

2217-776

3/22/2011

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

PBI/Gordon Corporation
1217 West 12th Street;
Post Office Box 014090
Kansas City, Missouri 64101

MAR 22 2011

Subject: Atrinal Plant Growth Regulator
EPA Reg. No. 2217-776
Amended Labeling
EPA Decision Number 444178
Your Application Dated December 20, 2010

Dear Dr. Kunstman:

The amended label referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act as amended, to revise the directions for bark banning and soil drenches of individual plants is acceptable provided the following changes are made.

1. Move the First Aid statement text box to the first page prior to the Precautionary Statements. Alternatively, if spacing will not accommodate the complete text, add the following statement on a new line immediately following the signal word - Caution.
"See page 2 for First Aid statements".
2. Reorder the reference tables by order of appearance in the label. Also adjust the table text references by changing the following:
 - a. Page 4 – Table 2 to Table 1, within the "Directions for Growth Control of Landscape Ornamentals" section.
 - b. Page 8 – Table 6 to Table 5, within the 5th numbered point.
 - c. Page 9 – Table 5 to Table 6, within the "Foliar Sprays to Reduce Undesired (Nuisance) Fruit and Flower Formation" section.
 - d. Page 10 – Table 6 to Table 7, within the "Mixing" section
 - e. Page 12 – Table 1 to Table 8, within the "Directions for Greenhouse and Nursery Ornamentals" section.


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Product Name Atrinal Plant Growth Regulator
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One copy of the label stamped "Accepted with Comments" is enclosed for your records. This label supersedes all labels previously accepted for this product. Please submit one copy of the final printed label before the product is released for shipment.

If you have any questions, please contact Shaunta Hill by phone at (703) 347-8961 or via email at hill.shaunta@epa.gov or myself at (703) 308-3194 or by email at joyner.shaja@epa.gov.

Sincerely,


Shaja B. Joyner
Product Manager (20)
Fungicide Branch
Registration Division (7505P)

Enclosure

ATRINAL® PLANT GROWTH REGULATOR

EPA Reg. No. 2217-776

ACTIVE INGREDIENT:

Dikegulac-sodium (Sodium salt of 2,3:4,6-bis-O-(1-methylethylidene)-a-L-xylo-2-hexulofuranosonic acid) 18.5%

OTHER INGREDIENTS: 81.5%

TOTAL 100.0%

THIS PRODUCT CONTAINS:

1.67 lb dikegulac-sodium per gallon or 200 grams active ingredient per liter. (1.55 lb dikegulac acid equivalent per gallon or 17.1%)

KEEP OUT OF REACH OF CHILDREN

CAUTION

STOP! READ THE ENTIRE LABEL FIRST. OBSERVE ALL PRECAUTIONS AND FOLLOW DIRECTIONS CAREFULLY.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION: Causes moderate eye irritation. Avoid contact with eyes or clothing.

Personal Protective Equipment (PPE)

Mixers, loaders, applicators, and other handlers must wear: long-sleeved shirt, long pants, shoes and socks. When making direct injections to trees, applicators must wear protective eyewear.

User Safety Requirements

Follow manufacturer's instructions for cleaning/ maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Discard clothing or other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

<p>User Safety Recommendations</p> <ul style="list-style-type: none"> • Users should wash hands thoroughly with soap and water before eating, drinking, chewing gum, using tobacco, or using the toilet. • Users should remove clothing/ PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. • Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.
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ACCEPTED
with COMMENTS
In EPA Letter Dated
3/22/2011



Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 2217-776

First Aid	
If in eyes:	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If inhaled:	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or doctor for treatment advice.
If on skin or on clothing:	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 - 20 minutes. • Call a poison control center or doctor for treatment advice.
If swallowed	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.
<p>Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-877-800-5556 for emergency medical treatment advice.</p>	

Environmental Hazards

For terrestrial uses: Do not apply directly to water, or to areas where water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

DIRECTIONS FOR USE

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

- Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.
- For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.
- Do not apply through any type of irrigation system.
- Do not use on food or fodder crops.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170.

This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as soil or water, is:

- coveralls,
- protective eyewear
- chemical-resistant gloves made of any waterproof materials and
- shoes plus socks

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses. **Reentry Statement:** Do not enter or allow people (or pets) to enter the treated area until sprays have dried.

1. Product Description

What Atrinal Does:

- Atrinal is a growth retardant for use on hedges, shrubs, trees and groundcovers. It can also be used on certain trees and shrubs to prevent flowering and undesired (nuisance) fruit set.
- Atrinal temporarily stops shoot elongation and promotes lateral branching. This reduces the need for trimming and pruning. It can also improve the appearance of landscape ornamentals by gradually filling in growth and providing a more uniform, compact shape.
- Atrinal is a systemic plant growth regulator applied as a foliar spray that reduces or breaks apical dominance and enhances lateral branching.
- Atrinal is a systemic plant growth regulator applied as a foliar spray. It is absorbed by the leaves and translocated to the shoot tips. Growth retardant effect is limited to sprayed branches.
- Atrinal is absorbed through the leaves and translocated to the shoot tips. Pinching effect is limited to sprayed branches.
- Atrinal will chemically pinch unpruned shoots and will also increase branching of trimmed shoots.
- Atrinal produces full, well branched plants with more abundant bloom.
- Atrinal reduces the need for mechanical pinching and pruning.
- [Atrinal solutions may also be injected into the trunks of larger trees to retard growth of certain broadleaf species along rights-of-way, city streets, parks, and other areas where there is need for reducing the frequency of manual pruning.]

Atrinal Is Easy To Use:

- Mix with water in a well rinsed sprayer. The spray solution should be used the same day it is prepared. Do not mix Atrinal with fertilizers or other pesticides.
- A surfactant is incorporated in the product. No additional wetting agent is needed for foliar applications.
- Plant foliage should be dry when spray is applied.
- On very hot, sunny days, spray preferably early in the morning or late in the afternoon.
- Spray entire plant until wet. Thorough coverage of foliage is the key to good results.
- After spray has dried, respraying may overdose previously treated plants. Be careful to avoid overlapping treatment of plants.
- If treated plants are subject to rainfall or overhead irrigation within 6 hours after spraying, effectiveness may be reduced.
- Trimming after applying Atrinal may interfere with the action of the product.

Considerations When Using Atrinal For Landscape Maintenance:

- **Looking for a formal appearance?** Trim the shrub or groundcover to shape, leaving at least two pairs of expanded leaves on each shoot to absorb the spray. Apply Atrinal within three days.

- **Looking for a more natural appearance?** Either trim only the long, wild shoots and immediately apply Atrinal spray or trim shrub or groundcover to shape, allow the new shoots to grow at least two inches (5 cm) and then apply Atrinal spray.
- **[Timing tree trunk injections?** On deciduous trees, best results are obtained when winter trimmed or untrimmed trees are injected with Atrinal solution after the first flush of leaves is 3/4 to fully developed and before shoot growth begins. Broadleaf evergreens may be treated during seasonal flushes of growth.]

Spray Drift Management:

Non-target terrestrial plants can be adversely affected when exposure to this product. Avoid spray drift to non-target terrestrial plants during application.

- Do not apply when wind velocity exceeds 15 mph, or when wind gusts approach 15 mph.
- Do not apply this product if the wind direction does not favor on-target deposition.
- Use only spray equipment with medium or coarser spray nozzles according to ASAE (S572) definition for standard nozzles. In conditions of low humidity and high temperatures, applicators must use a coarser droplet size.

2. Foliar Sprays For Growth Regulation (shrubs, hedges, and groundcovers)

Responses With Atrinal:

After an application of Atrinal in spring, plants can usually be maintained in acceptable shape for a full season. Under extremely good growing conditions or in areas with a long growing season, two treatments per year may be considered on certain species. However, in areas with a short growing season only a single spring treatment is recommended.

Plants must be well rooted and actively growing. Do not treat wilted or dormant plants. Plants must be healthy and not under stress from drought, nutritional deficiency or disease. Avoid treating slow growing plants under cool weather conditions or extremely hot summer temperatures.

Best response is obtained on lush spring growth or under good growing conditions.

Temporary reduction or suppression of flowering may be observed in shrubs and groundcovers such as alyssum, oleander, star jasmine and gazania, but normal bloom returns 3 to 6 weeks after spraying.

Chlorosis of the growing tip and terminal growth may occur a few weeks after the spraying of some species. This is usually transient but may persist up to 6 weeks on certain shrubs such as forsythia, oleander and privet. Fully expanded foliage is not affected.

Overdosing with Atrinal may result in marked chlorosis and necrotic terminal shoots. Underdosing may result in little or no growth retardant effect.

Directions For Growth Control Of Landscape Ornamentals:

Directed use rates of Atrinal vary with different species (Table 1). Where a dosage range is given, use a concentration in the lower part of the indicated range for tender, sensitive varieties; use a concentration in the higher part of the directed range for vigorous, rank-growing varieties.

Spray volume will vary with the size of plants and amount of foliage. Spray to wet. On hedges, shrubs and groundcovers one gallon of spray solution covers 400 to 600 square feet (1 liter per 10 to 15 square meters). Small trees up to 16 feet (5 meters) tall require 1 to 5 gallons (5 to 20 liters) per tree. Larger trees 20 to 30 feet (6 to 9 meters) in height will require 10 to 15 gallons (40 to 60 liters) of spray solution per tree. Thorough coverage provides the best results.

Species of Ornamental Plant (Common/botanical name)	Scientific name	Concentration of Atrinal in Water	
		fluid ounces per gallon	mL/liter
Arborvitae, American	<i>Thuja occidentalis</i>	1	8
Abelia	<i>Abelia x grandiflora</i>	1	8
Alyssum	<i>Alyssum</i> spp.	2	16
Ash, Arizona or Velvet	<i>Fraxinus velutina</i>	1 to 2	8 to 16
Ash, Shamel or Evergreen Ash	<i>Fraxinus uhdei</i>	1 to 2	8 to 16
Barberry	<i>Berberis</i> spp.	1	8
Bottlebrush	<i>Callistemon</i> spp.	2 to 3	16 to 24
Bougainvillea Temporary suppression of flowering may be observed 3 to 6 weeks after spraying.	<i>Bougainvillea</i> spp.	2	16
Butterfly bush or Buddleia	<i>Buddleia</i> spp	1 to 2	8 to 16
Bottlebrush	<i>Calistemon</i> spp	2 to 3	16 to 24
Cape honeysuckle or Tecomaria	<i>Tecomaria capensis</i>	2 to 3	16 to 24
Cherry-laurel and English Laurel	<i>Prunus</i> spp.	2 to 3	16 to 24
Coprosma	<i>Coprosma</i>	1 to 2	8 to 16
Cotoneaster	<i>Cotoneaster</i> spp.	1 to 2	8 to 16
Hawthorn, Thorn, Thorn Apple, or Red Hawthorn	<i>Crataegus</i> spp	1 to 2	8 to 16
Cypress	<i>Cupressus</i> spp.	1	8
Elaeagnus	<i>Elaeagnus</i> spp	2 to 3	16 to 24
Elm, Chinese	<i>Ulmus parvifolia</i>	2	16
Elm, Siberian or Dwarf Elm	<i>Ulmus pumila</i>	1 to 2	8 to 16
Escallonias	<i>Escallonia</i> spp.	1 to 2	8 to 16
Euonymus	<i>Euonymus</i> spp.	2 to 3	16 to 24
Eugenia	<i>Eugenia myrtifolia</i>	2	16
Fig, Creeping Fig, Climbing Fig or Creeping Rubber Plant	<i>Ficus repens</i> or <i>Ficus pumila</i>	2 to 3	16 to 24
Fig, Laurel, Benjamin Tree or Weeping Fig	<i>Ficus nitida</i>	2	16
Firethorn	<i>Pyracantha</i> spp.	2 to 3	16 to 24
Forsythia Treat only spring growth. Summer treatments may retard flower bud set and development.	<i>Forsythia</i> spp.	2	16
Gazania	<i>Gazania</i> spp.	2	16
Hardy Orange	<i>Poncirus trifoliata</i>	2	16
Algerian Ivy	<i>Hedera canariensis</i>	2 to 3	16 to 24
English Ivy	<i>Hedera helix</i>	2	16
Holly Use 3 fluid ounces of Atrinal per gallon for growth control of Yaupon holly (<i>Ilex crenata</i>). Avoid spraying Japanese holly (<i>Ilex crenata</i>) just before or during the flowering period if berry display is desired.	<i>Ilex</i> spp.	2 to 3	16 to 24
Honeysuckle	<i>Lonicera</i> spp.	3	24
Jasmine, Star Jasmine or Confederate Jasmine	<i>Trachelospermum jasminoides</i>	2	16
Orange Jessamine, Orange Jasmine or Satinwood	<i>Murraya paniculata</i>	2	16
Juniper	<i>Juniperus</i> spp	1	8
Lantana or Yellow Sage	<i>Lantana camara</i>	1 to 2	8 to 16
Lippia, Creeping	<i>Phyla nodiflora</i>	2	16

Species of Ornamental Plant (Common/botanical name)	Scientific name	Concentration of Atrinal in Water	
		fluid ounces per gallon	mL/liter
Mulberry, White	Morus alba	2	16
Oleander, Common Oleander or Rosebay	Nerium oleander	1 to 2	8 to 16
Osmanthus	Osmanthus spp.	2	16
Periwinkle or Myrtle	Vinca minor	2	16
Photinia, Red tip	Photinia fraseri	3	24
Pittosporum, Japanese Pittosporum, Mock Orange, Tobira or Australian Laurel	Pittosporum tobira	2	16
Podocarpus, Southern Yew, Japanese Yew or Buddhist Pine	Podocarpus macrophyllus	2	16
Privet Use 2 fluid ounces of Atrinal per gallon on waxleaf privet (Ligustrum japonica 'Texanum')	Ligustrum spp.	1 to 2	8 to 16
Indian Hawthorn	Raphiolepis indica	2 to 3	16 to 24
Viburnum	Viburnum spp.	2 to 3	16 to 24
Willow	Salix spp.	1 to 2	8 to 16
Xylosma	Xylosma spp.	2 to 3	16 to 24

3. Bark Banding To Reduce Undesired (Nuisance) Fruit And Flower Formation

Bark banding of certain landscape plants can reduce or prevent undesired (nuisance) fruit formation.

IMPORTANT: Make one application 2 to 4 weeks prior to flower buds at pinhead sized (or smaller) for optimum application timing. Applications made after flower buds have formed or flowers have opened will not be effective. Use low pressure settings. Compressed air sprayers, backpack (knapsack) sprayers and other pressurized sprayers can be used.

Spray concentration:

Mix 3 fl.oz. of Atrinal® plus 0.5 to 1.0 fl.oz. of a 100% organosilicone surfactant to one (1) gallon of water. Refer to the quick-mix table for additional spray preparations.

Spray mixture desired (gallons)	Add this amount of Atrinal® (fl.oz.)	Add this amount of 100% organosilicone surfactant (fl.oz.)
1	3 fl.oz.	0.5 to 1.0 fl.oz.
2	6 fl.oz.	1.0 to 2.0 fl.oz.
3	9 fl.oz.	1.5 to 3.0 fl.oz.
5	15 fl.oz.	2.5 to 5.0 fl.oz.
10	30 fl.oz.	5.0 to 10.0 fl.oz.
100	300 fl.oz.	50 to 100.0 fl.oz.

Note: Proportionally for each 12 inch trunk diameter at breast height (DBH) or at 4.5 feet above the soil, apply 1 gallon of spray mixture.

Equivalent concentrations: 3 fl.oz./1 gallon = 2.3% v/v solution = 0.4% dikegulac acid equivalent or 4000 ppm dikegulac acid equivalent.

Directions And Spray Amount Required For Each Tree:

1. The amount spray mixture required for bark banding depends upon the tree plant diameter.
2. Measure the diameter of the tree trunk in inches at breast height (DBH) or at 4.5 feet from the soil.
3. For multi-stemmed plants measure diameter of each stem at 4.5 feet from the soil, add the individual diameters of each stem to determine the total diameter of the tree at breast height.

(Example at 4.5 feet above the soil: A three-limbed, forked tree with 7 inch diameter stem; a 5 inch diameter stem; 6 inch diameter stem = 18 inches and would require 1.5 gallons of spray mixture).

4. Apply the appropriate mixture to the tree starting at the tree trunk and lower limbs and apply down to the soil line. Larger trees require applications to upper tree trunk and lower limbs and apply down to the soil line.
5. Use low spray pressure. Apply with a technique, pressure setting and nozzle setting that maximizes the retention of the mixture on the trunk.
6. The spray mixture should be applied as a circular band to the entire circumference of the tree trunk or multi-stemmed plants.
7. Be sure to apply the entire appropriate mixture to each tree.
8. Include spray applications to the tree root flares. Excess spray may accumulate at the soil line.
9. For optimum plant translocation (uptake and upward movement), apply when daytime temperatures are expected to be 60° F or above for several days after application.
10. Do not apply to dormant trees, or during drought stress and during periods when trees are not actively transpiring.

Table 3: Approximate amounts [gallonages] of spray solution [diluted spray] for individual plant treatments are presented below:

Tree diameter at 4.5 feet from soil or breast height (DBH), inches	Amount (volume) of spray mixture see Table 2
6 inches	0.5 gallon
12 inches	1 gallon
18 inches	1.5 gallon
24 inches	2.0 gallon

Note: Proportionally for each 12 inch trunk diameter at breast height (DBH) or at 4.5 feet above the soil, apply 1 gallon of spray mixture.

4. Soil Drenching To Reduce Undesired (Nuisance) Fruit And Flower Formation

Soil drenches of certain landscape plants can reduce or prevent fruit formation. **IMPORTANT:** Make one application 2 to 4 weeks prior to flower buds at pinhead sized (or smaller) for optimum application timing. Applications made after flower buds have formed or flowers have opened will not be effective.

Use equipment capable of delivering the drench mixture uniformly around the base of the plant, in as close proximity in a band around the plant at the soil-to-trunk interface and root flares as possible.

Drench concentration:

Mix 3 fl.oz. of Atrinal® plus 0.5 to 1.0 fl.oz. of a 100% organosilicone surfactant to one (1) gallon of water. Refer to the quick-mix table for additional drench mixtures.

Table 4: Quick Mix Table For Soil Drench Treatments

Spray mixture desired (gallons)	Add this amount of Atrinal® (fl.oz.)	Add this amount of 100% organosilicone surfactant (fl.oz.)
1	3 fl.oz.	0.5 – 1.0 fl.oz.
2	6 fl.oz.	1.0 – 2.0 fl.oz.
3	9 fl.oz.	1.5 – 3.0 fl.oz.
5	15 fl.oz.	2.5 – 5.0 fl.oz.
10	30 fl.oz.	5.0 – 10.0 fl.oz.
100	300 fl.oz.	50 – 100 fl.oz.

[Equivalent concentrations: 3 fl.oz./1 gallon = 2.3% v/v solution = 0.4% dikegulac acid equivalent or 4000 ppm dikegulac acid equivalent.]

Note: Proportionally for each 12 inch trunk diameter at breast height (DBH) or at 4.5 feet above the soil, apply 1 gallon of spray mixture.

Directions And Drench Amount Required For Each Plant:

1. The amount drench mixture required for soil drench depends upon the plant diameter.
2. Measure the diameter of the plant in inches at breast height (DBH) or at 4.5 feet from the soil.
3. For multi-stemmed plants measure diameter of each stem at 4.5 feet from the soil, add the individual diameters of each stem to determine the total diameter of the tree at breast height. (Example at 4.5 feet above the soil: A three-limbed, forked plant with 7 inch diameter stem; a 5 inch diameter stem; 6 inch diameter stem = 18 inches and would require 1.5 gallons of spray mixture).
4. Apply the spray mixture to the root zone as a band around the base of the tree or individual plant.
5. Apply the amount (volume) listed in Table 5 in a band around the plant at the soil-to-trunk interface and root flares.
6. The soil drench should be made completely around the base of the plant and all root flares.
7. Apply slowly to allow the drench mixture to enter the soil at the base of the plant and all root flares.
8. Be sure to apply the entire appropriate mixture to each tree.
9. For optimum plant translocation (uptake and upward movement), apply when daytime temperatures are expected to be 60° F or above for several days after application.
10. Do not apply to dormant plants, or during drought stress and during periods when trees are not actively transpiring.

Table 5: Approximate amounts [gallonages] of spray solution [diluted spray] for individual plant drench treatments are presented below:	
Tree diameter at 4.5 feet from soil or breast height (DBH), inches	Amount (volume) of spray mixture see Table 4
6 inches	0.5 gallon
12 inches	1 gallon
18 inches	1.5 gallon
24 inches	2.0 gallon

[Equivalent concentrations: 3 fl.oz./1 gallon = 2.3% v/v solution = 0.4% dikegulac acid equivalent or 4000 ppm dikegulac acid equivalent.]

Note: Proportionally for each 12 inch trunk diameter at breast height (DBH) or at 4.5 feet above the soil, apply 1 gallon of spray mixture.

5. Foliar Sprays To Reduce Undesired (Nuisance) Fruit And Flower Formation

Atrinal spray applied prebloom or during the flowering period of certain ornamentals reduces or eliminates bloom and prevents undesired (nuisance) fruit set.

Certain landscape trees and shrubs are allergenic during bloom. Ripe fruit falling on sidewalks, streets, and parked cars present a difficult cleanup problem which can often be reduced or prevented with a single spray treatment.

The spray concentration and timing of treatments are given in Table 6 for each species of tree or shrub. Atrinal treatment is generally ineffective for these purposes after fruit has begun to set.

Foliar injury may occur if Atrinal is applied to drought stressed trees. Treat healthy, vigorously growing trees only.

Complete spray coverage is essential for good results. See directed spray volumes indicated for growth control of landscape ornamentals.

Table 6. Suppression of Flower and Fruit Formation.		
Species of Ornamental Plant	Concentration of Atrinal in Water	
	fluid ounces per gallon	approximate mL/liter
Olive, ornamental (<i>Olea europaea</i>) Treat at any time from prebloom period after floral rachis has elongated about 1/2 inch (1.3 cm) through early bloom. Best results are obtained in early spring during the tight bud stage of the prebloom period.	2 1/3 to 5	20 to 40
Privet, glossy (<i>Ligustrum lucidum</i>) Treat when flower parts have elongated 1 to 3 inches (2.5 to 7.5 cm), since subsequent vegetative growth will cover the dead floral rachis and maintain satisfactory appearance. Treatment at a later stage, when flower parts are 4 to 6 inches (5 to 15 cm), leaves the dead floral parts visible for the remainder of the season.	2/3 to 1.5	5 to 12
Rose, multiflora (<i>Rosa multiflora</i>) Apply Atrinal at any time from the prebloom period when plants are in full foliage and flower buds have formed through early bloom (10 to 15% bloom).	2/3 to 1.5	5 to 12
Holly Japanese (<i>Ilex crenata</i>) To prevent berry set apply at any time from prebloom, tight bud stage through midbloom.	2/3 to 1.5	5 to 12

[Note to reader: Following sections on tree injections and greenhouse and nursery crops are not intended to be presented on container labels.]

6. Directions To Retard Growth Of Trees By Trunk Injections

Atrinal may be used to retard growth of certain broadleaf tree species along utility right-of-ways, city streets, parks, and other areas where there is a need for reducing the frequency of manual pruning. Tree growth is highly variable depending upon species, location, climatic factors, environmental conditions, etc., and it is recommended that users establish by testing on a limited number of trees the best rates to produce the desired growth reduction under local growing conditions before large scale tree injection programs are pursued. For control of growth, solutions of Atrinal are injected into the tree trunk as described below.

TIMING OF INJECTION:

On deciduous trees, best results are obtained when winter trimmed or untrimmed trees are injected with Atrinal solution after the first flush of leaves is 3/4 to fully developed and before shoot growth begins. Broadleaf evergreens may be treated during seasonal flushes of growth.

MIXING:

Pour the amount of Atrinal indicated in Table 7 into a partially filled tank, then add the necessary quantity of water to complete the desired volume of solution for injection.

EQUIPMENT:

Best results are obtained when the total volume of injected Atrinal is distributed evenly throughout the tree. The pressurized injection system developed by the United States Department of Agriculture, Nursery Crop Research Laboratory, Delaware, Ohio (G.K. Brown. 1978. Journal of Arboriculture 4:7-13) has proven effective for injection of Atrinal.

INJECTION TECHNIQUES:

Trees that are 6 to 16 inches in DBH (diameter breast height) require 3 injection holes equally spaced around the tree trunk. Trees greater than 16 inches DBH require 6 injection holes. Holes should be in the zone between root flare and about 40 inches above the ground.

Drill injection holes horizontally into the trunk, so that the growth regulator will be injected into the outer sapwood to facilitate rapid uptake. Injection holes should not penetrate the wood more than 2.5 inches and drill size should not exceed 7/32 inch. Use injection pressures of 100 to 200 psi to achieve rapid uptake of solution. Do not exceed pressure of 200 psi.

CONCENTRATION OF ATRINAL AND VOLUME INJECTED:

DILUTE SOLUTIONS:

Atrinal at the rates indicated for each tree species should be diluted with water to the required volume for injections.

When tree crown or leaf area is considered larger than normal, use concentrations in the higher part of the directed range. For trees with very small crowns or leaf area, concentrations in the lower part of the directed range should be used.

The volume of Atrinal dilute solution injected is dependent upon the tree size. The total injection volume (TIV) of Atrinal solution is determined by measuring the diameter of the tree at breast height (DBH) and utilizing one of the following formulas:

Diameter of the tree at breast height (DBH)	Number of injection holes required	Total injection volume in mL (TIV)	Volume per injection hole
For trees 6 to 16 inches DBH	3	$TIV = (DBH)^2 \times 1.59$	$\frac{TIV}{3}$
For trees greater than 16 inches DBH	6	$TIV = DBH \times 25.25$	$\frac{TIV}{6}$

CONCENTRATE SOLUTION:

More concentrated solutions of Atrinal can be used for tree injection. These are prepared by increasing the amount of Atrinal per unit volume by 2 to 4 times the amount recommended for dilute injection solutions and by reducing the TIV by a proportionate amount. The highest directed concentration for tree injection is a 4X concentration in 1/4 the volume calculated for dilute solutions.

PRECAUTIONS:

Do not inject Atrinal into drought stressed trees or trees that do not appear healthy. Do not inject Atrinal into bearing fruit or nut trees or sugar maple trees tapped for sugar.

Table 7. Growth Control of Trees by Trunk Injection.

Species of Tree	Concentration of Atrinal in Water	
	ml of Atrinal diluted with water to 1 liter	fluid ounces Atrinal diluted with water to 1 gallon
Sycamore (<i>Platanus occidentalis</i>)	60 to 90	8 to 12
London plane tree (<i>Platanus acerifolia</i>)	60 to 90	8 to 12
Bigleaf, Norway, Red and Silver maple (<i>Acer macrophyllum</i> , <i>A. platanoides</i> , <i>A. rubrum</i> and <i>A. saccharinum</i>)	60 to 90	8 to 12
Eucalyptus (<i>Eucalyptus</i> spp.)	60 to 90	8 to 12
(<i>Eucalyptus sideroxylon</i>)	30 to 60	4 to 8
Cottonwood (<i>Populus deltoides</i>)	60 to 90	8 to 12
Shamel ash (<i>Fraxinus uhdei</i>)	175 to 250	23 to 32
Hackberry (<i>Celtis occidentalis</i>)	225 to 375	30 to 50
Water oak (<i>Quercus nigra</i>)	250 to 500	32 to 64

7. Atrinal For Greenhouse and Nursery Crops

What Atrinal Does:

- Atrinal is a systemic plant growth regulator applied as a foliar spray that reduces or breaks apical dominance and enhances lateral branching.
- Atrinal is absorbed through the leaves and translocated to the shoot tips. Pinching effect is limited to sprayed branches.
- Atrinal will chemically pinch unpruned shoots and will also increase branching of trimmed shoots.
- Atrinal produces full, well branched plants with more abundant bloom.
- Atrinal reduces the need for mechanical pinching and pruning.

Considerations When Using Atrinal For Greenhouse And Nursery Crops:

- Best response is obtained on lush spring growth or under good growing conditions. Avoid treating plants under cool weather conditions or extremely hot summer temperatures.
- Plants must be well rooted and actively growing. Do not treat wilted or dormant plants. Plants must be healthy and not under stress from drought, nutritional deficiency or disease. Avoid treating plants under conditions favoring root disease, such as standing water in poorly drained soil.
- Atrinal should be applied on shorter, more tender new shoots than usually considered appropriate for hand pinching.
- For optimal results, remove any flower buds or flowers present, and trim all long shoots.
- Atrinal is best absorbed by soft, fully developed leaves. If plants have been heavily pruned at least two pairs of expanded leaves should remain on each shoot.
- For best results use Atrinal on rooted cuttings or young liners. One application is usually sufficient to get good frame branching. Subsequent pinching of older plants can be done with Atrinal to further improve branching.
- In frost susceptible regions, the final treatment should be made sufficiently early in the season so that the new growth will harden off before frost.
- Overdosing with Atrinal may result in marked chlorosis, necrotic terminal shoots and delayed regrowth. Underdosing may result in little or no pinching effect.

After Treating Plants With Atrinal:

- Allow sufficient time for the chemical pinching response. There is no visible effect for the first 7 to 10 days. Trimming or hand pinching after applying Atrinal may interfere with the action of the product.
- One (1) to two (2) weeks after treatment, the terminal growth and young leaves will often show distinct yellowing or chlorosis. This is normal and indicates Atrinal is working. This effect is transient and cannot be stopped by giving additional nutrients.
- Atrinal treated plants will not grow for some weeks and thus will require less fertilizer and water than hand pinched plants, until the axillary buds break and new growth begins. Do not over fertilize and overwater during this period.
- If growing conditions favor disease, make preventive fungicide applications.
- Give the plants enough space and light for new shoots to develop after axillary buds have broken.
- Cuttings taken from Atrinal treated plants root and grow normally.

Directions For Greenhouse and Nursery Ornamentals:

Directed use rates of Atrinal vary with different species (Table 8). Where a dosage range is given, use a concentration in the lower part of the indicated range for tender, sensitive varieties; use a concentration in the higher part of the directed range for vigorous, rank-growing varieties or if temporary retardation of growth is desired.

Sprays should be applied either to unpinched shoots when they reach 1 to 3 inches (3 to 8 cm) long or to trimmed plants within 3 days after cutting back new growth. Most plants should be treated only once per year.

Spray entire plant until wet. Thorough coverage of foliage is the key to good results. One gallon of spray solution covers 400 to 600 square feet (1 liter per 10 to 15 square meters).

Species of Ornamental Plant	Concentration of Atrinal in Water	
	fluid ounces per gallon	approximate ml/liter
Abelia x grandiflora	1/2	4
Acacia-farnesiana - Sweet acacia	1	8
Aeschynanthus spp. - Lipstick vine	1/3 to 2/3	2.5 to 5
Arborvitae – Thuja occidentalis	1/4	2
Azaleas (Rhododendron hybrids) Start treating rooted cuttings. Greenhouse azaleas may be treated several times during the first year of growth. For the final pinch treat no later than early July to avoid delayed bud development and subsequent bloom.	2 to 4	15 to 30
Begonia - Elatior hybrids Begonia x cheimantha Treat unpinched plants with 2 to 3 inch (5 to 8 cm) long shoots 8 to 10 weeks before finishing for sale. Rooted leaf cuttings can also be treated.	1/2 to 1	4 to 8
Bottlebrush - Callistemon lanceolatus	1 to 2	8 to 16
Bougainvillea - Bougainvillea spp.	1	8
Buddleia spp. - Butterfly bush	1/3 to 1	2.5 to 8
Callistemon lanceolatus – Bottlebrush	1 to 2	8 to 16
Cherry-laurel - Prunus laurocerasus	1 to 2	8 to 16
Cissus spp. - Grape ivy	1/2 to 1	4 to 8
Clerodendrum spp. - Glory-bower	2/3 to 1 1/3	5 to 10
Cleyera japonica	2	16
Cotoneaster spp.	1/2 to 1	4 to 8
Crape myrtle - Lagerstroemia indica For miniature crape myrtle varieties, use 1 fluid ounce of Atrinal per gallon.	1 to 2	8 to 16
Elaeagnus spp.	1 to 1.5	8 to 12
Eugenia myrtifolia	1 to 1.5	8 to 12
Euonymus spp.	1/2 to 1	4 to 8
Fatshedera lizei	3/4 to 1	6 to 8
Forsythia spp.	1 to 2	8 to 16
Fuchsia hybrids Treated rooted cuttings with 2 to 3 pairs of leaves or as soon as branching becomes desirable, but not later than 10 to 12 weeks before finishing for sale.	1/2 to 1.5	4 to 12
Gardenia jasminoides	1.5 to 3	12 to 24
Gelsemium sempervirens	1 to 2	8 to 16
Glory-bower - Clerodendrum spp.	2/3 to 1 1/3	5 to 10
Grape ivy - Cissus spp.	1/2 to 1	4 to 8
Hedera helix - English ivy	1	8
Holly - Ilex spp To induce branching treat vegetative growth in early spring. To prevent berry set on Japanese holly, Ilex crenata, use 2/3 to 1.5 fluid ounces of Atrinal per gallon at any time from prebloom, tight bud stage through midbloom.	2/3 to 2.5	5 to 20
Ivy, English - Hedera helix	1	8
Ivy, Geranium - Pelargonium peltatum	1	8
Juniperus spp. – Juniper	1/4 to 1/2	2 to 4

Table 8. Chemical Pinching of Greenhouse and Nursery Crops.		
Species of Ornamental Plant	Concentration of Atrinal in Water	
	fluid ounces per gallon	approximate ml/liter
Kalanchoe hybrids To induce lateral branching, more compact growth with a greater number of inflorescences, treat 2 days after pinching the main shoot.	2/3 to 1.5	5 to 12
Lagerstroemia indica - Crape myrtle For miniature crape myrtle varieties use 1 fluid ounce Atrinal per gallon.	1 to 2	8 to 16
Lantana camara	1/2 to 1	4 to 8
Ligustrum spp. – Privet	1/2 to 1	4 to 8
Lipstick vine - Aeschynanthus spp.	1/3 to 2/3	2.5 to 5
Oleander – Nerium oleander	1 to 1.5	8 to 12
Osmanthus spp.	1 to 2	8 to 16
Pachystachys lutea- Shrimp plant Treat 1 day after mechanical pinching.	1/2 to 1	4 to 8
Pelargonium peltatum - Ivy geranium	1	8
Photinia fraseri After mechanical pinching or trimming apply two treatments at a 10 to 14 day interval to induce lateral bud break.	2 to 4	15 to 30
Pittosporum tobira	1 to 2	8 to 16
Privet - Ligustrum spp.	1/2 to 1	4 to 8
Prunus laurocerasus – Cherry-laurel	1 to 2	8 to 16
Pyracantha coccinea	2 to 3	16 to 24
Raphiolepis indica Apply a single treatment or two treatments at a 10 to 14 day interval to induce lateral bud break.	1.5 to 2.5	12 to 20
Schefflera arboricola	2	16
Shrimp plant - Pachystachys lutea Treat 1 day after mechanical pinching.	1/2 to 1	4 to 8
Thuja occidentalis – Arborvitae	1/4	2
Verbena hybrids Treat unpinched seedlings, or plants from cuttings 1 day after manual pinching.	1/3 to 2/3	2.5 to 5
Viburnum spp.	1.5 to 2	12 to 16
Xylosma spp.	1.5 to 2	12 to 16

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

PESTICIDE STORAGE: Store in original container in a locked storage area. Keep from freezing.

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

[For Plastic Containers – Nonrefillable with capacities equal to or less than 5 gallons:]

CONTAINER HANDLING: Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Triple rinse [or pressure rinse] container (or equivalent) promptly after emptying.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

[OR

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.]

[For Plastic Containers – Nonrefillable with capacities greater than 5 gallons:]

CONTAINER HANDLING: Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Triple rinse [or pressure rinse] container (or equivalent) promptly after emptying.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

[OR

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.]

[For Refillable Containers:]

CONTAINER HANDLING: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose.

Container cleaning: Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

LIMITED WARRANTY AND DISCLAIMER

IMPORTANT: Read this LIMITED WARRANTY AND DISCLAIMER before buying or using this product. By opening and using this product, buyer and all users agree to accept the terms of this LIMITED WARRANTY AND DISCLAIMER in their entirety and without exception. If the terms are not acceptable,

return this product unopened immediately to the point of purchase, and the purchase price will be refunded in full.

It is impossible to eliminate all risks inherently associated with use of this product. Damage to the treated article, ineffectiveness, or other unintended consequences can result from use of the product under abnormal conditions such as weather, presence of other materials, or the manner of use or application, etc. Such factors and conditions are beyond the control of the manufacturer, and **BY PURCHASING AND USING THIS PRODUCT THE BUYER AND ALL USERS OF THIS PRODUCT AGREE TO ACCEPT ALL SUCH RISKS.** To the extent consistent with applicable law, buyer and all users further agree to assume all risks of loss or damage from the use of the product in any manner that is not explicitly set forth in or that is inconsistent with label instructions, warnings and cautions.

The manufacturer warrants only that this product conforms to the chemical description given on the label, and that the product is reasonably suited for the labeled use when applied according to the Directions for Use, subject to the inherent risks described below. **TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE MANUFACTURER NEITHER MAKES NOR INTENDS ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED.**

THE EXCLUSIVE REMEDY OF BUYER AND ALL USERS OF THIS PRODUCT, AND THE EXCLUSIVE LIABILITY OF THE MANUFACTURER, FOR ANY AND ALL LOSSES, DAMAGES, OR INJURIES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, WHETHER OR NOT BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE, SHALL BE LIMITED, AT THE MANUFACTURER'S OPTION, TO REPLACEMENT OF OR THE REPAYMENT OF THE PURCHASE PRICE FOR THE QUANTITY OF PRODUCT WITH RESPECT TO WHICH DAMAGES ARE CLAIMED. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, IN NO CASE SHALL THE MANUFACTURER BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT. The Manufacturer must be promptly notified in writing of any claims, whether based in contract, tort, negligence, strict liability, or otherwise, to be eligible to receive either remedy stated above.

The terms of this LIMITED WARRANTY AND DISCLAIMER cannot be varied by any written or verbal statements or agreements at the point of sale or elsewhere. No employee or agent of the manufacturer or seller is authorized to vary or exceed the terms of this Limited Warranty and Disclaimer in any manner.

APPENDIX

1. Statements which may appear on different label components depending on packaging configuration.

- See next panel for additional Precautionary Statements and First Aid
- Net Contents: _____
- EPA Est. No. _____

2. Advertising claims that may be presented on container labeling, advertisements, brochures, and other marketing/sales promotional materials:

- For Growth Regulation of Landscape Plants & Trees
- For Growth Regulation of Landscape Hedges, Shrubs, Groundcovers and Trees
- [graphic depicting treated -vs.- untreated landscape plants]
- For Systemic Chemical Pinching and Pruning of Ornamental Plants
- Reduces nuisance fruits on landscape plants with bark banding, soil drench and foliar applications

3. Alternate Brand Names

- Gordon's Atrimmec® Plant Growth Regulator

DOCUMENT CONTROL INFORMATION

1. Unique Label Identifier: 002217-00776.20100803.amend-accepted-clean.doc

2. Reason for Issue: reorganize overall and rewrite fruit suppression