

Algae on Asphalt Shingles

by Martin Holladay

Most roofers know that the unattractive black streaks that sometimes appear on asphalt shingles aren't fungus or soot, but algae. Algae growth, which also occurs on wood shingles and concrete tiles, is found in all but the driest climates.

Fortunately, algae do not eat asphalt. "If you can live with the black streaks, it won't hurt the shingles," says Husnu Kalkanoglu, director of technology at CertainTeed's roofing division. Although no one has yet studied whether algae growth shortens shingle life, that hasn't stopped experts from speculating. "If anything, algae might extend the life of the shingles by providing the asphalt with some protection from UV light," says Kent Blanchard, assistant VP of manufacturing at Tamko, a shingle manufacturer. But Ingo Joedicke, chief scientist at ISP Mineral Products, a roofing granule manufacturer, doubts that algae can be beneficial. "A heavily infested roof is dark, and darker roofs get hotter in the summer," he says. "There could be some acceleration in aging. But we don't really have any data to support the idea."

Coming Soon to a Roof Near You

Algae growth, though probably harmless, is ugly and increasingly common. Once considered a problem confined to the humid Southeast, it is now seen on many roofs near the Canadian border. "Every year we survey roofing contractors, and every year you can see the concern about roof algae slowly gravitating northward," says Michael Loughery, public relations manager for CertainTeed's roofing products group. Several reasons for the apparent spread of roof algae have been proposed, including global warming, adaptive changes in the algae, and changes in the way shingles are made.

More filler, less asphalt. Shingles

have always contained a certain amount of filler — inert materials like granite dust, oyster shell, and fly ash. But 30 years ago, the percentage of asphalt in roof shingles was higher than it is today. When the first energy crisis caused asphalt prices to jump, manufacturers began increasing the percentage of filler in their shingles. Searching for an economical material that would blend well with asphalt at relatively high concentrations, manufacturers settled on limestone, which is mostly calcium carbonate.

"The shingle manufacturers used to use slate flour as filler," says Carl Cash, a roofing consultant with Simpson Gumpertz and Heger in Arlington, Mass. "But I've seen limestone filler in every shingle I've examined recently." Greg Hall, senior process development engineer at 3M, a roofing granule manufacturer, has also noticed the changes in shingle composition. "The rising use of calcium carbonate began in the late '70s to early '80s," he says. "Because the cost of asphalt has gone up, the filler content in shingles is now greater. They used to use other fillers like fly ash or gypsum. But it is much easier to compound lime-

stone into the asphalt, and it tends to provide better weatherability."

Because limestone is an alkaline mineral, it provides a favorable pH environment for algae. "Limestone is more soluble than the other fillers," says Joedicke. "It makes sense that it would release some minerals that could be utilized by the algae." Algae's affinity for limestone can also be seen on stone walls. "We know from the study of limestone buildings that limestone supports the growth of algae," says Bill Rose, a building researcher at the University of Illinois in Urbana-Champaign. "In contrast to limestone, there is next to no biological growth on granite buildings."

Greg Hall says that 3M has investigated the limestone-algae connection. "A study we did in the mid-1980s showed there was a direct link between limestone filler and algae growth," he says. "But I'm not sure if the old information is relevant anymore, because it's also true that the absence of calcium carbonate does not limit algae growth. With another filler, like fly ash, a roof will get algae too. It just might take a little bit longer for the algae to get established."

Understandably, most shingle manufacturers downplay the link between limestone and algae. "Algae likes limestone, because limestone is alkaline," admits CertainTeed's Kalkanoglu. "However, limestone has been used as a filler in shingles for many years. A shingle that has no limestone is not necessarily a better shingle. You solve one problem and get another problem that is much larger — the shingles could start disintegrating or falling apart."

When formulating shingles, manufacturers make tradeoffs among many factors, including cost. Because the asphalt shingle market is so competitive, limestone fillers are probably here to



In this test house, the shingles on the left are stained with algae, while the shingles on the right include copper granules from 3M that protect the roof from algae.

Trade Talk

stay. The best way to produce an algae-resistant shingle, manufacturers have concluded, is not by reducing the level of limestone, but by adding copper-bearing granules to the shingle surface.

Keeping Roofs Algae Free

For the time being, there are only three weapons in the fight against algae on asphalt shingles: chlorine bleach, zinc strips, and algae-resistant (AR) shingles.

Washing the roof with a 10% solution of chlorine bleach will remove black stains and keep the algae away for a year or two. According to Greg Hall at 3M, "Chlorine bleach can cause premature chemical degradation of the asphalt." But most shingle manufacturers disagree. "Asphalt is basically unaffected by chlorine," says Kalkanoglu. If roof washing shortens shingle life, it's probably due not to the bleach, but to granule loss from footsteps, cleaning brushes, and power-washing wands.

Protective flashing. When rain washes over flashing — whether galvanized steel, lead, or copper — the leached metal ions inhibit algae growth. Pure zinc strips, installed along a roof's ridge, can keep an algae-free roof from getting infected. Such zinc strips are available from Savetime Corp., which sells Shingle Shields (800/942-3004; www.rainhandler.com), and from Wespac, which sells Z-Stop strips

(800/845-5863; www.z-stop.com).

If it's time for a new roof, the best way to avoid algae problems is to install AR shingles. In AR shingles, some of the mineral granules have cuprous oxide added to the semi-ceramic color coating. When those granules get wet, the copper leaches out, inhibiting algae growth. AR shingles can keep algae at bay for several years, although not for the life of the shingle — a fact reflected in algae-resistance warranties, which are generally much shorter than shingle warranties.

Caveat emptor. Experts at the two major manufacturers of copper roofing granules, 3M and ISP, warn that not every shingle manufacturer is conscientious in formulating their AR shingles. "We recommend that our AR granules be blended at a level of 10 percent, but if the manufacturers choose to do something different, it's up to them," says Joedicke. "I've seen some shingles with a lower percentage."

Greg Hall knows that some shingle manufacturers cut corners. "'Algae resistant' is a very vague term," says Hall. "Some manufacturers make algae-resistant shingles with just 2 or 3 percent of cuprous oxide granules blended in. That's a low level, and it won't address algae growth much."

One way to be sure that the shingles you buy have the best algae resistance is to choose shingles with the "3M Algae Block" label. Such shingles must

meet 3M's relatively stringent specifications, including a requirement that copper granules be blended at the 10% level. Check the shingle wrapper, though: Some manufacturers participate in the 3M certification program only for their more expensive lines of shingles, while their less expensive AR shingles may have copper granules blended at a lower level.

Even high-quality AR shingles may allow some types of algae to gain a foothold. The most common species of roof algae is *gloeocapsa magma*, a type of blue-green algae, but other species are known to infect roofs as well. "There are many types of algae," says Sid Dinwiddie, division quality manager at PABCO, a shingle manufacturer. "With some types of algae, the algae-resistant shingles are less effective."

Buying AR shingles. As an option, most shingle manufacturers offer AR shingles at an upcharge of a few dollars a square. But in areas outside of the Southeast and Northwest, AR shingles are often a special-order item with a shipping surcharge.

The following manufacturers offer AR shingles that meet the specifications of the 3M Algae Block program: IKO (Chicago, Ill.; 800/323-7171; www.iko.com); Malarkey Roofing Co. (Portland, Ore.; 800/545-1191; www.malarkey-rfg.com); and PABCO Roofing Products (Tacoma, Wash.; 800/426-9762; www.pabcoroofing.com).

Other manufacturers offering AR shingles include: Atlas Roofing Co. (Atlanta, Ga.; 770/933-4470; www.atlas-roofing.com); CertainTeed Corporation (Valley Forge, Pa.; 800/233-8990; www.certainteed.com); Elk Corp. of America (Tuscaloosa, Ala.; 800/945-5545; www.elkcorp.com); GAF Materials Corp. (Wayne, N.J.; 888/5325-767; www.gaf.com); Georgia-Pacific (Atlanta, Ga.; 800/284-5347; www.gp.com); Tamko Roofing (Joplin, Mo.; 800/641-4691; www.tamko.com); and Owens Corning (Toledo, Ohio; 800/438-7465; www.owenscorning.com).

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Limestone buildings, like this church in Urbana, Ill., are known to provide a hospitable environment for the growth of algae. In recent years, manufacturers have increased the use of limestone dust as a filler in asphalt shingles. Some researchers believe that the limestone in shingles promotes algae growth.

