

WHERE TO PLANT

-  Primary adaptation
-  Adapted to some sites



THE DURANA ADVANTAGE

NEWS AND INFORMATION ON DURANA WHITE CLOVER

THE DURABLE AND SUSTAINABLE ALL PURPOSE WHITE CLOVER

White clover is used extensively throughout the world as a cool season pasture legume. Research has repeatedly shown that adding white clover to grass pastures results in improved animal performance while reducing the need for nitrogen fertilizer application.

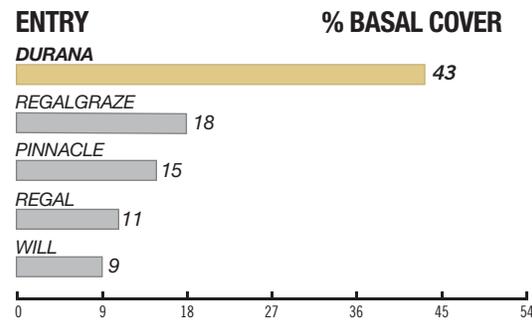
A limiting factor for clover use has been its poor persistence under grazing systems in many areas of the U.S. Scientists have linked low stolon density to the poor persistence of white clovers. Much of the breeding work on white clover has focused on ladino types which are high yielding, but possess a low number of stolons compared to stolon-dense common and wild types.

Seeing the potential of perennial white clover as a low input, effective and sustainable livestock forage, Dr. Joe Bouton, a former University of Georgia plant breeder and previous Director of the Noble Foundation Forage Improvement Division, initiated an aggressive white clover breeding program. His goal was to find a white clover with similar nutritional and agronomical attributes of traditional ladino clovers, but one that would be superior to ladino in persistence and grazing



Clover persistence and grazing tolerance has been linked to high plant stolon density. Durana white clover has 97 stolons/sq. ft. compared to only 52/sq.ft. for ladino clover types.

PERCENT BASAL COVERAGE DECEMBER 4, 2008



Percent basal cover of white clover varieties continuously grazed. Planted November 1, 2006 at the UGA Central Georgia Branch Experiment Station, Eatonton, Ga.

tolerance. Dr. Bouton began by collecting white clover ecotypes growing naturally and competitively in Georgia pastures. These ecotypes were exclusively the stolon-dense types and formed the parental base for the breeding program that developed "Durana."

In Bouton's research, Durana interseeded into tall fescue pastures maintained a clover percentage over a two year period of 43 percent by weight while the amount of Regal ladino clover fell to less than 5%. Beef steer gains over this two-year period averaged 2.5 lbs/hd/day for Durana and fescue mixed pasture; 2.0 lbs/hd/day for the Regal mixed pasture and 1.4 lbs/hd/day on pasture fertilized with 65 lbs N/A and no clover. Based on these results and others, Dr. Bouton and AgResearch-NZ released Durana for commercial use in 2003. It is marketed exclusively by Pennington Seed, Inc.

(Information contained in this article was taken from an article entitled "Ecotype-derived White Clover Cultivars and Their Place in the Southern Great Plains" by Dr. Joe Bouton, former Director, Noble Foundation's Forage Improvement Division)



Durana's PERSISTANCE & SUSTAINABILITY LEADS TO MULTIPLE USES

Because it is nutritious, persistent, durable and able to fix its own nitrogen, Durana white clover has quickly gained a reputation as a premier forage and one that will be a key component of future sustainable forage and crop production systems. These same traits have scientists, landowners, wildlife enthusiasts and erosion control professionals looking at additional ways Durana can be used to lower production costs, improve wildlife habitat and enhance the aesthetics of the countryside.

For specific information about each use of Durana, visit the Durana product page on the Pennington website at www.pennington.com



EROSION CONTROL

Responding to the commercial erosion control industry's desire for a more sustainable and aesthetically pleasing slope vegetation mix, Pennington introduced the SlopeMaster® product line which features Durana as a key ingredient. With its aggressive stolon production forming a thick water penetrable mat, Durana holds soil in place making it a natural fit as an erosion control plant. It also provides color which makes for more aesthetically pleasing areas.



HIGHLY NUTRITIOUS FOOD PLOT

Because of its high quality (25-30% protein and 80% digestibility), persistence and ability to compete in a mixed stand with perennial grasses or other aggressive plants including weeds, Durana has become a favorite as a wildlife food plot plant. It is a key component of several Pennington® Rackmaster® deer mixes including Rackmaster® Elite, Rackmaster® Clover Trio, and Rackmaster® Refuge.



PECAN ORCHARD FLOOR

While many have used Durana as a pasture forage and wildlife food plot plant, researchers and leading fruit and nut producers in several states are now adding this popular legume to the orchard floor forage mix to lower nitrogen fertilizer costs and attract beneficial insects.



CHRISTMAS TREE GROUND COVER

Christmas tree growers in North Carolina are using an Integrated Pest Management (IPM) Groundcover Management protocol for Fraser fir that combines the use of a reduced rate of the herbicide glyphosate with adapted and sustainable vegetative groundcover like Durana clover to control and suppress problem weeds. As a perennial, Durana has a long growing season of up to 10 months and re-grows both from live stolons and from volunteer reseeding. It is low growing and requires minimal maintenance which makes it ideally suited as a ground cover for this management system.



PINE PLANTATION WILDLIFE HABITAT

Managing planted pine plantations while simultaneously creating suitable wildlife habitat has traditionally been a challenge. But now with Durana white clover and a Quality Vegetation Management (QVM) system developed and perfected by researchers in Mississippi, landowners can manage their pine plantations for both maximum income and quality hunting. With its wide adaptability, low maintenance, shade tolerance and ability to withstand weather extremes and heavy grazing pressure, Durana white clover is a natural and proven choice as a perennial forage for this management scheme.



THE WHOLE TRUTH ABOUT DURANA WHITE CLOVER

By Kent Kammermeyer

There has long been a need for a persistent, productive, long-lived clover for wildlife food plots that is highly competitive in a mixed stand with perennial grasses or other aggressive plants including weeds. Along comes Durana white clover, the product of Dr. Joe Bouton, renowned plant breeder formerly at the University of Georgia and currently with the Noble Foundation in Oklahoma.

“Durana will last at least three times longer than common ladino white clovers on the market today,” said Dr. Carl Hoveland, senior researcher with the University of Georgia’s Crop and Soil Science Department.

Durana is an intermediate white clover that has smaller leaves than taller ladino clovers but produces many more runners or stolons, which allow aggressive spreading and excellent grazing tolerance. Durana also flowers profusely for long periods making it a more dependable re-seeder if that seed bank is ever needed.

In performance tests at UGA Experiment Stations, Durana was not as productive as Regal ladino during the establishment year but caught up to it in year two with both producing close to 4,000 lbs/acre dry weight. Both produced two to five tons of forage per acre at 25-30% protein levels and up to 80% digestibility. The difference is that Regal faded from perennial grasses in a few years (survival 17%) while Durana increased its original stand coverage (133%) and persisted for five years or more!

This cool season perennial legume is adapted in the Southeast, Northeast and Midwest on all soils except deep sands. It is also adapted to the



“Pennington’s Durana clover has really impressed me. With minimal maintenance, and I mean minimal, I get great plots through critical summer months. Of course the fall stands are awesome and the turkeys flock to it like chufa in the spring. We joke around and call it ‘chufa that you don’t have to plant every year!’”

—CJ Davis
Senior PR Representative for Chevalier Advertising, Marketing and PR

Pacific Northwest and Rocky Mountain regions (where rainfall is adequate).

UGA deer researchers completed a 1½ year field test at three locations testing Durana production, palatability and deer use. As seen in the table below, nitrogen savings provided by white clover can be up to \$75/acre after seed cost is factored in. In Georgia, standing crop of Durana was good all 12 months (after establishment) in the south but not in December and January in the north. High production of Durana occurred in March, April and May and again in September, October and November. The researchers suggest that Durana may be superior to ladino in the long-term. Combine this with superior persistence, and Durana quickly and easily becomes the clover of choice for hunters and deer managers.

Mark Buxton, manager of Oakland Club Plantation in South Carolina reported on his deer management successes at the recent Quality Deer Management Association Convention in Charleston, SC. Basically, his deer antler development has recently rewritten the SC record book for his part of the state. Durana is the cornerstone of his food plot program.

Why plant Durana? It withstands grazing, is more persistent, more drought tolerant, more acid tolerant, more aggressive with competitive grasses and weeds, and has more stolon density (runners) than any other clover. That is one tough clover!

Durana white clover is a key component of several Pennington® deer mixes including Rackmaster® Elite deer mix, Rackmaster® Clover Trio blend and RackMaster® Refuge mixture.

(Kent Kammermeyer, is a retired Ga. DNR biologist, book author and senior advisor—Quality Deer Management Assn.)

ADDING CLOVER TO PASTURES MAKES SENSE

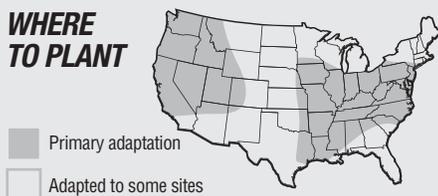
The significant improvement in animal performance on clover mixed pastures is well documented. It is not unusual to see average calf weaning weights increase 20+ lbs. per calf and stocker gains improve by 1.0 lb/head/day or more when clover is added to the pasture forage mix. While improved livestock performance alone makes clover a good investment, perhaps the greatest attribute of clover and its effect on farm profits is its nitrogen production capability. Forage researchers say an established stand (35-40% basal coverage) of perennial white clover can fix 75-150 lbs/ac. or more nitrogen annually. This greatly reduces the need for purchased nitrogen fertilizer on clover/fescue or clover/bermuda mixed pastures. As seen in the table below, nitrogen savings provided by white clover can be up to \$75/acre after seed cost is factored in. In university trials and on-farm experience, many Durana white clover stands have survived 3-5 years or longer, thus reducing annual planting costs and increasing net nitrogen savings over those shown in the table.

AMOUNT NITROGEN FIXED / A	
NITROGEN AT \$0.55 / LB	
75 LBS	150 LBS
\$41.25	\$82.50
SEED COST (PRORATED 3 YRS.)	
\$7.00	\$7.00
ANNUAL N SAVINGS	
\$34.25 / A	\$75.50 / A



PLANTING & MANAGEMENT INFORMATION FOR DURANA WHITE CLOVER

WHERE TO PLANT



MANAGEMENT

Seed come pre-inoculated and once established, Durana does not require nitrogen fertilizer. Clip or harvest surplus forage in under-utilized pastures or food plots. Under continuous grazing, keep grass and/or weed height between 2" and 6" to help maintain the clover stand.

PLANTING

RATE: 3 lbs./acre if no-till drilled or broadcast into established pastures; increase to 4 lbs./acre if frost seeded; 5 lbs./acre for a pure stand (pure stands for wildlife plots; for livestock see special considerations).

DEPTH: 1/8" Maximum (Stand failures will result from seed planted too deep).

DATE:

North: Aug.-Sept. May be frost seeded in February-March or spring seeded in April-May

Upper South: Sept.-Early Nov. May be frost seeded in February to early March or spring planted in April-early May

South: Sept.-Nov. May be frost seeded in February to early March in some locations

FERTILIZATION: Soil testing is highly recommended. Liming to a pH of 6.0-6.5 and providing adequate levels of potassium and phosphorus are necessary to ensure a productive clover stand. See your local county extension office for details.

SPECIAL CONSIDERATIONS: Bloat can be a problem for animals on pastures with a large proportion (>35%) of white clover. Bloat-preventative supplements are recommended.

For more detailed information on planting and managing Durana white clover for forage, visit the Durana forage product page on the Pennington forage website at pennington.com. For wildlife food plot use, visit the Rackmaster Durana product page in the Wildlife section under the Agriculture tab.



Research has shown the addition of adaptable clovers to warm season pastures can extend the number of annual grazing days and significantly reduce the cost of production in cow/calf enterprises by reducing winter hay needs.

LOWER COST & EXTEND GRAZING SEASON WITH CLOVER

Using an adaptable clover in perennial grass pastures can significantly reduce the cost of production in cow/calf enterprises by improving animal performance, lowering nitrogen fertilizer costs and extending the number of grazing days. In a four year study by Dr. Gerald Evers at Texas A&M, the cost of suckling calf gain per acre was 50% lower with clover mixed pastures when compared to grass pastures receiving nitrogen fertilizer. The value of the clover in this study amounted to almost \$100 per acre.

Research has also shown that clover overseeded into a warm season perennial pasture (bermuda, dallisgrass, etc.) provides more total annual forage production and allows grazing to begin 30-60 days earlier in the spring than pastures without clover. The results are less hay needed and lower labor costs. In his study at Texas A&M, Dr. Evers reported the addition of clover to a dallisgrass pasture lowered animal wintering costs by 26%.

Research at Mississippi State University using Durana white clover mirrors the results of the Texas study. The MSU trial looked at yields of bermuda-grass in fields overseeded with Durana. In the fall of 2003, Durana was seeded into established bermuda at 5 lbs. of seed/ac. Sixty-eight pounds of nitrogen was applied once in the spring of 2004 and not again during the three year study. Total annual forage yields (bermuda & clover) ranged from 3.5 tons/A in a drought year to 6 tons/A. MSU forage agronomist David Lang reported that Durana persisted into the fall of 2006 with a nearly 100% stand. He added that forage quality of the bermudagrass interseeded with clover was similar to bermuda alone fertilized with nitrogen. He, like Dr. Evers, found that clover, as a companion forage with a warm season perennial

pasture grass, extended the number of annual grazing days for livestock. Dr. Lang pointed out that because it is a cool season forage, the Durana white clover provided abundant forage growth in early spring prior to bermuda green-up and again in early fall when the bermuda was beginning to go dormant. Since white clover is low growing, Lang said it did not significantly interfere with early spring growth of bermuda.

SUCKLING CALF GAIN WITH & WITHOUT CLOVER G.W. EVERS – TEXAS A&M

FORAGE SYSTEM	CALF GAIN/A	COST OF GAIN
DALLISGRASS+150 LBS/A N	316 LBS	\$183.28/A
DALLISGRASS+CLOVER (NO N)	307 LBS	\$85.96/A

In addition to reducing the need for purchased N, improving animal performance and lowering wintering costs, the addition of clover can give an added benefit of reducing weed competition in the pasture without herbicide treatment. Texas research showed that a good stand of clover equaled the weed control obtained from one early herbicide application. This was attributed to a solid stand of clover in the spring shading out weed seed that would normally germinate during that time of year.

DISCOVER THE DURANA ADVANTAGE!

- Persists under close continuous grazing
- University proven to last 3 times longer
- Captures up to 150 lbs./acre per year of free nitrogen
- More tolerant of low pH soils
- More drought tolerant
- Saves money on planting costs vs. annual clovers