

DISCOVER THE DURANA ADVANTAGE ON YOUR CHRISTMAS TREE FARM!



DURANA

The Durable, All Purpose White Clover

- Excellent fit for Ground Cover Management Systems
- Reduces weed competition
- Reduces soil erosion and chemical runoff
- Tolerant of pH ranges required by Christmas trees
- Free Nitrogen fertilizer source
- Low maintenance costs
- Builds soil organic matter
- Improves soil tilth
- Increases beneficial insect populations



EASY TO MAINTAIN

Durana is low growing with small leaves. Requires minimal mowing thus reducing labor and equipment costs.



REDUCES WEED COMPETITION

Durana forms thick cover that suppresses weed emergence and competition.



EROSION CONTROL

Durana is a true perennial that will hold the soil year round, saving precious topsoil and reducing chemical runoff.

AND Durana has over 90% more stolons, increasing persistence up to 3 times longer than other white clovers!

Durana White Clover - An Excellent Fit for Christmas Tree IPM Groundcover Management System

"In university monitored trials and on-farm demonstrations, perennial intermediate-type white clover like Durana has proven to be an excellent fit for use in an IPM Groundcover Management system for Christmas trees."

For several years, North Carolina growers, Extension educators and research scientists have been working to advance groundcover management in Christmas tree production. It all began some ten years ago when grower and industry leader, Bill McNeely, approached Avery County, North Carolina Extension IPM Program Director Doug Hundley with a novel weed control idea. The idea was pitched to several growers who had similar keen interests in making Christmas tree production as environmentally friendly as possible. This group became the Round-up Study Group.

Through trial and error, the group developed a groundcover management protocol for Fraser fir trees that eventually became known as "Integrated Pest Management (IPM) Groundcover Management". This management scheme, now used extensively across the Fraser fir Christmas tree growing region, combines the use of a reduced rate of the herbicide glyphosate with adapted and sustainable vegetative groundcover to control and suppress problem weeds.

The basic concept of the IPM Groundcover Management system is to establish and maintain sustainable and low maintenance vegetative ground cover. This cover offers numerous production benefits including reduced weed competition and less chemical use which lowers production cost. In addition, the cover lowers soil temperatures which allow tree roots to better absorb soil nutrients.

Environmental impact is significant. It includes a reduction in soil erosion and chemical runoff resulting in cleaner streams. The vegetative cover is a haven for natural insect predators, so fewer insecticides are needed to control troublesome insect pests. Moreover, the cover provides excellent habitat for both game and non-game wildlife including birds, bees, quail, turkey and rabbit.

Hundley points out that the IPM Groundcover Management protocol was developed specifically for Fraser fir trees using low rates of glyphosate herbicide and it may not be suitable for other species used for Christmas tree production. The Extension leader says growers in his area have been very receptive to the IPM Groundcover Management idea. **"Our Christmas tree growers are as concerned about the long term quality of the water, the soil and their neighbors as everyone else."**

Groundcover Plants

Groundcovers in the Groundcover Management protocol include many natural vegetation species including low growing clover, wild strawberries, violets, buttercups and other woodland perennials. Clover and birdsfoot trefoil are also being seeded by growers in cleared land or other sites where appropriate ground covers are not present. In university monitored trials and on-farm demonstrations,

perennial intermediate-type white clover like Durana has proven to be an excellent fit for use in an IPM Groundcover Management system for Christmas trees.

When compared to other clovers, Durana is more heat and drought tolerant and exhibits better insect and disease resistance. It is tolerant of poor soils with low fertility and low pH. Once established, it has also proven to tolerate the low glyphosate rates that are being used in this groundcover management protocol. Durana forms a thick, water penetrable mat that suppresses undesirable weeds and holds highly erodible soils in place. It spreads across the top of the ground, covering open surfaces to provide 100% ground cover.



The basic concept of the IPM groundcover management system is to establish and maintain sustainable and low maintenance ground cover.

Brian Davis, former IPM technician with North Carolina State University Extension and now manager of Carolina Fraser Fir Company, established a planting of Durana clover in the spring of 2009. **"We had a period of drought and heat this summer. Durana held its leaves and maintained more ground cover than the dutch white clover we have been using. This resulted in fewer weeds breaking through in the Durana fields."**

As a legume, Durana improves soil structure and captures up to 150 lbs. of atmospheric nitrogen per acre annually which it shares with companion plants – another plus adds Davis, **"We will be reducing the amount of nitrogen we apply which will result in big cost savings."**



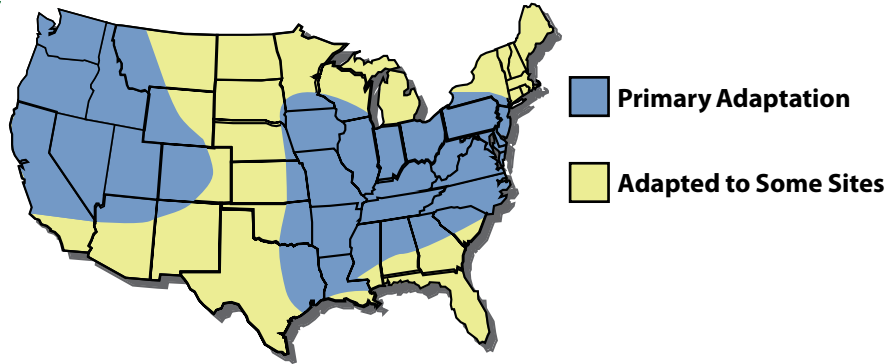
Intermediate white clover forms a thick, water penetrable mat that suppresses weeds and holds soil in place.

According to Joel Reagan, Regional Forage Specialist with Pennington Seed Co., **"Intermediate white clovers like Durana are perennials that have a long growing season of up to 10 months and re-grow both from live stolons and from volunteer reseeding. They are also low growing and require minimal maintenance which makes them ideally suited for groundcovers."**

CHRISTMAS TREES

Durana White Clover for Christmas Trees

Where to Plant:



Name: Durana White Clover (*Trifolium repens*) **Type:** Cool season perennial legume

Adaptation: From eastern Texas and Oklahoma across the south to the Atlantic coast and north along a line from Macon, GA to Dallas, TX. On loamier soils in the Coastal Plain region of the Southeastern U.S. under Christmas tree farm management. Also in the Pacific Northwest and in river valleys and certain irrigated areas of the western U.S.

Benefits: A perennial plant that offers year round sustainable and low maintenance vegetative cover. Durana is highly persistent with excellent drought, cold and heat tolerance. Reduces weed competition and is competitive with existing grasses. As a legume, Durana captures atmospheric nitrogen ranging from 75 to 150 lbs. per acre or more per year. Builds soil organic matter and improves soil tilth. Serves as a host for beneficial insects.

Planting:

- Seeding rate:** Seeding rate: 5 lbs/ac. on moderate slopes; 8 lbs/ac. on 3:1 or greater slopes.
- Method:** Mow row middles close prior to seeding. Avoid leaving heavy amounts of debris on the soil surface. Broadcast seed on an exposed soil surface with a seeder designed for sowing small seed. Where feasible, seed can be drilled with a no-till planter equipped with a small seed hopper.
- Depth:** 1/4 inch maximum; many stand failures result from seed planted too deep.
- Planting dates:** Upper South and Higher Elevations – Aug. 15 to Oct. 1 and Mar. 1 to May 15. North – Aug. 1 to Sept. 15 and Mar. 15 to May 15
- Fertilizer:** Soil testing is highly recommended. Durana performs best at a soil pH of 6.0-6.5 but will tolerate a pH in the 5.0 – 5.5 range. Providing adequate levels of potassium and phosphorus are necessary to ensure that the clover establishes and remains productive.
- Inoculant:** Durana seed come pre-inoculated with selected Rhizobia strains of bacteria for optimal root nodulation and nitrogen fixation.

Management: Durana does not require the addition of nitrogen fertilizer. Excess forage may be periodically clipped. Keeping the vegetation at a 6-8" height helps maintain the clover and helps control weeds and grass.

WHAT PEOPLE ARE SAYING ABOUT DURANA CLOVER

"We had a period of drought and heat this summer. Durana held its leaves and maintained more ground cover than the dutch white clover we have been using. This resulted in fewer weeds breaking through in the Durana fields." – Bryan Davis, Mgr., Carolina Fraser Fir Co., Mouth of Wilson, VA



CHRISTMAS TREES