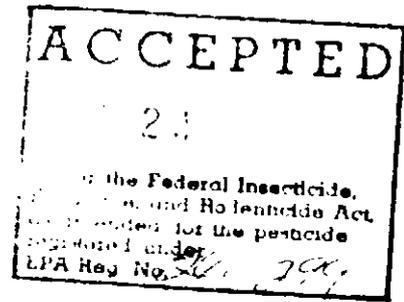


PM 25 241-299

ARSENAL® herbicide

APPLICATORS CONCENTRATE



ACTIVE INGREDIENT:

Isopropylamine salt of Imazapyr (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid)*..... 53.1%

INERT INGREDIENT..... 46.9%

TOTAL..... 100.0%

*Equivalent to 43.3% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid or 4 pounds acid per gallon.

EPA Reg. No. 241-299

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN
CAUTION!

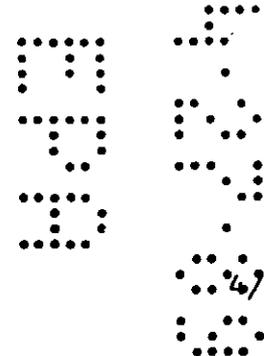
PRECAUCION

PRECAUCION AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

In case of emergency endangering life or property involving this product, call collect, day or night, Area Code 201-835-3100.

See next page for Additional Precautionary Statements

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AGRICULTURAL DIVISION
VPC VENTURES
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4/12/89

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PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

CAUTION!

Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

FIRST AID

IF ON SKIN: Wash with plenty of soap and water.

IF IN EYES: Flush with plenty of water. Get medical attention if irritation persists.

ENVIRONMENTAL HAZARDS

DO NOT apply directly to water or wetlands. DO NOT contaminate water when disposing of equipment washwaters.

PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of ARSENAL should be mixed, stored, and applied only in stainless steel, fiberglass, plastic, and plastic-lined steel containers.

DO NOT mix, store, or apply ARSENAL or spray solutions of ARSENAL in unlined steel (except stainless steel) containers or spray tanks.

IMPORTANT

DO NOT use on food or feed crops. Keep from contact with fertilizers, insecticides, fungicides, and seeds. DO NOT apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. DO NOT side trim desirable vegetation with this product. Prevent drift of spray to desirable plants. DO NOT USE in California.

Clean application equipment after using this product by thoroughly flushing with water.

GENERAL INFORMATION

ARSENAL herbicide APPLICATORS CONCENTRATE is a surfactant free aqueous solution to be mixed in water and applied as a spray for control of most annual and perennial grasses, broadleaf weeds, vines and brambles, and hardwood trees for site preparation and release for forest management. ARSENAL herbicide APPLICATORS CONCENTRATE is also recommended for control of undesirable vegetation along forest roads, non-irrigation ditchbanks, and the establishment and maintenance of wildlife openings. ARSENAL may also be mixed in water and used for injection and cut-surface treatment for control of unwanted woody vegetation.

ARSENAL is readily absorbed through foliage and roots and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis first appears in the youngest leaf tissue. In perennials, the herbicide is translocated into and kills the underground storage organs, thus preventing most resprouting. Chlorosis and tissue necrosis may not be apparent in some plant species for several weeks after application. Complete kill of some brush species may not occur for several months.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

This labeling must be in the possession of the user at the time of pesticide application.

ARSENAL herbicide APPLICATORS CONCENTRATE should be used only in accordance with recommendations on the leaflet label. Keep containers closed to avoid spills and contamination.

A postemergence application of ARSENAL is recommended for control of most annual and perennial grasses and broadleaf weeds, vines and brambles, and woody brush and tree species for site preparation and release for forest management. ARSENAL may be applied using helicopters, ground operated sprayers, low-volume hand-operated spray equipment such as back-pack and pump-up sprayers, and injection equipment.

ARSENAL may be applied for the control of annual and perennial weeds and brush along drainage ditches and forest roads in forest management areas. ARSENAL may also be used in the establishment and maintenance of wildlife openings. • DO NOT apply ARSENAL directly to water. [REDACTED]

[REDACTED] DO NOT treat any ditch into which roots of desirable trees or other plants may extend, as injury may result.

STORAGE AND DISPOSAL

PROHIBITIONS: DO NOT store below 10 degrees F.
DO NOT contaminate water, food, or feed by storage or disposal.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in an approved sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

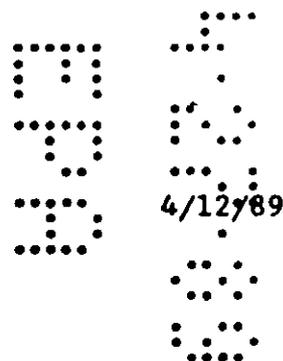
MIXING AND APPLICATION INSTRUCTIONS

HELICOPTER SPRAY EQUIPMENT:

Thoroughly mix the recommended amount of ARSENAL in 5 to 30 gallons of water per acre and uniformly apply with properly calibrated aerial equipment. A suitable nonionic surfactant such as Ortho X-77* must be added to the spray solution to enhance proper control of undesirable vegetation. All precautions should be taken to minimize or eliminate spray drift. Applications should not be made under gusty conditions or when wind velocity exceeds 5 mph. Except when applying with a MICROFOIL boom, a drift control agent may be added at the recommended label rate. A foam reducing agent may be added at the recommended label rate, if needed.

IMPORTANT: DO NOT make applications by fixed wing aircraft. Maintain adequate buffer zones to insure that drift does not occur off the target area. Thoroughly clean application and mixing equipment, including landing gear, immediately after use. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part.

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GROUND OPERATED SPRAY EQUIPMENT:

Thoroughly mix and apply the recommended amount of ARSENAL in 15 to 100 gallons of water per acre. A suitable nonionic surfactant such as Ortho X-77* may be added to the spray solution to enhance proper control of undesirable vegetation. A drift control agent and a foam reducing agent may be added at the recommended label rates, if needed. If desired, a spray pattern indicator may be added at the recommended label rate.

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution.

IMPORTANT: DO NOT spray under windy or gusty conditions. Maintain adequate buffer zones to insure that drift does not occur off the target area. **HIGH VOLUME APPLICATIONS ARE RECOMMENDED FOR KUDZU WEED CONTROL PROGRAMS.** To avoid potential offsite damage use the minimum gallonage appropriate for the specific application. Clean application and mixing equipment after using this product by thoroughly flushing with water.

DIRECTED OR SPOT SPRAY EQUIPMENT:

When making directed or spot spray applications with aerial or ground spray equipment, thoroughly mix a solution of 1/2 - 5 percent by volume of ARSENAL herbicide APPLICATORS CONCENTRATE and a minimum of 1/4 percent by volume of a nonionic surfactant such as Ortho X-77* in water.

To mix the spray solution, add the volume of ARSENAL herbicide and nonionic surfactant indicated in the table below to the desired amount of water.

SPRAY SOLUTION MIXING GUIDE

SOLUTION VOLUME	ARSENAL CONCENTRATION (%)				SURFACTANT
	1/2	1	2.5	5	
1 gallon	2/3 oz.	1 1/3 oz.	3 1/3 oz.	6 2/3 oz.	1/3 oz.
5 gallons	3-1/3 oz.	6 2/3 oz.	1 pint	2 pints	1-2/3 oz.
10 gallons	6-2/3 oz.	13 1/3	2 pints	4 pints	3-1/3 oz.
25 gallons	1 pint	2 pints	5 pints	10 pints	8 oz.
100 gallons	4 pints	1 gal.	2.5 gal.	5 gal.	2 pints

2 tablespoons = 1 fluid ounce

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution. **Avoid making applications directly to desirable conifers. BIGLEAF MAPLE REQUIRES THE HIGHER CONCENTRATION SPRAY SOLUTIONS;**

IMPORTANT: DO NOT overapply causing runoff from the treated foliage. Avoid direct application to desired plant species as injury may occur. **DO NOT exceed recommended dosage rate per acre.** Clean application and mixing equipment after using this product by thoroughly flushing with water.

CUT SURFACE AND INJECTION TREATMENTS

ARSENAL APPLICATORS CONCENTRATE may be used to control undesirable woody vegetation in forest management by treating cut stumps or use of injection techniques.

A concentrated solution of 50 - 100% ARSENAL is recommended for cut surface and injection applications.

For cut stump treatments: Spray or brush the solution onto the cambium area of the freshly cut stump surface. Insure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

For tree injection treatments: Using standard injection equipment, apply 1 milliliter of solution at each injection site around the tree with no more than 3 inch intervals between cut edges. Insure that the injector completely penetrates the bark at each injection site.

For frill or girdle treatments: Using a hatchet, machete, or similar device, make cuts through the bark at intervals around the tree with no more than 3 inch intervals between cut edges. Spray or brush the solution into each cut until thoroughly wet.

NOTE: Injury may occur to non-target or desirable woody plants if they extend from the same root system or their root systems are grafted to those of the treated tree.

SITE PREPARATION TREATMENTS

ARSENAL may be used to control labeled grasses, broadleaf weeds, vines and brambles, and woody brush and trees on forest sites in advance of regeneration. Herbaceous grass and broadleaf weeds are controlled and may provide fuel to facilitate a site preparation burn, if desired, to control residual pines.

Use ARSENAL for site preparation in advance of regeneration with the following species:

Species	Rate (pints/A)		
Loblolly Pine (<u>Pinus taeda</u>)	1 1/2 - 2 1/2		
Virginia Pine (<u>Pinus virginiana</u>)	1 1/2 - 2 1/2
Slash Pine (<u>Pinus elliotii</u>)	1 1/2 - 2 1/2	: : : :	.
Shortleaf Pine (<u>Pinus echinata</u>)	1 1/2 - 2 1/2	: : : :	: : .
Loblolly X Pitch Hybrid	1 1/2 - 2 1/2	: : : :	: : .
Jack Pine (<u>Pinus banksiana</u>)	3/4 - 2
White Pine (<u>Pinus strobus</u>)	3/4 - 2	: : : :	. . .
Ponderosa Pine (<u>Pinus ponderosa</u>)	3/4 - 2
Douglas Fir (<u>Pseudotsuga menziesii</u>)	3/4 - 2		: : .
White Spruce (<u>Picea glauca</u>)	3/4 - 2		: : .
Black Spruce (<u>Picea mariana</u>)	3/4 - 2		: : .
Red Spruce (<u>Picea rubens</u>)	3/4 - 2		: : .

Apply recommended rate of ARSENAL per acre when making helicopter or mechanical ground spray applications. Refer to mixing and application instructions for proper spray volumes. Use a minimum of 1/4 percent by volume of a nonionic surfactant. Use the higher label rates of ARSENAL and higher spray volumes when controlling particularly dense or multi-layered canopies of hardwood stands, or difficult to control species.

DO NOT plant seedlings on sites that have been broadcast treated with ARSENAL or into the treated zone of spot or banded applications for three months following application or injury may occur.

Tank mixes may be necessary for chemical control of residual pines and other tolerant species in certain cases.

HERBACEOUS RELEASE TREATMENTS

Use ARSENAL for herbaceous competition release of the following species:

Species	Rate (fl.oz./A)
Loblolly Pine (<u>Pinus taeda</u>)	6 - 10
Virginia Pine (<u>Pinus virginiana</u>)	6 - 10
Loblolly X Pitch Hybrid	6 - 10
Slash Pine (<u>Pinus elliotii</u>)	4 - 10

ARSENAL herbicide may be applied as a broadcast or directed spray application for release of young pines from herbaceous weeds. Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. For release of pine from herbaceous weeds, apply the recommended rate of ARSENAL by either helicopter or ground spray applications. Refer to mixing and application instructions for proper spray volumes. A suitable nonionic surfactant may be added at a rate not to exceed 1/4 percent by volume in water. For best results, applications should be made to newly emerged weeds. For difficult to control weeds, use the higher rates of ARSENAL.

HARDWOOD RELEASE TREATMENTS

Use ARSENAL for broadcast hardwood competition release of the following species:

Species	Rate (pints/A)
Loblolly Pine (<u>Pinus taeda</u>)	1 - 2
Virginia Pine (<u>Pinus virginiana</u>)	1 - 2
Loblolly X Pitch Hybrid	1 - 2
Ponderosa Pine (<u>Pinus ponderosa</u>)	3/4 - 1
Douglas Fir (<u>Pseudotsuga menziesii</u>)	3/4 - 1
White Spruce (<u>Picea glauca</u>)	3/4 - 1
Black Spruce (<u>Picea mariana</u>)	3/4 - 1
Red Spruce (<u>Picea rubens</u>)	3/4 - 1
White Pine (<u>Pinus strobus</u>)	1/2 - 1

ARSENAL may be applied as a broadcast or directed spray application for control of labeled weed species. Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer injury, release treatments may be made after formation of final conifer resting buds in the fall.

Apply recommended rate of ARSENAL per acre when making helicopter or mechanical ground spray applications. Refer to mixing and application instructions for proper spray volumes. Addition of a nonionic surfactant at 1/4 percent by volume is recommended. Use the higher label rates of ARSENAL when controlling particularly dense stands or difficult to control species. To minimize injury, do not make applications to pine stands before formation of resting buds at the end of the second growing season. Directed spray applications may be made with low-volume applications in plantations of all ages by targeting the unwanted vegetation and avoiding direct application to the conifer.

Use ARSENAL for spot treatment of undesirable hardwood vegetation:

ARSENAL may be used to control undesirable brush and hardwoods in the management of commercial conifer species as a directed application using low-volume spray equipment or injection techniques. Refer to mixing and application instructions for proper use rates and application techniques.

Avoid direct application to desired plant species as injury may occur. Injury may occur to non-target or desirable hardwoods or conifers if they extend from the same root system or their root systems are grafted to those of the treated tree or if their roots extend into the treated zone.

WEEDS CONTROLLED

ARSENAL herbicide APPLICATORS CONCENTRATE will provide postemergence control and some residual control of the following target vegetation species. Degree of control is both species and rate dependent. ARSENAL herbicide should be used only in accordance with the recommendations on this label.

GRASSES

The species of annual and perennial grasses controlled by ARSENAL herbicide include the following:

Annual bluegrass (Poa annua)
Bahagrass (Paspalum otatum)
Beardgrass (Andropogon spp.)
Bermudagrass (Cynodon dactylon)
Big bluestem (Andropogon gerardi)
Broadleaf signalgrass (Brachiaria platyphylla)
Canada bluegrass (Poa compressa)
Cattail (Typha spp.)
Cheat (Bromus secalinus)
Crabgrass (Digitaria spp.)
Dallisgrass (Paspalum dilatatum)
Downy brome (Bromus tectorum)
Fall panicum (Panicum dichotomiflorum)

Feathertop (Pennisetum villosum)
 Fescue (Festuca spp.)
 Foxtail (Setaria spp.)
 Goosegrass (Eleusine indica)
 Guinea grass (Panicum maximum)
 Italian ryegrass (Lolium multiflorum)
 Johnsongrass (Sorghum halepense)
 Kentucky bluegrass (Poa pratensis)
 Lovegrass (Eragrostis spp.)
 Orchardgrass (Dactylis glomerata)
 Paragrass (Brachiaria mutica)
 Phragmites (Phragmites australis)
 Prairie cordgrass (Spartina pectinata)
 Prairie threeawn (Aristida oligantha)
 Quackgrass (Agropyron repens)
 Reed canary grass (Phalaris arundinacea)
 Saltgrass (Distichlis stricta)
 Sand dropseed (Sporobolus cryptandrus)
 Sandbur (Cenchrus spp.)
 Smooth brome (Bromus inermis)
 Timothy (Phleum pratense)
 Torpedograss (Panicum repens)
 Vaseygrass (Paspalum urvillei)
 Wild barley (Hordeum spp.)
 Wild oats (Avena fatua)
 Wirestem muhly (Muhlenbergia frondosa)
 Witchgrass (Panicum capillare)

BROADLEAF WEEDS

The species of annual and perennial broadleaf weeds controlled by ARSENAL herbicide include the following:

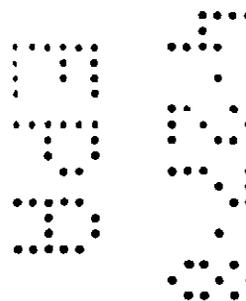
Bull thistle (Cirsium vulgare)
 Burdock (Arctium spp.)
 Camphorweed (Heterotheca subaxillaris)
 Canada thistle (Cirsium arvense)
 Carolina geranium (Geranium carolinianum)
 Carpetweed (Mullugo verticillata)
 Clover (Trifolium spp.)
 Cocklebur (Xanthium strumarium)
 Common chickweed (Stellaria media)
 Common ragweed (Ambrosia artemisiifolia)
 Dandelion (Taraxacum officinale)
 Dock (Rumex spp.)
 Dogfennel (Eupatorium capillifolium)
 Filaree (Exodium spp.)
 Fleabane (Erigeron spp.)
 Giant ragweed (Ambrosia trifida)
 Goldenrod (Solidago spp.)
 Hoary vervain (Verbena stricta)
 Horseweed (Conyza canadensis)
 Indian mustard (Brassica juncea)

Kochia (Kochia scoparia)
 Lambsquarters (Chenopodium album)
 Little mallow (Malva parviflora)
 Milkweed (Asclepias spp.)
 Miners lettuce (Montia perfoliata)
 Mullein (Verbascum spp.)
 Nettleleaf goosefoot (Chenopodium murale)
 Oxeye daisy (Chrysanthemum leucanthemum)
 Pepperweed (Lepidium spp.)
 Pigweed (Amaranthus spp.)
 Plantain (Plantago spp.)
 Pokeweed (Phytolacca americana)
 Primrose (Oenothera kunthiana)
 Purslane (Portulaca spp.)
 Silverleaf nightshade (Solanum elaeagnifolium)
 Smartweed (Polygonum spp.)
 Sorrell (Rumex spp.)
 Sowthistle (Sonchus spp.)
 Sunflower (Helianthus spp.)
 Sweet clover (Melilotus spp.)
 Tansymustard (Descurainia pinnata)
 Texas thistle (Cirsium texanum)
 Western ragweed (Ambrosia psilostachya)
 Wild carrot (Daucus carota)
 Wild lettuce (Lactuca spp.)
 Wild parsnip (Pastinaca sativa)
 Wild turnip (Brassica campestris)
 Woollyleaf bursage (Ambrosia grayi)
 Yellow starthistle (Centaurea solstitialis)
 Yellow woodsorrel (Oxalis stricta)

VINES AND BRAMBLES

The species of vines and brambles controlled by ARSENAL herbicide include the following:

Blackberry (Rubus spp.)*
 Dewberry (Rubus spp.)*
 Field bindweed (Convolvulus arvensis)
 Greenbriar (Smilax spp.)
 Hedge bindweed (Calystegia sepium)
 Honeysuckle (Lonicera spp.)
 Kudzu (Pueraria lobata)**
 Morningglory (Ipomoea spp.)
 Poison ivy (Rhus radicans)
 Redvine (Brunnichia cirrhosa)
 Trumpetcreeper (Campsis radicans)
 Virginia creeper (Parthenocissus quinquefolia)
 Wild buckwheat (Polygonum convolvulus)
 Wild grape (Vitis spp.)



Wild rose (Rosa spp.)

Including: Multiflora rose (Rosa multiflora)

Macartney rose (Rosa bracteata)

*The degree of control may be species dependent. Some Rubus species may not be controlled.

** Use a minimum of 75 GPA - Control of established stands may require multiple applications.

WOODY BRUSH AND TREES

The species of woody brush and trees controlled by ARSENAL herbicide include the following:

American beech (Fagus grandifolia)

Ash (Fraxinus spp.)

Aspen (Populus spp.)

Bald cypress (Taxodium distichum)

Bigleaf maple (Acer macrophyllum)

Blackgum (Nyssa sylvatica)

Boxelder (Acer negundo)

Cherry (Prunus spp.)

Chinaberry (Melia azedarach)

Chinese tallow-tree (Sapium sebiferum)

Dogwood (Cornus spp.)

Hawthorn (Crataegus spp.)

Hickory (Carya spp.)

Maple (Acer spp.)

Mulberry (Morus spp.)*

Oak (Quercus spp.)

Persimmon (Diospyros virginiana)

Poplar (Populus spp.)

Privet (Ligustrum vulgare)

Red alder (Alnus rubra)

Red maple (Acer rubrum)

Sassafras (Sassafras albidum)

Sourwood (Oxydendrum arboreum)

Sumac (Rhus spp.)

Sweetgum (Liquidambar styraciflua)

Willow (Salix spp.)

Yellow poplar (Liriodendron tulipifera)

*The degree of control may be species dependent.

DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use or application of the product contrary to label instructions, all of which are beyond the control of American Cyanamid Company. All such risks shall be assumed by the user.

American Cyanamid Company warrants only that the material contained herein conforms to the chemical description on the label and is reasonably fit for the use therein described when used in accordance with the directions for use, subject to the risks referred to above.

Any damages arising from a breach of this warranty shall be limited to direct damages and shall not include consequential commercial damages such as loss of profits or values or any other special or indirect damages.

American Cyanamid Company makes no other express or implied warranty, including other express or implied warranty of FITNESS or of MERCHANTABILITY.

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