

101 REMOVAL OF BIOLOGICAL GROWTH

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INTRODUCTION

Often we are approached regarding the appropriate treatment for removing algae, fungi, and other forms of biological growth from masonry surfaces. In the building preservation community, it is generally agreed that biological growth can adversely affect both the appearance and durability of stone, concrete, and other masonry materials. The presence of dark colored organisms detracts from the appearance of the masonry, especially in situations where there is ornamental carving. More importantly, because all forms of biological growth are associated with the retention of water there is usually accelerated deterioration related to its presence. In addition, most organisms secrete acidic byproducts during metabolism; this lowers the pH of the moisture retained, posing a greater danger to acid sensitive materials such as limestone and marble.

The information presented below can be useful in identifying the types of organisms, their detrimental effects to masonry materials, and treatments currently available.

TYPES OF ORGANISMS

There are several types of organisms that are considered potentially damaging to masonry substrates include fungi, algae, lichens, and mosses and other higher plants.

Molds, Mildews, Yeasts

Fungi, which include molds, mildews and yeasts, are typically green, brown, or black in color. From the spot or patch that initially appears, the fungus develops into a “fuzzy” layer. Most of the damage directly attributable to

fungi has involved staining of interior plaster. Fungi are known to be the necessary precursors of some organisms and are thus indirectly responsible for other types of damage. Although several types of fungi have been isolated from exterior stonework, their role in its deterioration has not been firmly established. However, because fungi produce organic acids that can solubilize mineral constituents (e.g., oxalic and citric), their potential for directly damaging substrates is well recognized.

Algae

Many different species of algae have been isolated from limestone and sandstone substrates. Algae are green, red, or brown in color and often appear “slimy”. The unsightly appearance of algae is worsened when dust and soot are entrapped in the algal mass. Algae develop on masonry materials during wet conditions and, because they retain moisture, normal drying of underlying substrates is retarded. This often results in the acceleration of water-related deterioration. Damage attributable to algae includes pitting, discoloration and staining, and the solubilization of calcium carbonate.

Lichen

A lichen is actually algae and a fungus growing together in a close association. Lichen are usually orange or gray in color. The hard, leathery appearance of some lichen is disfiguring to masonry surfaces. Lichen damage masonry substrates in several ways. Mechanical damage is caused by increases in size of the lichen mass. As with algae, the retention of water and production of acidic metabolic products often accelerates deterioration of masonry. In addition, most lichens are resistant to severe climatic conditions and survive during droughts and high and low

temperature extremes. During drought conditions lichens shrink in size, creating shear stresses that can be damaging.

Moss

Mosses are small plants that typically form dense green clumps or mats, often in damp or shady locations and can attach themselves on a variety of surfaces including many types of masonry. Moss grows on exterior concrete surfaces that are not exposed to sunlight and remain in a persistently moist state. While moss is not harmful to concrete, its presence on concrete patios and walkways can make them more slippery, causing a safety hazard. Moss growth can be inhibited by decreasing availability of water through proper drainage or increasing direct sunlight exposure.

Other Higher Plants

Other higher plants such as ivies are often seen growing up the side of buildings. Ivies climb by producing aerial roots or little, suction cup-like pads along their roots and stems that “grab” onto surfaces. Ivy can easily damage old bricks, wood, stucco and even vinyl siding. The roots easily find seams and small cracks in brick, mortar, concrete, and stucco, growing into them and causing damage. With stucco, when ivy is pulled off, the stucco may be pulled off as well. Ivy is occasionally responsible for moisture issues with older homes because covered exterior walls can hold moisture in.

REMOVAL

Several types of compounds are used to remove biological growth on exterior masonry substrates. Because the types of organisms that are found are numerous and because substrate conditions vary, a single treatment that is successful in one situation may be ineffectual in another.

There are compounds that should not be used under most circumstances for removal of biological growth on masonry surfaces. Compounds such as bleaches and metallic salts are sometimes used as “toxic washes.” They are generally

brushed or sprayed on the surface in a flooding application and left for several days before removal of (presumably) dead organisms is attempted. Bleaches can leave residues, stains, and even lighten the color of different types of masonry. With some metallic compounds, (e.g., copper carbonate or iron sulfate) staining is an unwanted side-effect when light colored materials are treated. Zinc or magnesium fluorosilicate treatment often results in unwanted crust formation at the surface.

In addition, toxic washes may require repeated applications for complete removal. Success of toxic washes are variable. Some compounds used as toxic washes are only capable of effecting an initial kill of existing organisms, others provide long-term inhibition of growth. Some may effectively halt the growth but may not do anything to assist in removing the biological matter itself from the masonry.

Products such as Enviro Klean® ReKlaim and Enviro Klean® ReVive safely remove biological and atmospheric staining from vertical or horizontal masonry surfaces without damage to the surface or the environment caused by more conventional cleaning methods. They can be used to clean difficult mold and mildew staining that blackens limestone, marble, concrete and other masonry surfaces in humid environments. For mosses, ivies, and other higher plants, it is recommended to mechanically remove as much of the growth as possible from the surface.

PROTECTION

As moisture is a necessary condition for all biological growth, the use of a water repellent treatment can greatly reduce the likelihood of future biological growth. PROSOCO offers a wide variety of water repellent treatments to effectively protect your masonry. Sure Klean® Weather Seal penetrating water repellents provide an invisible, breathable shield against the water-related enemies of masonry.

The information and recommendations made are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible application of our products, nor anticipate every variation encountered in masonry surfaces, job conditions and methods used. The purchasers shall make their own tests to determine the suitability of such products for a particular purpose. Read and follow all instructions and warnings on Product Label, Product Data Sheet, and Safety Data Sheet.