AEN-14
PAINTING GREENHOUSES & EQUIPMENT
ISSUED: 6-74
J.N. Walker and G.A. Duncan

The primary reasons for painting a greenhouse are to improve its appearance and to protect the surfaces being painted. Although painting a greenhouse may not in itself improve the quality of the plants within the house, it is possible to show off plants more effectively if the surroundings are attractive. Few things look worse than an unpainted, weather-beaten greenhouse. In addition, the sash wooden bars of glass houses must generally be painted for best performance of glazing compounds. Unpainted bars will absorb the oil in glazing putties and this, in turn, may result in the putty coming loose. It is also generally accepted that painting greenhouse frames white is beneficial since greater reflection of light from the frames then occurs, increasing the light level within the plant growth area.

Painting Wood

Wood Types

Woods vary in their ability to hold paint. Low-density softwoods hold paint better, and the paint gives better service than on high-density softwoods. Edge-grained members are considerably easier to paint than are flat-grained. Woods having broad bands of summerwood are particularly troublesome. Special primers are in this case generally required for best paint performance. Although woods that will withstand severe moisture conditions without deterioration must be selected, the capability of lumber to be painted should also be considered (see Table 1). If treated wood is used, select a salt-type, water-borne preservative, since wood treated in this fashion is more easily painted and is less toxic to plant growth than wood treated with an oil-borne preservative. (Refer to publication AEN-6 of this series.)

Paint Types

In selecting a paint for a wooden framework or other wood in a greenhouse, a good white exterior house paint should be used. Since zinc dust is less tolerant to moisture than other pigments, zinc-free paint should be used. Certainly the primer should not contain zinc.

Table 1: Grouping of Softwoods for Exterior Painting.

Easiest to Paint
GROUP 1
Alaska-cedar
Atlantic white-cedar
Baldcypress
Incense-cedar
Northern white-cedar
Port-Orford-cedar
Redwood
Western red-cedar
Intermediate

GROUP 2
Eastern white pine
Sugar pine
Western white pine

GROUP 3
Commercial white fir
Eastern hemlock
Eastern spruce
Engelmann spruce
Sitka spruce
Western hemlock
Ponderosa pine

Most Difficult to Paint
GROUP 4
Douglas-fir
Red pine
Southern yellow pine
Tamarack
Western larch
Lodgepole pine

White lead is one of the most moisture-tolerant pigments, but it is not as durable as the titanium pigments. Lead paint will also discolor in industrial atmospheres where organic sulfide gases are present.

Most exterior paints fail by "chalking." This means that they weather away over a number of years with the thickness of the paint film becoming progressively less. As they "chalk," dirt and discolored pigments are carried away so that the paint is self-cleansing. With such paints, repainting is required when the paint film has become so thin that the wood surface begins to be exposed. If repainting is done at this time, only one coat is required. Problems with thick paint buildup and resulting scaling or flaking, which are common with trim or enamel-type paints, are not encountered with exterior paints that "chalk." While white lead chalks more rapidly than most other good exterior paints, it collects dirt more readily and will not stay white-looking as long as these other paints. Paint should preferably be applied by brush, since brush application provides the best service.

Breather Paints

Titanium-lead mixture paints are now available and are often referred to as "breather" paints. These paints are quite tolerant of moisture and therefore blistering is less of a problem with them. They cover well and are somewhat cleaner than the straight white lead paints. They are also more durable than straight white lead. They have the disadvantage of any paint that contains lead in that they will discolor if subjected to sulfide gases. Straight titanium paints are also available and are sold as blister and stain-

resistant paints. Other than not being discolored by sulfide gas, they perform similarly to the titanium-lead paints.

Latex water-base paints are also sold as "breather" paints. These paints will permit higher rates of moisture movement than any of the oil paints and therefore do not "blister" as readily. The main advantage of the water-base paints is ease of application, ease of cleanup, quick drying and low odor. They can also be applied in damp weather and on slightly damp surfaces. They should never be used over unprimed iron, since the moisture movement through the film will rust the iron and the rust will badly stain the paint.

Mildew-Resistant Paint

Since the moist, warm environment in greenhouses is favorable for mildew, a mildew-resistant paint which contains a fungicide is particularly desirable. These paints should largely eliminate the problem with staining due to biological growth on the paint surface. Paints sold specifically for painting greenhouses contain a mildew resistant agent.

Priming

The oil "breather-type" paints are sometimes used as self primers; however, most paints are used over a special primer which is always zinc-free. As a general recommendation, both the finish coat and primer should be made by the same manufacturer. On occasion, paints from different manufacturers will not be compatible and poor performance will be obtained if they are used together. A special primer is needed for flat-grained wood with wide summerwood bands and for wood with knots. Knot sealers, which minimize "bleeding," are available if only a limited area needs to be covered. Latex paints generally should not be used over one of the chalking oil-base type paints.

Number of Coats

The first time a structure is painted, three coats are normally recommended -- the prime coat and two finish coats. Thereafter, if paint is applied when the base wood is just beginning to show through, one coat is adequate. Painting either too frequently or too heavily can lead to poor paint performance as readily as delaying painting too long. If painting is done each time the coat is weathered to the point where it is just covering the wood, very little scraping, sanding or other surface preparation will be required.

Prevention of Water-Vapor Damage to Paint

In some houses the painting of the exterior walls, furnace enclosures, doors or other solid non-glazed areas can be particularly difficult due to vapor movement through the material in cold weather and the subsequent peeling of paint on the outside surface. The use of a blister-resistant paint will be helpful, but the moisture movement is often sufficiently great to result in the peeling of even the most tolerant paints. In these situations, a vapor barrier must be provided on the inside surface of the affected doors, enclosures or wall areas. For wood, plywood, or composition boards, two coats of an aluminum paint, preferably with a varnish vehicle, will provide a reasonably good vapor barrier. Masonry surfaces seldom are a problem. The outside surface of masonry, if

painted, should be permeable to vapor and a good masonry paint is generally satisfactory. If a vapor barrier is needed, it can be obtained by painting the inside surface with two coats of aluminum paint. If the inside surface is rough, it should be plastered prior to painting. After applying the two coats of aluminum paint, some other color paint can be used as finish paint, if desired.

Painting Metal Surfaces or Equipment

In almost all greenhouses some metal equipment, flashing or sheeting is used. Many structures are of steel construction. These materials often have a galvanized coating when new; however, these coatings eventually weather and rusting will occur. When rusting first begins, these metal surfaces should be painted. At this stage, maximum performance of the paint will be obtained. If painting is delayed until pitting has developed, paints will not perform as well and considerably more surface preparation will be required.

For galvanized surfaces, research at several experiment stations has shown that metallic zinc paints will give the best service. These paints have the added advantage in that they can be applied over rusted metal. The only surface preparation required is to remove the loose scale and any dirt or oil on the surface. With other metal paints, wire brushing to bright metal is recommended. Even when this is done, these paints will not normally provide the degree of protection given by the metallic zinc paints.

Of the types of metallic zinc paint available, the oil-base paint gives the best performance over rust and would be the best general metal paint. The one which has an alkyd-resin vehicle is the most heat resistant and is generally considered capable of taking temperatures to 300°F; it should therefore be best on heat ducts or pipe. The other metallic zinc paint has a phenolic resin vehicle, and it is reported that it will take the most severe moisture conditions. This paint should be the best selection on the inside of evaporative cooler distribution gutters, water tanks or water pipes.

For metal surfaces which have not been galvanized, the metallic zinc paints serve as good primers. The ability of this paint to hold on rusted surfaces without elaborate wire brushing makes it a highly desirable metal paint. Since the paint contains heavy zinc particles which settle to the bottom rather rapidly, proper mixing is important. Since zinc is toxic to some plants, metallic zinc paint should not be used where it will come in contact with plant parts unless it is known that no problem with toxicity will be encountered.

With almost all paints, the manufacturer mixes the ingredients in the proper proportions for direct application. In most cases, any addition of thinner or oil will do more damage than good. For maximum paint performance the manufacturer's recommendations should be closely followed. In most cases, the manufacturer has spent considerable effort testing the paint and developing it to its optimum potential. As a general rule, the performance of any paint is directly related to the price paid for it. In experiment station paint tests at several institutions, the "best buy" was the best quality paint the manufacturer made. The bargain paints were seldom, if ever, bargains. Not only do they give poor service, they often leave the surface in poor condition for later coats, and excessive scraping or sanding is required if maximum paint performance is to be obtained.