


species or management technique you haven't thought of testing. See *Up-and-Coming Cover Crops* (p. 191) for a few examples. Overwhelmed? You needn't be. Initiative and common sense—traits you already rely on—are fundamental to any on-farm testing program. As a grower, you already test varieties, planting dates and other management practices every year. This section offers

enough tips to start testing cover crops. You also can collaborate with others in your region to pool resources and share findings. There's a good chance others in your area could benefit from your cover cropping wisdom!

[Adapted and updated in 2006 from *Northeast Cover Crop Handbook* by Marianne Sarrantonio, Rodale Institute, 1994.] 

Appendix B

UP-AND-COMING COVER CROPS

Balansa clover

Identified as a promising new cover crop in screening trials throughout the Southeastern U.S., balansa clover (*Trifolium michelianum Savi*) is a small-seeded annual legume with superior reseeding potential compared with other legumes, including crimson clover. Well-adapted to a wide range of soil types, balansa performs particularly well on silty clay soil with a pH of about 6.5. Established stands tolerate waterlogging, moderate salinity, and soil pH from 4.5 to 8.0. It does not do well on highly alkaline soils (30). It is considered marginal in Zone 6B.

Balansa and other reseeding legumes were screened in Zones 6, 7, and 8 (from the Gulf Coast to northern Tennessee, and from Georgia to western Arkansas). TIBBEE crimson clover (*Trifolium incarnatum*) was used as a phenological check. Growth was terminated 2 to 3 weeks after TIBBEE bloomed at each location to identify adapted cover crops that reseed earlier than TIBBEE. Spotted burclover (*Medicago arabica*) and balansa clover were the best reseeding legumes that were hardy throughout zone 7A. Of these, only balansa clover is commercially available.

Balansa clover is open pollinated. Flowers vary from white to pink and are attractive to bees. Ungrazed, it grows up to three feet high and produces thick hollow stems that are palatable and of good feed value. It becomes more prostrate when grazed.

Balansa clover was named *Trifolium michelianum Savi* in 1798. It is sometimes called

Trifolium balansae or *Trifolium michelianum* subsp. *balansae*. A landrace of balansa clover collected in Turkey in 1937 was released in 1952 by the Alabama office of NRCS with the name MIKE. Small amounts of seed of this accession are available from the Plant Introduction station in Athens, GA.

Balansa clover seed is quite small, so planting only 5 lb./A gives a dense stand. Seed is produced commercially only in Australia. Balansa clover requires a relatively rare inoculant, designated "Trifolium Special #2" by Liphatech, Inc., manufacturer of "Nitragin" brand inoculants. Kamprath Seed Co. imports balansa seed (See *Seed Suppliers*, p. 195). Some seed suppliers offer coated seed that is pre-inoculated. The price per pound of coated seed is about the same as bare seed, but $\frac{1}{3}$ of the weight is coating so the seeding rate for coated seed should be increased to 8 lb./A.

PARADANA is the cultivar that has been most widely tested in the U.S. It was released in 1985 by the South Australia Department of Agriculture. It was derived from Turkish introductions crossed and tested at Kangaroo Island, NSW, Australia. Seed yields over 550 lb./A have been obtained. BOLTA is 1-2 weeks later than PARADANA and FRONTIER is 2-3 weeks earlier. FRONTIER, a selection out of PARADANA, has replaced its parent in the seed trade in recent years.

While PARADANA seed matures slightly earlier than crimson clover, it often does not produce as

much biomass. Nitrogen accumulation in above ground biomass is about 60 lb./A at full bloom. Balansa can reseed for several years from a single seed crop, due to its relatively high amount of hard seed. It reseeded for four years following maturation of a seed crop in 1993 in Senatobia, Miss., and for at least two years in no-till systems at several other locations in Alabama, Georgia and Mississippi. Neither TIBBEE nor AU ROBIN crimson clover reseeded for more than one year at any location in those tests. Balansa clover does not reseed well after tillage, probably because the small seeds are buried too deeply.

Allowing balansa clover to grow for 40 days past first bloom every 3 to 4 years will allow stands to persist indefinitely in no-till systems. Reseeded stands are denser, bloom 5 to 7 days earlier, and are more productive than planted stands because growth begins as soon as conditions are favorable and seedling density is higher. However, seed cost is minor compared to opportunity cost and risk associated with delaying main crop planting. Waiting past the optimum planting date to encourage reseeding is only practical in rotations that include main crops optimally planted in May in the Southeastern U.S.

Balansa is less likely than crimson clovers to host root-knot nematodes (*Meloidogyne incognita*, race 3). Gary Windham, USDA-ARS, Starkville, Miss., found that balansa had egg mass index scores between 2.3 and 2.9. For comparison, a very resistant white clover scored 1.5, most crimson clovers score between 3 and 3.5 and very susceptible crops like REGAL white clover score 5 on a scale from 1 to 5.

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Black oat

Black oat (*Avena strigosa* L.) is the No. 1 cover crop on millions of acres of conservation-tilled soybean in southern Brazil, and has potential for use in the southern USA (Zones 8-10).

Black oat produces large amounts of biomass, similar to rye. It maintains a narrower carbon to nitrogen (C:N) ratio than rye so it cycles nitrogen

better than rye, important for nitrogen management in conservation tillage systems. It breaks disease cycles for wheat and soybean and is resistant to root-knot nematodes. It is very resistant to rusts and has exceptional allelopathic activity for weed control. It is easy to kill mechanically.

Black oat is adapted for use as a winter cover crop in the lower Coastal Plain of the USA, including Zones 8b-10a. It has done well in fall plantings in Zone 8b, but winterkilled one year of six at some locations within this zone, dependent on planting date.

Planting dates are similar to common oat. If planted too early, it is more susceptible to winterkill and lodging. Planting in late winter (early February) yielded good biomass and ground cover for late planted cash crops in the lower Coastal Plain.

Seed 50-70 lb./A for use as a cover crop, 40 lb./A for seed production. In the Southeast, fall plantings (November) result in seed ripening in mid May through early June. Seed yields range from 800 to 1400 lb./A. Seed is available commercially in limited amounts.

One cultivar, SOILSAVER, was selected for increased cold tolerance and released by Auburn University and IAPAR (Institute of Agronomy of Paraná, Brazil). Auburn University and USDA-ARS researchers developed it from a population of IAPAR-61-IBIPORA, a public variety from the Institute of Agronomy of Parana, Brazil (IAPAR) and the Paranense Commission for Evaluation of Forages (CPAF).

SOILSAVER black oat has several advantages as a cover crop. It tillers well, producing good soil coverage in relation to total biomass produced. It suppresses broadleaf weeds extremely well. In one study, weed control in conservation tillage cotton (*Gossypium hirsutum* L.) averaged 34% with black oat compared to 26% for rye, 19% for wheat, and 16% with no cover crop.

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