

2217-776

08/22/2008

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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**WASHINGTON, D.C. 20460**

OFFICE OF  
PREVENTION, PESTICIDES  
AND TOXIC SUBSTANCES

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AUG 22 2008

Subject: Atrinal® Plant Growth Regulator  
EPA Registration Number 2217-776  
Decision D388508: the amended label that was submitted  
on January 8, 2008

Dear Mr. McCain,

The amended master label referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended, to add bark banding spray applications, is acceptable, provided that you comply with the following conditions.

1. Make the following changes to the label.

a. Ensure that the Signal Word ("CAUTION") is printed on the final printed label in a size that conforms to the requirements of 40 CFR §156.60.

b. Replace all of the text that is currently in the "Hazards to Humans and Domestic Animals" section with the following text:

"Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing."

c. Replace the text in the first bulleted item in the "User Safety Recommendations" section with the following text:

"Users should wash hands thoroughly with soap and water before eating, drinking, chewing gum, using tobacco, or using the toilet."

d. In the first sentence in the "Environmental Hazards" section, change "...areas where water is present to intertidal areas..." to "...areas where water is present or to intertidal areas...".

e. One of the column subheadings in Table 1. (which begins on page 4) and in Table 3. (on page 9) reads "approximately ml/liter". Change this to "approximate ml/liter" in both tables.

f. Table 1., Table 2., and Table 3. all have column headings that read "fluid ounces per gallon", but in Table 1. this column is the rightmost column and in Tables 2. and 3. it is the second from the rightmost column. Alter the appropriate table(s) to produce a result in which this column is either the rightmost or the second from the rightmost in all three tables.

g. In the "Species of Tree" column in Table 6. (on page 12) change the scientific name for "Cottonwood" from "Populus deltoids" to "Populus deltoides".

h. In the second sentence in the "CONTAINER DISPOSAL:" subsection of the "STORAGE AND DISPOSAL" section on page 12, change "...in a sanitary landfill or incineration..." to "...in a sanitary landfill or by incineration...".

i. Add "To the extent consistent with applicable law," before the last sentence in the second paragraph in the "LIMITED WARRANTY AND DISCLAIMER" section on page 14.

j. In the first bulleted item in the "2. Advertising claims that may be presented on container labeling, advertisements, brochures, and other marketing/sales promotion materials:" change "For Consistent Growth Regulation..." to "For Growth Regulation...".

2. Submit one copy of your final printed labeling before you release the product for shipment.

If you have any questions about this letter, please contact John Bazuin at (703)305-7381 or bazuin.john@epa.gov.

Sincerely yours,

*John B. Bazuin, Jr.*  
*for*

Tony Kish  
Product Manager (22)  
Fungicide Branch  
Registration Division (7505P)

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# 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%
INERT 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%)  
 Atrinal® is a registered trademark of MAAG Agrochemicals, Inc.

### 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. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

### 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><b>User Safety Recommendations</b></p> <ul style="list-style-type: none"> <li>• Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.</li> <li>• Users should remove clothing/ PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.</li> <li>• 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.</li> </ul>
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ACCEPTED  
 with COMMENTS  
 In EPA Letter Dated  
 AUG 22 2008



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

<b>First Aid</b>	
<b>If in eyes:</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If inhaled:</b>	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If on skin or clothing:</b>	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15 - 20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If swallowed</b>	<ul style="list-style-type: none"> <li>• Call a poison control center or doctor immediately for treatment advice.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
<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 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 24 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,
- 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.

**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.

**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.

**RECOMMENDATIONS FOR GREENHOUSE AND NURSERY ORNAMENTALS:**

Suggested 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 suggested 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	
	approximately ml/liter	fluid ounces per gallon
Abelia x grandiflora	4	1/2
Acacia farnesiana - Sweet acacia	8	1
Aeschynanthus spp. - Lipstick vine	2.5 to 5	1/3 to 2/3
Arborvitae - Thuja occidentalis	2	1/4
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.	15 to 30	2 to 4

**Table 1. Chemical Pinching of Greenhouse and Nursery Crops.**

Species of Ornamental Plant	Concentration of Atrinal in Water	
	approximately ml/liter	fluid ounces per gallon
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.	4 to 8	1/2 to 1
Bottlebrush - Callistemon lanceolatus	8 to 16	1 to 2
Bougainvillea - Bougainvillea spp.	8	1
Buddleia spp. - Butterfly bush	2.5 to 8	1/3 to 1
Callistemon lanceolatus - Bottlebrush	8 to 16	1 to 2
Cherry-laurel - Prunus laurocerasus	8 to 16	1 to 2
Cissus spp. - Grape ivy	4 to 8	1/2 to 1
Clerodendrum spp. - Glory-bower	5 to 10	2/3 to 1 1/3
Cleyera japonica	16	2
Cotoneaster spp.	4 to 8	1/2 to 1
Crape myrtle - Lagerstroemia indica For miniature crape myrtle varieties, use 1 fluid ounce of Atrinal per gallon.	8 to 16	1 to 2
Elaeagnus spp.	8 to 12	1 to 1.5
Eugenia myrtifolia	8 to 12	1 to 1.5
Euonymus spp.	4 to 8	1/2 to 1
Fatshedera lizei	6 to 8	3/4 to 1
Forsythia spp.	8 to 16	1 to 2
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.	4 to 12	1/2 to 1.5
Gardenia jasminoides	12 to 24	1.5 to 3
Gelsemium sempervirens	8 to 16	1 to 2
Glory-bower - Clerodendrum spp.	5 to 10	2/3 to 1 1/3
Grape ivy - Cissus spp.	4 to 8	1/2 to 1
Hedera helix - English ivy	8	1
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.	5 to 20	2/3 to 2.5
Ivy, English - Hedera helix	8	1
Ivy, Geranium - Pelargonium peltatum	8	1
Juniperus spp. - Juniper	2 to 4	1/4 to 1/2
Kalanchoe hybrids To induce lateral branching, more compact growth with a greater number of in- florescences, treat 2 days after pinching the main shoot.	5 to 12	2/3 to 1.5
Lagerstroemia indica - Crape myrtle For miniature crape myrtle varieties use 1 fluid ounce Atrinal per gallon.	8 to 16	1 to 2
Lantana camara	4 to 8	1/2 to 1
Ligustrum spp. - Privet	4 to 8	1/2 to 1
Lipstick vine - Aeschynanthus spp.	2.5 to 5	1/3 to 2/3
Oleander - Nerium oleander	8 to 12	1 to 1.5
Osmanthus spp.	8 to 16	1 to 2

<b>Table 1. Chemical Pinching of Greenhouse and Nursery Crops.</b>		
<b>Species of Ornamental Plant</b>	<b>Concentration of Atrinal in Water</b>	
	<b>approximately ml/liter</b>	<b>fluid ounces per gallon</b>
Pachystachys lutea- Shrimp plant Treat 1 day after mechanical pinching.	4 to 8	1/2 to 1
Pelargonium peltatum - Ivy geranium	8	1
Photinia fraseri After mechanical pinching or trimming apply two treatments at a 10 to 14 day interval to induce lateral bud break.	15 to 30	2 to 4
Pittosporum tobira	8 to 16	1 to 2
Privet - Ligustrum spp.	4 to 8	1/2 to 1
Prunus laurocerasus – Cherry-laurel	8 to 16	1 to 2
Pyracantha coccinea	16 to 24	2 to 3
Raphiolepis indica Apply a single treatment or two treatments at a 10 to 14 day interval to induce lateral bud break.	12 to 20	1.5 to 2.5
Schefflera arboricola	16	2
Shrimp plant - Pachystachys lutea Treat 1day after mechanical pinching.	4 to 8	1/2 to 1
Thuja occidentalis – Arborvitae	2	1/4
Verbena hybrids Treat unpinched seedlings, or plants from cuttings 1day after manual pinching.	2.5 to 5	1/3 to 2/3
Viburnum spp.	12 to 16	1.5 to 2
Xylosma spp.	12 to 16	1.5 to 2

**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.

**ATRINAL - FOR LANDSCAPE MAINTENANCE**

**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 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 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 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.

**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.

**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.

**RECOMMENDATIONS FOR GROWTH CONTROL OF LANDSCAPE ORNAMENTALS:**

Suggested use rates of Atrinal vary with different species (Table 2). 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 suggested 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	MI/liter
Arborvitae, American	<i>Thuja occidentalis</i>	1	8
Abelia	<i>Abelia x grandiflora</i>	1	8
Alyssum	<i>Alyssum</i> spp.	2	16.

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**Table 2. Growth Control of Landscape Ornamentals.**

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

**Table 2. Growth Control of Landscape Ornamentals.**

Species of Ornamental Plant (Common/botanical name)	Scientific name	Concentration of Atrinal in Water	
		fluid ounces per gallon	MI/liter
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

**RECOMMENDATIONS FOR SUPPRESSION OF FLOWER AND FRUIT 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 3 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 suggested spray volumes indicated for growth control of landscape ornamentals.

**Table 3. Suppression of Flower and Fruit Formation.**

Species of Ornamental Plant	Concentration of Atrinal in Water	
	fluid ounces per gallon	approximately 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

**Bark banding of individual plants:**

Bark banding of certain landscape plants can reduce or prevent undesired (nuisance) fruit formation. Make one application at the flower bud stage through the early-bloom stage, and before fruit set. Generally, applications after fruit set are ineffective for fruit suppression.

Do not apply to dormant trees, or during drought stress and during periods when trees are not actively transpiring.

Compressed air sprayers, backpack (knapsack) sprayers and other pressurized sprayers can be used.

**Spray concentration:**

Mix 3 fl.oz. of Atrinal® plus 0.5 fl.oz. of an organo-silicant surfactant to one (1) gallon of water. Refer to the quick-mix table for additional spray preparations.

**Table 4: Quick mix table for bark banding treatments.**

Spray solution desired, gallons	Amount of Atrinal®, fl.oz.	Amount of surfactant, fl.oz.
1	3 fl.oz.	0.5 fl.oz.
2	6 fl.oz.	1.0 fl.oz.
3	9 fl.oz.	1.5 fl.oz.
10	30 fl.oz.	5.0 fl.oz.
100	300 fl.oz.	50 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.

**Spray volume:**

The amount spray solution required for bark banding depends upon the plant diameter.

Measure the diameter of the tree trunk in inches at breast height (DBH) or at 4.5 feet from the soil. For multi-stemmed plants, add the individual diameters of each stem to determine the total diameter at breast height.

**Table 5: Approximate amounts (gallonages) of spray solution (diluted spray) for individual plant treatments are presented below:**

Tree diameter at breast height (DBH), inches	Width of spray band from the soil line, inches	Amount (volume) of spray solution at 2.3% v/v,
1 inch	5 inches	10 fl.oz.
2 inches	10 inches (1 foot)	20 fl.oz.
3 inches	15 inches	2 pints (0.25 gal)
4 inches	20 inches	2.5 pints
5 inches	25 inches (2 feet)	3.3 pints
6 inches	30 inches	4.0 pints (0.5 gal)
7 inches	35 inches (3 feet)	4.5 pints
8 inches	40 inches	5.0 pints
10 inches	50 inches (4 feet)	6.5 pints
12 inches	60 inches (5 feet)	8.0 pints (1 gallon)

Note: Based on 1 gallon of spray solution per 12-inch trunk diameter at breast height (DBH).  
 Note to reader: Rows may be omitted based on use patterns or tree sizes.

The spray solution should be applied as a circular band to the entire circumference of the tree trunk or multi-stemmed plants. Typical spray band widths from the soil line can vary from 20 to 30 inches for medium sized trees (4 to 6 inches DBH). Begin the band treatment at the upper portion of the trunk, treating downward to soil to allow the spray solution to move onto the untreated portion of the trunk. For adequate coverage, apply the proper amount (volume) of spray solution as described in Table 2.

**Soil drench of individual plants for undesired (nuisance) fruit suppression:** Soil drenches of certain landscape plants can reduce or prevent fruit formation. Make one soil drench at the flower bud stage through the early-bloom stage, and before fruit set. Use spray equipment capable of delivering the mixture uniformly around the base of the plant, in as close proximity of the root flares as possible.

**Drench volume and concentration:** Refer to Tables 4 and 5 of the bark banding section for the spray preparation and the amounts of spray solution needed for individual plant treatments.

**Application:** Apply the spray solution to the root zone as a band around the base of the tree or individual plant. Apply the amount (volume) listed in Table 5 in a band from the base of the tree outward for 1 to 2 feet. The soil drench should be made completely around the base of the plant. Apply the mixture over the root flares of the plant to allow the spray solution to enter the soil at the base of the plant.

**[Note to reader: This section for tree injections is not intended to be presented on container labels.]**

#### **RECOMMENDATIONS 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 6 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 Arborculture 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 suggested range. For trees with very small crowns or leaf area, concentrations in the lower part of the suggested 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 suggested 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 6. 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 deltoids</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

**STORAGE AND DISPOSAL**

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

**PESTICIDE STORAGE:** Store in original container in a locked storage area. Keep from freezing. To prevent cross contamination, do not store near other pesticides, fertilizers, seeds, food or feed.

**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 a sanitary landfill or incineration, or if allowed by state and local authorities by burning. If burned stay out of smoke.

## **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.** 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.**

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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 Consistent Growth Regulation of Landscape Plants & Trees
- [graphic depicting treated -vs.- untreated landscape plants]
- For Systemic Chemical Pinching and Pruning of Ornamental Plants

**3. Alternate Brand Names**

- Gordon's Atrimmec® Plant Growth Regulator

**DOCUMENT CONTROL INFORMATION**

1. **Unique Label Identifier:** 002217-00776.20080108.doc

2. **Previous Version:** AP061207

3. **Reason for Issue:** Various changes pertaining to re-registration. Re-format label. Addition of method of application