herbicide effects. This is displayed as percentage, either w/w or w/v. In the case of phenoxy compounds like 2,4-D, instead of ai., another term acid equivalent (ae.) has been in use. Acid equivalent is the amount of active ingredient expressed in terms of the parent acid. Technically, **it** refers to that portion of a herbicide derived from an acid that can theoretically be converted back to the acid form.

Chemical Name

The chemical name of a herbicide refers to the active ingredient, and it represents the structure of the compound. Herbicides are named according to the rules of IUPAC (International Union of Pure and Applied Chemistry).

Common Name

An ordinary short name given to a herbicide without reference to its structure. This also applies to the active ingredient. Common names are given mainly because of the long and complex nature of chemical names. Common names are also approved by professional bodies such as the International Standardisation Organisation (ISO).

Trade or brand name

It is the name given by a manufacturing company to its herbicide to differentiate it from those of other companies. Trade names of herbicide may change from country to country. It is thus not adequate enough to identify a herbicide or to determine the correct rates of application. Percentage content of active ingredient and the type of formulation are usually given along with the trade name.

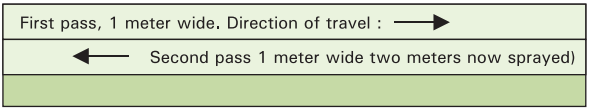
Determining the amount of herbicide to use

Once the sprayer out put per area is known, the applicator can begin to prepare to spray a field.

With a sprayer output of 180 liters/hectare and a herbicide rate of 100 grams/hectare the calculations for spraying a one hectare field would be:

Wheat field size: **1 hectare**	180 liters / ha x 1 ha = **180 liters** 180 liters / 15 liter per tank = **12 tanks** **(Spray tank capacity of 15 liters)**

Put 100 grams of the herbicide into 12 liters of water and mix well. Pour one liter into each tank, fill with water, mix and spray at the same speed used for calibration. With this boom sprayer, straight passes will be made each meter across the field.



Calibration of the sprayer

Calibration is nothing but finding out how much area could be sprayed with the sprayer you have. The area sprayed is

also dependent on the type of nozzle, spray pressure and the speed of application. The most practical way to calibrate the sprayer is by actually using it in the field. Spraying can be done by moving the spray lance from side to side using a flat fan nozzle or walk forward holding the spray lance in one position using a flood jet nozzle. In both cases measure the swath width i.e., the width that is treated

- Mark an area having width equal to the swath width
- Keep the sprayer on a level ground and fill the water to a marked level
- Carry out spraying on the marked area at a normal speed
- Avoid skipping or overlapping
- Refill the sprayer to the original level marked earlier
- The quantity refilled is the quantity required to spray the marked area.
- Work out the volume rate/ha

Example :

Marked area 20 square meters

Quantity of water used 1 litre

Volume rate = (1X10,000)/20

= 500 l/ha or 200 l/acre

With the same swath width and operating speed, the spraying could be undertaken to apply the herbicides in the field.

The basic principle in calibration of a boom sprayer (with more than one nozzle) or tractor-mounted sprayer is also similar, the only difference being the flow rate of all nozzles in a boom has to be taken into account.

Calculation of herbicide requirement

The product label and the literature supplied with the herbicide will provide details of herbicide name, active ingredient (a.i.), date of expiry, directions for use etc. It must be read before using the herbicide. It is particularly important to note the strength of the product (a.i.) as the same herbicide may be sold under different trade names with varying amounts of active ingredient. For example, isoproturon is available at 50 and 75% formulations. For this reason only, the recommendations are normally made on kg a.i. basis. Even in liquid formulations the herbicide present is mentioned in g/l.

The amount of commercial formulation of the herbicide required can be calculated by the following formula:

$$\text{Commercial product (kg/ha)} = \frac{\text{Dose in kg a.i. / ha} \times 100}{\text{\% a.i. in the product}}$$

Example 1

Isoproturon is available as 75% WP and 50% WP. If the recommended rate of application is 0.75 kg ai/ha then the amount of commercial product required is:-

50% WP product =

$$\frac{0.75 \times 100}{50} = 1.50 \text{ kg/ha} \qquad \ldots\ldots 1$$

75% WP product =

$$\frac{0.75 \times 100}{75} = 1.00 \text{ kg/ha} \quad \ldots\ldots 2$$

Example 2

Glyphosate is to be applied at 3 kg ai/ha. The herbicide is available as Round up (commercial name of glyphosate) which contains 41% glyphosate

The quantity of Gramoxone required is :

$$\frac{3 \times 100}{41} = 7.3 \text{ l/ha} \quad \ldots\ldots 3$$

Making stock solution

In order to apply herbicide uniformly in the entire required area, it is advisable to prepare stock solution of the herbicide. Suppose;

Area to be treated = 1 ha (2.5 acres)
Sprayer capacity = 15 litre
Sprayer calibration = 450 litres / ha

Then,

$$\frac{450}{15} = 30$$

that is 30 refills are required to spray one hectare area.

In which case, it is advisable to dissolve the required amount of herbicide as obtained in calculations 1, 2 or 3 in 30 measures (could be a glass tumbler, plastic mug or a container) of water which becomes the stock solution. Now add 1 measure of this stock solution to sprayer tank containing 15 l water, stir it and spray as suggested earlier.

Alternatively one can dissolve the entire quantity of herbicide in 450 liters of water contained in a big container and use this solution directly for spraying.

Safe handling of herbicides

It is important to read the label before use and follow directions and precautions properly. The label tells what the herbicide is, lists the amount of active ingredient, and gives recommendations and precautions for use. Most herbicides are potentially dangerous particularly in concentrated form but they are not likely to cause injury if used properly and if recommended precautions are observed. The following points may be taken note of in preventing the abuse of herbicides.

- Avoid prolonged contact with the skin, breathing vapours or dusts and splashing herbicide solution in to eyes or mouth.
- Wash off with soap water any herbicide spilled on the body.
- Do not smoke or eat while working with chemicals.
- Do not spray against the wind. Cover the face with a cloth while spraying.
- If unusual symptoms such as dizziness, nausea or skin rashes appear, seek medical attention at once.
- Dispose of empty containers immediately. Mutilate them to avoid re-use and bury the remnants deep in an isolated area. Do not use them for domestic purposes.
- Avoid contaminating water supplies with herbicides.
- Store unused herbicides in original containers in a locked storage area away from food grains and children.

HERBICIDE RECOMMENDATIONS FOR DIFFERENT CROPS

RICE (Dry seeded)

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (Green weed, Weed kill, weedmar, knockweed etc.)	750-1000	2250-3000 (36EC) 20-25 kg (4G)	20-25 DAT	Apply 20-25 day after sowing where sedges and broad weeds are dominant. Drain before application and reflood where relevant within a few days. Good against water hyacinth and *Manochoria*.
Chlorimuron + metsulfuron-methyl (Almix)	4	20	15-20 DAS	It is a ready-mix meant for controlling a broad spectrum of weeds including annual BLWs and grasses.
Anilophos (Arozin, Aniloguard)	400	1200	3-5 DAT	Apply on saturated soil and do not flood for next 2-3 days. Controls many annual grasses and some BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Butachlor (Machete, Dhanuchlor, Teer, Donmix (EW))	1000-1500	2000-3000 20-25kg (5%G)	6-7 DAS	Controls annual grasses and some BLWs.
Cyhalofop butyl (Clincher,Wrap -up)	70-90	1000	25-30DAS	Excellent control of grasses.
Fenoxaprop-p-ethyl (Whip Super)	60-70	800-1000	25-30 DAS	Excellent control of annual grasses. May be applied as a follow up application with all pre-em herbicides.
Bisbyribac sodium (Nominee Gold)	25	250	20 DAS	Controls annual grasses, some BLWs and sedges
Azimsulfuron (Segment 50WG)	35	70	20 DAS	Controls annual grasses, some BLWs and sedges
Oxadiagryl (Raft)	90	1500	0-3 DAS	Gives excellent control of grasses and some sedges. Control of BLWs is not satisfactory.
Oxadiazon (Ronstar)	500-750	2000-3000	Pre-em. or early Post - emergence	Controls broad spectrum of weeds.
Oxyfluorfen (Goal and Zargon)	150-250	600-1000	0-6 DAS	Controls many annual grasses and some BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pretilachlor (Refit)	750	1500	3-7 DAS	Broad spectrum herbicide for controlling a wide variety of annual grasses and BLWs.
Pyrazosulfuron (Saathi)	25	200	20-25 DAS	Gives effective control of *Broad leaved and sedges.*
Thiobencarb (Saturn)	1000-1500	2000-3000 20-25 kg (5%G)	6-7 DAS	Controls annual grasses and some BLWs.

RICE (Punddle-seeded)

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (Green weed, Weed kill, weedmar etc.)	750-1000	2250-3000 (36EC) 20.-25 kg (4G)	20-25 DAS	Apply 20-25 days after sowing when sedges and broad leaved weeds are dominant. Effective against water hyacinth and *Monochoria*.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Anilophos Arozin, Aniloguard)	400	1200	3-5 DAT	Apply on saturated soil and do not flood for next 2-3 days. Controls many annual grasses and some BLWs.
Cyhalofop-butyl (Clincher and Wrap-up)	60-75	600-750	15-20 DAS	Excellent control of annual grasses particularly the barnyard grass as post-emergence.
Chlorimuron + Metsulfuron-methyl (Almix)	4	20	15-20 DAS	It is a ready-mix meant for controlling a broad spectrum of weeds including annual BLWs and sedges.
Ethoxysulfurn (Sunrice 15WDG	15	125	10-15 DAT	Excellent control of broad leaved and sedges.
Fenoxaprop-p-ethyl (Whip Super)	60-70	800-1000	25-30 DAS	Excellent control of annual grasses. May be applied as a follow up application with all pre-em herbicides..

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Oxadiagryl (Raft 6% EC, Topstar 80WP)	70-80 (for Topstar) and 100 (for Raft)	87.5 (80WP) and 1500 (6%EC)	0-5 DAS	Apply before weed emergence. Gives excellent control of grasses and some sedges. Poor on BLWs.
Pretilachlor (Refit)	750	1500	3-7 DAS	Broad-spectrum herbicide for controlling a wide variety of annual grasses and BLWs.
Pyrazosulfuron 10WP (Saathi)	25	250	10-15 DAS	Gives effective control of *Broad leaved and sedges.* Could be used for weed control in wet seeded nursery as well
Thiobencarb (Saturn)	1000-1500	2000-3000 20-25 kg (5%G)	6-7 DAS	Controls annual grasses and some BLWs. Ensure sufficient moisture at the time of application. Apply after light rains before germination of weeds. Could be used for weed control in wet seeded nursery as well.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pendimethalin (Stomp, Pendistar)	1000-1500	3000-4500	6-7 DAS	Controls annual grasses and some BLWs. Could be used for weed control in wet seeded nursery as well.

RICE (Puddle-transplanted)

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (Green weed, Weed kill, weedmar etc.)	750-1000	2250-3000 (36EC) 20.-25 kg (4G)	20-25 DAT	Apply 20-25 days after sowing when sedges and broad leaved weeds are dominant. May be applied as a follow up application with all pre-em herbicides. Drain before application and re-flood where relevant within a few days. Effective against water hyacinth and *Monchoria*.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Bensulfuron (0.6%) + Pretil achlor-(6%) (Londex power 6.6%)	660	10000 (4kg/acre)	0-3DAT	Effective for controlling Grasses,broad leaved and sedges.
Chlorimuron + Metsulfuron-methyl (Almix)	4	20	15-20 DAT	It is a ready mix meant for controlling a broad-spectrum of weeds including annual BLWs and grasses.
Anilophos (Arozin, Aniloguard)	400	1200	3-5 DAT	Apply on saturated soil and do not flood for next 2-3 days. Controls many annual grasses and some BLWs. Supplement with 2,4-D, Almix, pyrazosulfuron ethoxysulfuron or fenoxaprop-ethyl (depending on the weed flora) as post-em for broadspectrum weed control.
Copper sulphate	15-20 Kg			To control algae and scum as and when they appear. Apply by broad casting in standing water.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Ethoxysulfurn (Sunrice 15WDG	15	125	10-15 DAT	Excellent control of broad leaved and sedges.
Cyhalofop-butyl (Clincher,Wrap -up))	60-75	600-750	10-15 DAT	Excellent control of annual grasses particularly the barnyard grass.
Fenoxaprop-ethyl (Whip Super)	60-80	800-1200	25-30 DAT	Excellent control of annual grasses.
Glyphosate (Round up, Glycel)	1000-1500	2000-3000	10-15 days before transplanting	May be applied to clear the vegetation and as a substitute for tillage. Kills all weeds including perennial weeds but poor on *Chenopodium*
Pendimethalin (Stomp, Pendistar)	1000-1500	3000-4500	6-7 DAT	Controls annual grasses and some BLWs. Could be used for weed control in wet seeded nursery as well.
Pyrazosulfuron (Saathi)	25	250	8-10 DAS	Gives effective control of broad leaved weeds and sedges.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Oxadiagryl (Raft 6% EC, Topstar 80WP)	70-80 (for Topstar) and 100 (for Raft)	87.5 (80WP) and 1500 (6%EC)	0-5 DAS	Apply before weed emergence. Gives excellent control of grasses and some sedges. Poor on BLWs.
Bisbyribac sodium (Nominee Gold)	25	250	20 DAS	Controls annual grasses,some BLWs and sedges.
Azimsulfuron (Segment 50WG)	35	70	20 DAS	Controls annual grasses,some BLWs and sedges.
Pretilachlor (Refit)	750	1500	3-7 DAT	Broad spectrum herbicide for controlling a wide variety of annual grasses and BLWs. Gives excellent control of *Ischaemum rugosum.*
Thiobencarb (Saturn)	1000-1500	2000-3000 20-25 kg (5%G)	6 7 DAT	Controls annual grasses and some BLWs.

Wheat

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (Green weed, Weed kill, weedmar etc.)	400-600	Varies with formulation	30-35 DAS	Apply after first irrigation for controlling broad leaved weeds only. Should not be used in sensitive cultivars such as HD 2009.
Carfentrazon 40DF(Affinity)	20	50	25-30 DAS	Excellent control of broad leaved weeds specially *Convolvulus arvensis.*
Clodinafop (Topik or Jhataka)	60	400	25-30 DAS	Excellent control of grasses.
Metribuzin (Sencor, Tata metri etc.)	175-210	250-300	30-35 DAS	Quite effective on *P. minor* including HR one. Also gives good control of many BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fenoxaprop (Puma Super)	100-120	1000-1200	4-6 WAS	Ideal for controlling HR *P.minor.* Gives excellent control of wild oats. Does not control BLWs. Use 2,4-D after a week for controlling BLWs. Avoid application during morning hours when foliage is wet due to dew fall. Suitable for application in wheat when mix/intercropped with mustard.
Isoproturon	750-1000	1000-1250 (75WP) 1500 2000 (50WP)	25-30 DAS	Controls many annual BLW and grass weeds. Apply after first irrigation. Do not use against *Phalaris minor* in some areas in Punjab, Haryana and Western U.P. where the weed has developed resistance to the herbicide.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Metsulfuron-mehtyl (Algrip or Metsy)	4-	20-30	25-30 DAS	Controls several annual BLWs and sedges.
Pendimethalin (Stomp, Dhanutop, Pendistar)	1000	3000	0-3 DAS	Controls many annual grasses and some BLWs.
Sulfosulfuron (Leader, Safal, Fateh, SF-10)	25	33	25-30 DAS	Controls many annual grasses and some BLWs.
Pinoxaden 5EC (Axial)	40-50	800-1000	25-30 DAS	Excellent control of Grassy weeds particularly *Phalaris minor* and Avena ludoviciana.
Sulfosulfuron 75% + Metsulfuron5%WG (Total or Brackett or Topel or Twin)	32	40	25-30 DAS	Good control of BLW and Grasses.
Mesosulfuron 3% + Iodosulfuron methyl sodium 0.6% WDG (Atlantis)	12 + 2.4	400	25-30 DAS	Good control of BLW and Grasses.

Maize

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (Green weed, Weed kill, weedmar etc.)	750	Varies depending on formulation	Post-em	For the control of broad leaved weeds only. Not suited to maize intercropped with grain legumes.
Alachlor (Lasso)	2000-2500	4000-5000	0-3 DAS	Control many annual grasses and some BLWs.
Atrazine (Atrataf, Dhanuzine)	750-1000	1500-2000	0-3 DAS or early post - emergence	Apply either prior to emergence of crop or within 2 weeks after emergence. Controls many annual BLWs and some grasses.
Pendimethalin (Stomp, Pendistar)	1000-1500	3000-4500	0-3 DAS	Control many annual grasses and some BLWs.

In transplanted maize, apply atrazine at 0.25-0.50 kg/ha from 0-4 weeks after transplanting

Sorghum

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (sodium or ammonium salt)	750	Vary as per formulation	5-6 WAS	For the control of *Striga* and the other broad leaved weeds only.
Atrazine (Atrataf, Dhanuzine)	500-750	1000-1500	0-3 DAS	Controls many annual BLWs and some grasses.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	0-3 DAS	Controls many annual grasses and some BLWs.

Pearlmillet

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (Sodium or ammonium salt)	750	Vary as per formulation	5-6 WAS	For control of Striga and other broad leaved weeds only. Controls many annual BLWs and some grasses.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Atrazine (Atrataf, Dhanuzine)	250-500	500-1000	0-3 DAS	Controls many annual BLWs and some grasses.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	0-3 DAS	Controls many annual grasses and some BLWs.

Greengram/Blackgram/Pigeonpea

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Alachlor (Lasso)	2000-2500	4000-5000	0-3 DAS	Controls many annual grasses and some BLWs.
Fluchloralin (Basalin)	750-1000	1500-2000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.
Oxadiazon (Ronstar)	250	1000	0-3 DAS	Controls wide spectrum of weeds.
Oxyfluorfen (Goal,Zargon)	100-125	400-500	0-3 DAS	Controls wide spectrum of weeds.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	0-3 DAS	Controls many annual grasses and some BLWs.
Quizalofop-ethyl (Targa Super)	40-50	800-1000	15-20 DAS	Excellent control of annual grasses.

Chickpea/Lentil/field Peas

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	750-1000	1500-2000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.
Metolachlor (Dual)	1000-1500	2000-3000	0-3 DAS	Controls many annual grasses and some BLWs.
Metribuzin (Sencor) (In peas only)	250	350	0-3 DAS or 15-20 DAS	Controls several annual grasses and BLWs and some sedges.
Oxyfluorfen (Goal,Zargon) (In peas)	100-125	400-500	0-3 DAS	Controls wide spectrum of weeds.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	0-3 DAS	Controls many annual grasses and some BLWs. Supplement with quizalofop as post-em for grass weed control
Quizalofop-ethyl (Targa Super)	40-50	800-1000	15-20 DAS	Excellent control of annual grasses.

Groundnut

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Alachlor (Lasso)	1500-2000	3000-4000	0-3 DAS	Controls many annual grasses and some BLWs.
Butachlor (Machete, Dhanuchlor, Teer, Donmix (EW))	1000-1250	2000-2500	Pre-em	Apply within 3-4 days of planting of cotton. Controls many annual grasses and some BLWs
Imazethapyr (Pursuit and Lagaam)	100	1000	0-3 DAS or early postem	Controls a wide variety of annual grasses and BLWs

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	750-1000	1500-2000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.
Metolachlor (Dual)	1000-1500	2000-3000	0-3 DAS	Controls many annual grasses and some BLWs.
Oxadiazon (Ronstar)	750	3000	0-3 DAS	Controls wide variety of weeds.
Oxyfluorfen (Goal, Zargon, Oxygold)	250	1000	0-3 DAS	Controls wide variety of weeds.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	Pre-plant or Pre-em	Pre-plant incorporation or pre-em 2-3 days of sowing. Controls many annual grasses and some BLWs.
Quizalofop-ethyl (Targa Super)	40-50	800-1000	15-20 DAS	Excellent control of annual grasses.
Trifluralin (Treflan)	1000	2000	0-3 DAS	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.

Soybean

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Alachlor (Lasso)	1500-2000	3000-4000	0-3 DAS	Controls many annual grasses and some broad-leaved weeds and sedges. Ensure good soil moisture particularly when granules are used.
Chlorimuron (Kloben, Tranz,Curin)	6-9	30-40	15-20 DAS	Controls many annual BLWs, and sedges
Fenoxaprop (Whip Super)	80-100	800-1000	20-25 DAS	Excellent control of annual grasses. Very weak on other weeds. Can be used as sequential application with all pre-planting and pre-em herbicides

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fenoxaprop + chlorimuron (Whip Super + Kloben or Tranz)	80 + 6	800 + 30	Post-em (20 DAS)	Controls a wide variety of annual grasses and BLWs.
Fluchloralin (Basalin)	1000	2000	Pre-planting	Incorporate into surface soil immediately after application. Controls many annual grasses and some BLWs.
Imazethapyr (Pursuit,Lagaam)	100	1000	Pre-em or early post-em	Controls a wide variety of annual grasses and BLWs.
Metribuzin (Sencor, Lexone, Barrier, Tata Metri)	350-525	500-750	0-3 DAS	Apply 1-2 days after sowing. Controls many annual grasses and BLWs.
Oxadiazon (Ronstar)	500	2000	Pre-em or Early post-em	Controls many annual grasses and some BLWs.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	Pre-em or Pre-planting	Incorporate in to surface soil when used before planting. Controls many annual grasses and some BLWs.
Quizalofop-ethyl (Targa Super)	40-50	800-1000	20-25 DAS	Excellent control of annual grasses. Less effective of BLWs and sedges.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Quizalofop-p-tefuryl 4.4% (Pantara)	30-40	750-1000	20-25 DAS	Excellent control of grasses.
Quizalofop-p-tefuryl 4.4% or Quizalofop-ethyl 5% + chlorimuron (Pantara or Targa Super + Tranz or Curin or Kloben)	30-40	750-1000 + 40	20-25 DAS	Excellent control of grasses and broad leaved weeds.
Trifluralin (Treflan)	1000	2000	Pre-planting	Apply before planting at the time of final land preparation. Controls many annual grasses and some BLWs.

Sunflower

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Alachlor (Lasso)	1000-1500	2000-3000	0-3 DAS	Controls many annual grasses and some BLWs. Granular formulations can also be applied at the time of last cultivation.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Butachlor (Machete, Teer, Dhanuchlor, Donmix (EW))	1000-1500	2000-3000	0-3 DAS	Controls many annual grasses and some BLWs.
Fluchloralin (Basalin)	1000	2000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.
Oxadiazon (Ronstar)	500-1000	2000-4000	0-3 DAS	Controls wide variety of weeds.
Oxyfluorfen (Goal)	250	1000	0-3 DAS	Controls wide variety of weeds.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	0-3 DAS	Controls many annual grasses and some BLWs.
Trifluralin (Treflan)	1000	2000	Pre-planting	Apply just before planting and incorporate in to the surface soil. Controls many annual grasses and some BLWs.

Rapeseed/Mustard

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	1000	2000	Pre-planting	Incorporate into surface soil before sowing of the crop. Controls many annual grasses and some BLWs.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-300	Pre-em	Controls many annual grasses and some BLWs. Untimely rain immediately after herbicide application may damage the crop.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Isoproturon (Many)	750-1000	1000-1250 (75WP) 1500-2000 (50WP)	Pre-em or early post	Controls many annual grasses and BLWs. Untimely rain immediately after herbicide application may damage the crop. With post-em application, mix herbicide in 20-25 kg dry soil and broadcast uniformly. However, avoid application on wet foliage.
Oxadiazon (Ronstar)	500	2000	Pre-em early postem	Controls many annual grasses and some BLWs.
Quizalofop (Targa Super)	40-50	800-1000	15-20 DAS	Excellent control of annual grasses, including *Phalaris minor* and wild oats. Less effective on other weeds.

Linseed/Sesamum/Niger

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	1000	2000	Pre-planting	Incorporate into surface soil before sowing of the crop. Controls many annual grasses and some BLWs.
Isoproturon (Many) (In linseed)	1000-1500	1250-3000 (75WP) 2000-3000 (50WP)	Post-em	Controls many annual grasses and BLWs. Gives satisfactory control of parasitic weed Cuscuta. Untimely rain immediately after herbicide application may damage the crop.
Oxadiazon (Ronstar)	500	2000	Pre-em or Early post - em	Controls many annual grasses and some BLWs.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	0-3 DAS	Controls many annual grasses and some BLWs.

Jute

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	1000	2000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.
Pendimethalin (Stomp, Pendistar)	750-1000	2500-3000	0-3 DAS	Controls many annual grasses and some BLWs.
Fenoxaprop-p-ethyl (Whipsuper)	100	1000	25 DAS	Controls many annual grasses.
Quizalofop (TargaSuper)	50	1000	25DAS	Controls many grasses.

Cotton

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Butachlor (Machete, Dhanuchlor, Teer, Donmix (EW))	1000-1250	2000-2500	Pre-em	Apply within 3-4 days of planting of cotton. Controls many annual grasses and some BLWs.
Diuron (Klass)	500-750	600-900	Pre-em	Do not apply to coarse sandy soil. Crop may be damaged if seed has been treated with systemic insecticide.
Fluchloralin (Basalin)	1000	2000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Glufosinate (Basta)	450	1000	Post-em	As directed spray when cotton is over 15 cm high. Spray when it is not windy with least drift on to the crop. Good control of all weeds.
Glyphosate (Roundup, Glycel)	1000	2500	Post-em	As directed spray when cotton is over 15 cm high. Spray when it is not windy with least drift on to the crop. Good control of all weeds including perennial weeds. Poor on Chenopodium.
Oxadiazon (Ronstar)	500-750	1000-1500	0-3 DAS	Controls many annual grasses and some BLWs.
Pyrithiobac sodium (Theme) 10EC	75	750	Post-emergence	Excellent control of broad leaved weeds.
Paraquat (Gramoxone)	500	2000	Post-em	As directed spray when cotton is over 15 cm high. Spray when it is not windy with least drift on to the crop. Good control of all weeds.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pendimethalin (Stomp, Dhanu top, Pendistar)	1000-1500	3000-5000	Pre-plant Pre-em or Lay-by application	Apply before sowing and incorporate in to surface soil, or apply 2-3 days after sowing. Controls many annual grasses and some BLWs. Could also be applied at the end of last intercultivation followed by irrigation for season-long weed control. Remove all weeds before lay-by application.
Trifluralin (Treflan)	500-1000	1000-2000	Pre-planting	Incorporate into surface soil immediately after application. Controls many annual grasses and some BLWs.

Sugarcane

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
2,4-D (Green weed, Weed kill, weedmar etc.)	1000	3000	Post-em	Apply 5 weeks after planting. Controls BLWs and sedges but not grasses.
Atrazine (Atrataf, Dhanuzine etc.)	2000	4000	Pre-em	Good soil tilth and soil moisture enhances the herbicide activity. Controls many annual BLWs and some grasses. Tank mix atrazine with alachlor at 2.0 kg/ha (4.0 l product) for broad spectrum weed control.
Diuron (Klass)	1500	2100	Pre-em	Controls wide range of weeds including grasses and BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Glyphosate (Roundup, Glycel)	1000	2500	Post-em	As directed spray when cotton is over 15 cm high. Spray when it is not windy with least drift on to the crop. Good control of all weeds including perennial weeds.
Metribuzin (Sencor, Lexone, Barrier, Tata Metri)	1000-1500	1500-2250	Pre-em or early post - em	Apply 3-5 days after planting or at 20-25 days after planting. Use floodjet nozzle and as directed spray in case of post-em application. Ensure sufficient soil moisture for better weed control. Can be mixed with 2,4-D in early post - emergence application for broad spectrum weed control.
Hexazinon +Diuron-60% (Velpar K-4)	120	2000	Pre and Post-em	Controls grasses, broad leaved and sedges. Sufficient moisture must be there during pre-emergence application.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Paraquat (Gramoxone)	500 or 0.30% spray	2000	Pre-em or post-em	Apply to emerged weeds up to 5-10% cane emergence. As directed spray(Use of hood) when the crop is over 30 cm high. Good control of all weeds. Tank-mix with 2,4-D at 1.0 kg/ha to increase spectrum of weed control.

Potato

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Butachlor (Machete, Dhanuchlor, Teer, Donmix (EW))	750-1000	1500-2000	Pre-em	Apply within 3-4 days of planting potato tubers. Ensure adequate soil moisture at the time of application. either before or after irrigation. Controls many annual grasses and some BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	1000-1500	2000-3000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.
Isoproturon (Many)	750-1000	1000-1250 (75WP) 1500-2000 (WP)	Pre-em or early post-em	Controls wide variety of annual weeds both grasses and BLWs. In case of post-em application spray after earthing-up operation.
Metribuzin (Sencor, Tatametri etc.)	525	750	Pre-em or early post-em	Apply 3-4 days after planting or as post-em when potato has reached 5 cm in height. Controls wide variety of annual weeds both grasses and BLWs. Use flat fan nozzle for pre-em and floodjet nozzle for post-em application.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pendimethalin (Stomp, Pendistar)	1000	3000	Pre-em	Apply at 2-3 days after planting. Does not control emerged weeds. Controls many annual grasses and some BLWs.

Cabbage / Cauliflower

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	1000	2000	Pre-or post-transplanting	Incorporate into the surface soil immediately after application or could be applied just before planting followed by irrigation. Controls many annual grasses and some BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pendimethalin (Stomp, Pendistar)	1000	3000	Pre-or post-transplanting	Apply before or immediately after transplant-ing followed by irrigation. Controls many annual grasses and some BLWs.

Tomato/Brinjal/Chilli/ Green Pepper

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Alachlor (Lasso)	2000	4000	Pre-transpla-nting	Apply before transplanting followed by irrigation. Controls many annual grasses and some BLWs.
Fluchloralin (Basalin)	1000	2000	Pre-transpla-nting	Apply before transplanting followed by irrigation. Controls many annual grasses and some BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Pendimethalin (Pendistar, Stomp, Dhanutop, Dost etc.)	1000	3000	Pre- or post - transplanting	Apply before or immediately after transplanting followed by irrigation. Controls many annual grasses and some BLWs.
Quizalofop-p-ethyl (Targa Super)	50	1000	Post-emeregence	Kills many grassy weeds.
Metribuzin (Sencor, Tatametri etc.) (In tomato)	525	750	Pre-transplanting or early post - em	Apply one week before transplanting followed by irrigation or post-em two weeks after transplanting. Controls many annual grasses and some BLWs. Could be applied as early post-em by avoiding direct contact with tomato plants.
Oxadiazon (In chillies)	500-750	1000-1500	Pre-transplanting	Controls many annual grasses and some BLWs.

Onion / Garlic

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Butachlor (Bilchlor, Machete etc.)	1000-1250	2000-2500	Post-transplanting	Apply within 3-4 days of transplanting either before or after irrigation. Controls many annual grasses and some BLWs.
Fluchloralin (Basalin)	1000	2000	Pre-or post - transplanting	Apply before or after transplanting and followed by irrigation. Controls many annual grasses and some BLWs.
Haloxyfop-butyl	100		2 WAT	Apply when maximum weeds have emerged. Gives excellent control of grasses and some sedges, but poor on BLWs.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Oxadiagryl (Raft, Topstar)	90	1500	0-3 DAT	Apply before weed emergence and after irrigation. Gives excellent control of grasses and some sedges. Poor on BLWs.
Oxadiazon (Ronstar)	500-750	2000-3000	Pre-or post - transplanting	Apply before or after transplanting and followed by irrigation. Controls many annual grasses and some BLWs.
Oxyfluorfen (Goal, Zargon or Oxygold)	250	1000	Pre- or early post-transplanting	Apply before or after transplanting and followed by irrigation. Controls many annual grasses and some BLWs. Could be applied up to 25-30 DAT.
Pendimethalin (Stomp, Pendistar)	1000	3000	Pre- or post-transplanting	Apply before or after transplanting and followed by irrigation. Controls many annual grasses and some BLWs. If direct sown, spray within 2-3 days of sowing. Apply 0-3 DAS in direct-seeded crop.

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Quizalofop-p-ethyl (Targa super)	50	1000	Post-em	Kills many grassy weeds.

Beet Root/Radish/Carrot

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	1000	2000	Pre-planting or Pre- or post-transplanting	Apply before planting in case of direct seeded crop. Apply before or after transplanting and followed by irrigation. Controls many annual grasses and some BLWs.
Pendimethalin (Stomp, Pendistar)	1000	3000	0-3 DAS or Pre- or post - transplanting	Apply from0-3 DAS in case of direct seeded crop. Apply before or after transplanting and followed by irrigation. Controls many annual grasses and some BLWs.

Cumin/Coriander/Fennel (Saunf) / Fenugreek (Methi)

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Fluchloralin (Basalin)	1000	2000	Pre-planting	Incorporate into the surface soil immediately after application. Controls many annual grasses and some BLWs.
Pendimethalin (Stomp, Pendistar)	1000-1500	3000-5000	Pre-em	Apply 2-3 days after sowing. Controls many annual grasses and some BLWs.
Quizalofop (Targa Super)	50	800-1000	Post-em	Controls many grassy weeds.

Cucurbits

Herbicides (Trade name)	Dose (g ai/ha)	Product (g or ml/ha)	Application time	Remarks
Oxyfluorfen (Goal or Zargon)	250	1000	Pre-emergence	Precautions to be taken during spray on soil surface to avoid direct contact of seedlings or seeds. Controls many annual grasses and some BLWs.
Metribuzin (Sencor)	500	700	Pre-em	Precautions to be taken during spray on soil surface to avoid direct contact of seedlings or seeds. Controls many annual grasses and some BLWs.

Abbreviation used for :
DAS - Days after sowing
DAT - Days after transplanting
BLWs - Broad leaved weeds
Pre-em - Pre-emergence

Appendix - I

List of prominent herbicides use in India with their common and trade names and manufacturers

Common name	Trade name (s)	% a. i.	Manufacturer
2,4-D	Weedmar, Weedkill, Knockweed, Tafacide, Erbitox, Combi, Agrdone-48,	EC 38, 34EE, WP 80, 72 WSC	Zeneca-ICI, Agromore, Dhanuka, Rallis, Atul, Bharat Pulverizers, Green crops, kilpest.
Alachlor	Lasso	50 EC	Monsanto
Anilophos	Aniloguard, Arozin, Anilodhan	30 EC	Bayer, Gharda, Dhanuka,
Atrazine	Atrataf, Dhanuzine, Solaro and Surya	50 WP	Bayer, Rallis, Dhanuka, Pesticide India Nagarjuna
Azimsulfuron	Segment	50WG	DuPont
Bisbyribac sodium	Nominee Gold	10 EC	Pesticide India
Butachlor	Machete, Dhanuchlor, Teer, Donmix (EW), Topchlor	50 EC	Monsanto, Dhanuka, Rallis, Coromandal Indag, Hindustan Insecticides, Montari, Searle, Siris,
Bensulfuron + pretilachlor	Londax power, Eraze Strong	6.6 EC	DuPont and Nagarjuna
Carfentrazon	Affinity	40DF	FMC
Chlorimuron	Kloben,Tranz, Curin	20 WP	DuPont, Bayer and Dhanuka
Chlorimuron + metsulfuron	Almix	20 WP	DuPont
Clodinafop	Topik, Jhatka and Point	15 WP	Syngenta, UPL, Nagarajuna
Clomazone	Command	50 EC	FMC
Cyhalofop-butyl	Clincher,Wrap-up	10 EC	Dow Agro and Dhanuka
Dalapon	Dalapon, Dowpon	85 WP	Dow Agro and BASF

Common name	Trade name (s)	% a. i.	Manufacturer
Diclofop-methyl	Illoxan	28 EC	Bayer
Diuron	Karmex, Klass, Agromex, True	80 WP	Bayer, BASF, Rhone-Poulenc, Atul, Agromore
Ethoxysulfuron	Sunrice	15 WG	Bayer
Fenoxaprop	Whip Super	10 EC	Bayer
Fluchloralin	Basalin	45 EC	BASF
Glufosinate Ammonium	Basta	15 SL	Bayer
Glyphosate	Roundup, Glycel, Glytaf, Noweed, Weedoff, Globus SL	41 EC	Monsanto, Excel, Rallis, Dhanuka, Dow, Nagarjuna
Haloxyfop Methyl	Focus, Gallant, Verdict	10 EC	Dow Agro
Imazethapyr	Pursuit, Lagaam	10 EC	BASF and UPL
Isoproturon*	Alon, Arelon, Hilproturon, Tolkan, **Isoguard**, Nocilon, Dhar, Dhanulon, **Delron**,Tritilon, Agrilon, Isolon, Wonder, **Milron**, Shivron, Greniran, Taurus, Rahshak, Ranak, Kanak, Sonaron, Phulon, totalon, Carelon, Marklon, Pestolon, Agron, Monolon, Jaiproturon, Graminon, Prow, Isotox, Isohit, Ciluron, Isocin, Isoptoturon, Norlon	50 WP 75 WP	Bayer, Gharda, Dow Agro, Rallis, Dhanuka, Montari, Crop Health, Hexamar
Linuron	Afalon	50 WP	Bayer
Methabenzthiazuron	Tribunil, Ambonil, Yield, Perch	70 WP	Bayer
Metolachlor	Dual	50 EC	Syngenta
Metribuzin	Sencor, Lexone, Barrier, Tata Metri,	70 WP	Bayer, Rallis, Dhanuka

* Many Industries have discontinued this product.

Common name	Trade name (s)	% a. i.	Manufacturer
Metsulfuron – methyl	Algrip, Dot, Hook or Matsy	20 WP	DuPont and Nagarjuna, Chemicals, Dhanuka, UPL
Oxadiargyl	Raft, Topstar	6 EC, 80 WP	Bayer
Oxadiazon	Ronstar	25 EC	Rhone-Poulenc
Oxyfluorfen	Goal, Zargon, Oxygold	23.5 EC	Rohm & Hass, Dow Agro and Dhanuka
Paraquat	Garamaxone and Ozone	24 EC	Syngenta
Pendimethalin	Stomp, Dhanutop, Panida, Dost, Pendistar	30 EC	BASF, Dhanuka, Rallis, UPL and Hyderabad Chemicals
Pinoxaden	Axial	5EC	Syngenta
Pretilachlor	Rifit, Craze, Eraze	50 EC	Syngenta, Dhanuka and Nagarjuna
Pretilachlor + Safener	Sofit	50 EC	Syngenta
Pyrazosulfuron	Sathi	10 WP	UPL
Quizalofop-ethyl	Targasuper	5 EC	Dhanuka
Sulfosulfuron	Leader,Safal, Fateh, SF -10	75 WP	Monsanto,Gharda UPL and Tata Rallis
Thiobencarb	Saturn	50 EC	Pesticide India
Trifluralin	Treflan, Trinetra and Toofan	48 EC	Dow Agro, Hexamar

Disclaimer

Where trade names are used, this does not constitute endorsement of or discrimination against any product. It remains the responsibility of the user to follow product information contained on the product label.

Address of Manufacturer

Syngenta India Ltd.
Royal Insurance Building,
14 J Tata Road, Churchgate,
Mumbai - 400 020.

E.I.Dupont India Pvt. Ltd.
Cyber greens, Tower-C
7th Floor, Sector-25A,
DLF City, Phase - III,
Gurgaon -122 002

Dow AgroScience India Pvt. Ltd.
1st Floor, Unit No. 9,
Sakhi House, Corporate Park,
V.N. Purav Marg, Chembur,
Mumbai - 400 071

FMC India Private Limited
8, Palace Road, Embassy Star
First Floor, High Grounds,
Bangalore-560 052

United Phosphorus Ltd.
Uniphos House, Madhur
Park, 11th Road, Khar (W),
Mumbai - 400 052

Excel Crop India
705-707, Navrang House
7th floor, Kasturba Gandhi
Marg, New Delhi-110001

Rallis India Ltd.
Rallis Agrochemical
Research Station
Plot No. 21 & 22, Phase II
Bangalore - 560 058

Dhanuka Agritech Limited
Dhanuka House, 861-862,
Joshi Road, Karol Bagh,
New Delhi - 110 005

Bayer Crop Science Ltd.
Bayer House, Central Avenue,
Hiranandani Gardens
Powai, Mumbai-400076

Gharda Chemicals Ltd.
5/6, Jer Mansion, W.P.
Varde Road, Bandra (W),
Mumbai - 400 050

Indofil Chemicals Com.
Nirlon House, (3rd Floor),
DR. A. B. Road, Worli,
Mumbai - 400 030.

Monsanto India Limited
Ahura Centre, 5th Floor
96, Mahakali Caves Road
Andheri (East)
Mumbai -400 093

BASF India Ltd.
RBC, Mahindra Tower,
First floor A wing,
Dr. G.M. Bhosle Marg,
Worli, Mumbai -400 025

M/s. Nagarjuna Agrichem Limited
Plot No. 61, Nagarjuna Hill's
Panjagutta, Hyderabad,
Andhra Pradesh - 500 082

SAFE HANDLING OF PESTICIEDES

DO NOT TRANSPORT PESTICIDES ALONG WITH FOODSTUFF

STORE UNDER LOCK & KEY

KEEP OUT OF REACH OF CHILDREN

BUY PESTICIDES IN ORIGINAL PACKING

READ LABEL AND LEAFLET BEFORE USE

WEAR PROTECTIVE CLOTHING

MEASURE RECOMMENDED QUANTITY CORRECTLY

MIX THOROUGHLY IN WATER USING A PADDLE OR STICK

USE FUNNEL AND FILL WITHOUT SPILLAGE

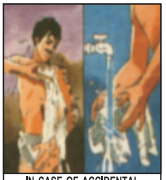
DO NOT USE PESTICIDE CONTAINERS FOR FOOD OR WATER

SPRAY ALONG THE WIND

DO NOT BLOW WITH YOUR MOUTH TO CLEAN NOZZLE

DO NOT SMOKE DRINK OR EAT WHILE SPRAYING

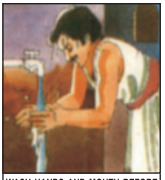
DO NOT USE LEAKY OR DAMAGED SPRAYER OR DUSTER



IN CASE OF ACCIDENTAL CONTAMINATION WASH CLOTHES AND BODY THOROUGHLY

DO NOT ALLOW CHILDREN TO SPRAY

DO NOT KEEP THE FOOD STUFF NEAR THE SITE OF APPLICATION

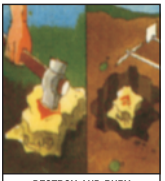


WASH HANDS AND MOUTH BEFORE SMOKING DRINKING OR EATING

GIVE FIRST-AID IN CASE OF ACCIDENTAL POISONING AND CALL THE DOCTOR

SHOW LEAFLET AND CONTAINER TO THE DOCTOR

GET IMMEDIATE EXPERT MEDICAL TREATMENT



DESTROY AND BURY EMPTY CONTAINERS

TAKE BATH AND WASH CLOTHES AFTER APPLICATION

AVOID ENVIRONMENTAL CONTAMINATION

PUT UP WARNING BOARD IN TREATED FIELDS

(Acknowledgment - CropLife India)

Directorate of Weed Science Research
Maharajpur, Adhartal, Jabalpur (MP)
Phone : 0761-2353934, 2353101
Fax : 0761-2353129
e-mail : nrcws@sancharnet.in