

"Most of the fabrics were not developed for use in landscaping," Grandy says. "Because we did, we have the advantage, but we can't be used effectively for soil separation."

Texas A&M University has been studying the use of Weedblock for five years. In that time, Grandy says, they've had to use a chemical only once, and that was for nutgrass. "They've saved an enormous amount of time and labor cost," he says.

The Polyesters

Warren's has little competition in the polyester market. Warren's products are made from Trevira, a registered name for the type of polyester used. Warren's markets three major products: Terrabond, used for weed control, soil or sand/gravel separation and erosion control; Terracover, used to cover and protect turf in sports complexes; and Terrashield, a blanket to cover greens and tees.

Terrabond and Terrashield are made of continuous spunbound fibers. Terracover is made with short staple fibers which create a tighter, denser fabric ideal for a stadium cover or bench tarp.

In fact, Steve Wightman of Den-

ver's Mile High Stadium has successfully used Warren's geotextiles to protect the turf during rock concerts.

K.I.M. International produces Earthblanket, a Trevira polyester similar to Warren's Terrabond. It is marketed for home use, however, while Terrabond is primarily commercial. Earthblanket is light green in color.

Material color seems to be a real issue among polyester fabric manufacturers. Hunter emphasizes that Terrabond is gray, which won't cause snowblindness in a sandtrap, as might American Enka's white polyester Stablenka.

Stablenka is not a major competitor of Terrabond since it is usually used in conjunction with Enkamat for erosion control.

Bidim, made by the Quline Corp., is similar to Terrabond, and in fact shares the patent with Trevira.

Quline's Bobby Digh says the only difference is that "we play with the filament size and are slightly stronger."

Which is best?

Digh considers his biggest competitors the polypropylene products

manufactured by major oil companies such as Amoco and Phillips.

Polyester, he says, has an advantage since it is chemical resistant and can be used to line places such as hazardous waste landfills. But most polypropylene manufacturers don't view polyester products as major competition yet.

Which geotextile is best to use depends on the application. Polyester works well as a ground cover, soil stabilizer or lining. Polypropylene will usually save some money, but its weight must be taken into consideration if it's being used for something other than weed control.

Which is the best for weed control? Every company has done its own tests or had a university run tests, but it seems there are no completed objective tests using all the materials on the market.

Perhaps Dupont's Ebbets best sums it up: "Nobody does tests on how they work to control weeds. Instead they play games with weights and fibers. People want to know if it works and if it does, how much does it cost, and can I trust it?"

If someone does such a test, please let us know. **WT&T**

A CRISIS SITUATION

Soil erosion is becoming a national crisis, particularly in the agricultural industry.

But farmers aren't alone in their concern for the loss of a natural resource, topsoil. Landscapers are also realizing the severity of the problem.

Geotextiles have become a popular solution. Not only do geotextiles control weeds, but they can slow erosion as well.

But the fabric has to be strong to stabilize the soil.

For example, DuPont's Landscape Fabric doesn't work as well as its heavier Typar. Varying strengths of Typar are used for erosion control in applications such as river and lake banks, coastlines, highway and railroad cuts, and ocean and bay shores.

Polyester products, such as Warren's Terrabond, are often used as a drain lining, soil/gravel separator, or for erosion control on banks.

But several companies specialize in products which control erosion. Many erosion-control materials also help seeds to germinate, creating a natural soil stabilizer with the root systems.

American Enka's Company's Enkamat is considered a geomatrix



Workers install Enkamat to prevent erosion of a pond's bank.

GEOTEXTILES

Brand name	Circle No.	Manufacturer	Fabrication process
Bidim	101	Quiline	nonwoven needle-punched spunbound polyester
Duon	102	Phillips	nonwoven staple fiber heatbonded needle-punched polypropylene
Earthblanket	103	K.I.M. International	nonwoven spunbound polyester
Filterbond	104	DeWitt (distributor)	nonwoven polypropylene
Landscape Fabric	105	Dupont	nonwoven continuous filament spunbound heatbonded polypropylene
Rit-a-Weed	106	Amoco	nonwoven and woven needle-punched polypropylene
Stabilenka	107	American Enka	nonwoven polyester
Terrabond	108	Warren's	nonwoven continuous filament needle-punched spunbound polyester
Terracover	109	Warren's	nonwoven staple fiber needle-punched spunbound polyester
Terrashield	110	Warren's	nonwoven continuous needle-punched spunbound polyester
Weed Barrier	111	DeWitt (distributor)	woven needle-punched polypropylene
Weed Barrier Mat	112	American Woven Fabrics	woven needle-punched polypropylene
Weedblock	113	Easy Gardener	nonwoven molded polypropylene



While installing North American Green's erosion control blanket, one should start at the top of the slope and unroll the blanket. The blanket should never be stretched so that contact with the soil is constant.

uct, Miramat, manufactured by 3M. Miramat is made of a vinyl material. Vice president of marketing Terry Montgomery says the difference between Miramat and Enkamat is that Miramat is heavier and more flexible. Another difference is that Miramat tends to be used more in the private sector, while Enkamat is used publicly, especially along highways.

Although Miramat was developed for civil engineering purposes, Montgomery says he has seen an increased interest among landscapers. "There's been a lot of interest," Montgomery says. "They use it to take care of unsightly areas, such as rock on slopes or channels or concrete lined ditches."

Miramat's green color adds to the natural look many landscapers are after, while controlling erosion at the same time.

Some companies have developed natural erosion control blankets made of biodegradable materials such as wood or straw. Montgomery doesn't consider the products competition.

"I think they're excellent in low-flow conditions. They serve a niche," Montgomery says. "We don't compete against mulch or straw. It's not cost-effective."

Natural products are much cheaper than the man-made Enkamat or Miramat.

Jim Neimeier, marketing director for North American Green, does consider the man-made products competition to his erosion control blankets made of straw, coconut fibers or a combination of both.

In fact, he has run tests comparing his blankets to the Enkamat, Miramat and other natural products, with his

rather than a geotextile. Stabilenka, a polyester geotextile, is often used in conjunction with the Enkamat to further control erosion.

Enkamat is a three-dimensional structure made from heavy nylon monofilaments fused at their intersections. The open construction of the mat leaves 90 percent to be filled with soil, gravel or other materials.

It gives vegetation a matrix for vegetative root growth. Before vegetation develops, the Enkamat will protect against surface erosion and prevent the disturbance of seed distribution. After vegetation develops, the mat forms a surface cover skin which protects subsoils against erosive forces.

George Dodson, assistant development engineer for American Enka, says Enkamat is a permanent solution to an erosion problem. Dodson calls it "unique" and says it really doesn't have any competition, except for old-

fashioned riprap.

Used alone, Enkamat can line highway ditches and storm channels. Used in a "sandwich" with Stabilenka, Enkamat can restore highway shoulders and slopes which have been damaged by acidic water, allowing turf to recover and grow. Dodson says Stabilenka can help prevent roadside weed growth, although the company doesn't market it for that purpose.

Barney Barron of the San Francisco Parks Department has used Enkamat since 1981 to hold down the sod in Candlestick Park. The root system established with Enkamat prevents individual grass plants from being uprooted by players cleats.

Dodson says landscapers often use Enkadrain (Stabilenka heatbonded to the Enkamat) to line terraces or planters instead of gravel.

Mirafy Inc. markets a similar prod-

GEOTEXTILE GLOSSARY

Here are important terms used in the geotextile manufacturing industry:

NONWOVEN: fabric made of a random orientation of fibers

WOVEN: all fibers in the fabric are oriented in two directions at right angles to each other

SPUNBOUND: nonwoven fabric using continuous filament fibers bound together with heat, chemicals, resin or needle-punch

STAPLE: nonwoven fabric using short fibers bound together with heat, chemicals, resin or needle-punch

POLYETHELENE: non-breathable plastic film

POLYESTER: large, complex polymer derived from crude oil or natural gas that is resistant to many environmental fabrics

POLYPROPYLENE: short, less complex polymer derived from crude oil or natural gas

UV STABILIZED: fabric which has been treated to guard against breakdown from the sun's ultraviolet rays



Turf Nit netting is stretched across a sod field to stabilize the seed while it germinates.

product winning in velocity and less soil loss. But the products are inherently different.

"We're flexible, they're more structural," Neimeier says. "Their product is permanent and doesn't provide an adequate environment for vegetation."

The blankets are constructed to prevent moisture loss through evaporation, while allowing water to get through. The blanket also keeps the soil warm to help seeds germinate.

"The key to stopping erosion is to revegetate the area," Neimeier explains. The blankets then break down and provide mulch to the area. The coconut fiber blankets last longer than the straw blankets, allowing strong root systems to develop.

Five of North American Green's six blankets are placed over a seeded area and stapled to the ground. The company has just developed a foot-operated staple gun for this purpose.

The sixth blanket comes pre-seeded, for steep grades. The company calls it "an effective alternative to sod."

The blanket is perhaps the only one of its type on the market. Quline Corporation has developed plans for a pre-seeded Bidim, which would be made in a biodegradable fabric and used on steep slopes where erosion is a serious problem.

The technology for erosion control blankets has long been used in Europe. "The U.S. is not as conscious of erosion because they have more land and less population," Neimeier says. "We're behind the times."

Erosion control blankets made out of wood were first developed by American Excelsior Co. about 25 years ago.

P.P.S. Packaging Co. manufactures the Xcel, excelsior erosion control blanket made out of Colorado Aspenwood. American Excelsior's Curlex

blanket is made out of a type of poplar wood, similar to the Aspen.

Wood products last about one year to 18 months before biodegrading.

Houseman says he hasn't seen straw blankets used very often. "The basic difference is that Aspenwood has the highest moisture content and is able to absorb water. You don't want runoff," Houseman explains. "Straw isn't going to do that."

American Excelsior branch manager Ernesto Forti says another problem with straw is it is often contaminated with weed seed. "It's hard to find sterilized straw," Forti says. The blanket is used most frequently along highways where weed growth is difficult to control anyway.

Houseman says his product isn't competitive with the man-made materials, estimating a price difference of 41 cents per square yard for the Xcel blanket to possibly \$6 per square yard for the Enkamat or Miramat. Both Houseman and Forti agree that the two types of products can be used together to combat serious erosion problems.

The Department of Transportation is the biggest user of the wood blankets. Although Houseman says he's seen inroads in the landscape business, he says many people are still committed to jute mesh, a type of rope fabric imported from India.

Delmarva Textile Co. manufactures Turf Nit netting to prevent erosion on seeded areas. It works under the same theory as Curlex or North American Green products, except the person has to lay down the straw. Still, the extra labor may be worth it because of the cheaper cost.

Turf Nit is made of UV stabilized polypropylene fiber.

After an area is seeded and covered with straw, the netting holds the seed and straw down to prevent erosion while the seeds germinate. It also

helps hold the root system in place.

Before Turf Nit, chemical tackifiers were used for the same purpose.

"There's nothing comparable," says Delmarva president Joe Lamb. "No one makes a knitted netting which won't blow away in wind conditions."

Turf Nit consumer information says it can withstand heavy rains and winds in excess of 50 mph. The product is available in two size rolls, a 630 lb., 7 1/2-acre roll for the sod industry and an easy-to-use 61 lb., 3/4-acre roll for the landscaping industry. The company even sells its own stakes to hold the netting in place.

According to Lamb, the smaller roll is becoming popular with golf courses which use it on small replacement sod fields. Some golf courses even use it to hold straw in place on heavy traffic areas.

"The erosion control business hasn't even started," Lamb says.

Whether its artificial and permanent like Enkamat or Miramat, biodegradable like Excel, Curlex, or American Green or an inexpensive alternative like Turf Nit, erosion control is a growing field...literally.

—Heide Aungst