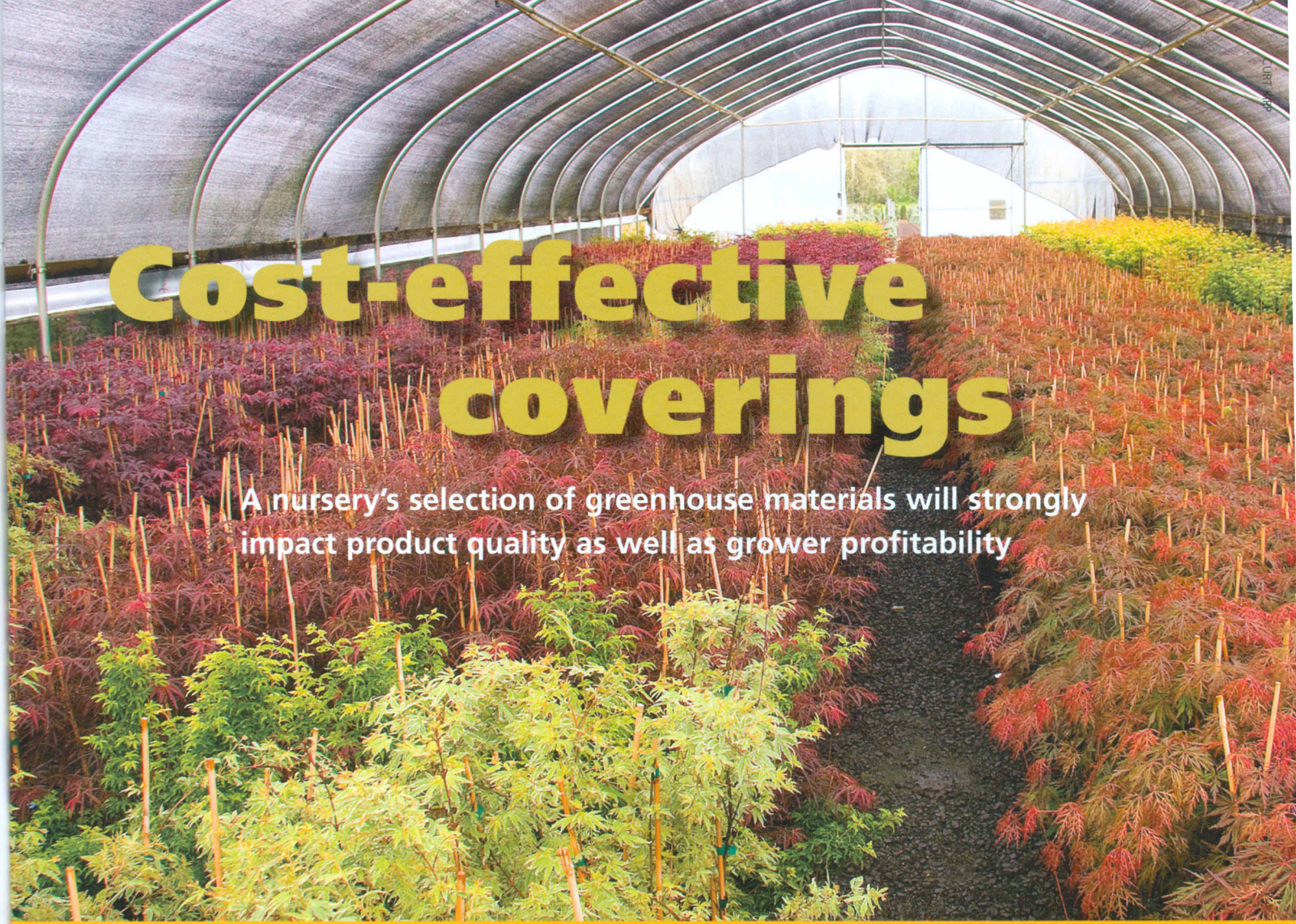


From Forest Nursery Notes, Summer 2011

69. Cost-effective coverings. McCoy, M. Digger 54(7):21-24. 2010.



Cost-effective coverings

A nursery's selection of greenhouse materials will strongly impact product quality as well as grower profitability



The Romans used greenhouse-like structures to grow vegetables during the off-season for Emperor Tiberius. Today's greenhouses are much more sophisticated but they perform the same basic function: creating a better growing environment for plants.

By Miles McCoy

One of the clearest images of the early Oregon nursery industry is one of glass greenhouses and "hot beds" built by Burkhardt Florists in southeast Portland in the late 1890s.

Imagine what that must have cost in those days. But even then, creating an artificial climate also created economic advantage.

This strategy of modifying the immediate climate with coverings may go back to the Roman times. Apparently, history notes that the Roman emperor Tiberius required a "cucumber-like" vegetable in his daily meal.

To produce it in the off-season, gardeners planted them in carts that could be moved inside, under cover, at night. The coverings were either oiled cloth ("specularia") or sheets of

selenite. So, the idea of a greenhouse is not new.

By the 13th century, Italians had built the first "modern" glass greenhouse to protect exotic plants brought back by explorers. The technology soon spread to the Netherlands and England, though these early houses required tremendous effort to close and winterize the structures. More practical designs followed as rich estates built houses known as "orangeries" (holding orange trees) or "pineries" (pineapple pits).

Finally, with more improvements in glass and construction techniques, huge greenhouses such as the one at the Palace of Versailles in France became more common.

Glass remained the main greenhouse covering until the 1960s, when wider sheets of polyethylene film ("poly") became readily available. Hoop

GK MACHINE, INC

COMBINING TECHNOLOGY AND TRADITION SINCE 1976



TH1 Sprayer



Pot-in-Pot Planter



H7 Tree Digger

FIND OUT HOW WE'RE REVOLUTIONIZING THE INDUSTRY
WWW.GKMACHINE.COM

PORTLAND AREA: (503) 678-5525 OR CALL TOLL-FREE: (877) 678-5525
10590 DONALD RD • DONALD, OR 97020 • ONLINE AT: WWW.GKMACHINE.COM

▲ COST-EFFECTIVE COVERINGS

houses became more common, constructed commercially or built by the growers themselves. These houses — made from aluminum, galvanized steel tubing, steel or just PVC water pipe — cost much less, and their uses expanded.

In the 1970s, the industry developed more effective ultraviolet light (UV) inhibitors, greatly increasing polyethylene film's durability.

Since then, these UV inhibitors extended a film's usable life to four or more years. Today, most growers use some form of greenhouse or hoop house in production.

Finding the best coverings

Obviously, greenhouse-covering materials can significantly influence its productivity and performance. They both impact the level and quality of light reaching the crop, and the air temperature, based on its insulative value, or heat holding capacity.

Light interacts with temperature to affect plant quality. For instance, a plant can grow rapidly at high temperatures, but if light is low, the stems will be weak. Growers, therefore, must perform a balancing act between cost, greenhouse design and crop value, to determine the best covering for their crop.

Coverings are one of the most intensively researched areas in greenhouse technology, and the majority of improvements in coverings were made more than a decade ago. Improvements included reducing light to some extent, since researchers learned that diffused light is generally better than direct light, so the lower level was not detrimental.

Meanwhile, they also discovered that fluorescent and pigmented films increase the proportion of good red light helping plant growth, repelled insects with UV waves, and reflect long wave infrared (IR) radiation to improve heat retention at night.

Chris Guntermann, the territorial sales manager for Horticultural Services Inc. in Oregon and southwest Washington, noted that there are gen-



MJSS/MCCOY

Polyethylene film (shown here) is the most common greenhouse covering in use today. Other common coverings include corrugated polycarbonate, and polycarbonate structured sheets (PCSS).

erally only small differences between the products. “Manufacturers may claim big differences, and perhaps there are a few recent ones of note,” he said, “but I am a skeptic on the efficacy of some of them.”

In addition to poly, other common coverings include corrugated polycarbonate and polycarbonate structured sheets (PCSS).

Controlling heat and heat loss

According to Guntermann, the double poly option is very efficient at controlling heat loss. “Heat loss is a function of exposed surface area, and thermal insulation provide by the covering,” he said.

In most cases, the less heat loss, the better the growing success.

The light value is stated as “U” value, or the “coefficient of heat transmission.” It measures a material’s ability to conduct heat. It measures the number of British thermal units (Btu) that flow through one square foot of material in one hour. The lower the number, the greater the heat transfer resistance (insulating) characteristics of the material.

Glass has a U-value of 1.00, he said. Meanwhile, double poly has a U-value of .70, while the infrared poly would be slightly higher. Corrugated polycarbonate, with the highest exposed surface area, lets in more light, but has a lower insulation capacity at U 1.2.

If heat loss is the main concern, growers may look at using double polycarbonate with a U of .58 or triple polycarbonate at about .50, according

to Erin Kelly of Green-Tek, based in Janesville, Wisc.

“So you can see that triple polycarbonate at .50 versus corrugated at 1.2 is a huge savings of energy,” Gunterman said. “However, if it is not a heavy heated crop, then the light lost with the triple would not offset the heat.”

“But, another advantage to polycarbonate products is their longer durability,” Kelly said. “Many of these products will last up to ten years.”

She said that while polycarbonate initially is more expensive, there are fewer replacements and labor costs. So, the company can claim a return on investment of three to four years. “Higher end growers with high-value crops often use this option,” she said.

The key considerations in selecting a covering material include cost, durability (how long it lasts), weight, ease of repair or replacement, how much light is transmitted through the material, and how much energy moves through the material. When all these factors are weighed, for most crops, the most common greenhouse covering is poly, according to Kelly.

Guntermann agreed. “By far it is poly with all those variations of colors, types, (and) length of service,” he said. “The main advantage to poly is cost.”

In addition, poly gives good insulation and is very strong. “It is also easy to apply,” Guntermann added. “And when it is changed, you get a new clean roof.”

Yet, there are some disadvantages.

PHYTOPLUS BRAND

BAICOR, L.C.

Enhance your plants health
and productivity by using
**BAICOR's Organic and
Amino Acid Based Fertilizers.**

Logan Utah
435.752.2475
www.baicor.com



This greenhouse at Kraemer's Nursery in Mt. Angel, Ore. had these *Rhododendron azalea* 'Hino Crimson' and *Physocarpus* 'Dart's Gold' looking their best for spring shipment in late March. For more on 'Dart's Gold', see the article on drought-tolerant plants starting on Page 26 of this issue.

First, it can tear, or be punctured if not taken care of, Guntermann said. And if it is improperly installed, it can swell into a big "balloon," reducing insulative capacity and exposing it to wind damage.

"This means it requires constant electricity to maintain the air inflation," he said. "The uninflated poly can trap snow and puddles and bring down the house."

Coverings adjusted to crops

The type of crop can be a factor in determining which covering is best used, as growers try to balance capturing heat with allowing maximum light. As Kelly mentioned, crops with higher values or higher capital costs may use a hard cover to reduce the risk.

Kelly noted that high-light crops do best with corrugated polycarbonate even though it is not heat efficient. Growers focus more on getting the extra light.

"These growers will often add a heat curtain at night," said Guntermann.

Conversely, high heat crops may benefit from triple layer hard covers since they are more energy efficient than even poly.

In a few cases, the structures do not lend themselves to poly, he said.

Finally, with a few crops, some coverings can be degraded by required pesticide and herbicide sprays, accord-

ing to Dave Young of Berry Plastic in Citrus Heights, Calif.

"For example, we don't recommend using polyethylene with roses, since the sulfur spray for *Botrytis* reacts with the plastic," he said. "Even herbicides sprayed on the greenhouse perimeters can cause serious damage."

A few new developments

Despite the success of the current products, work continues to improve greenhouse coverings.

Kelly pointed to Green-Tek's DynaGlas® SolarSoft™ 8mm polycarbonate covering, which has a different pigmentation that creates better diffusion with light in the PAR (Photosynthetically Active Radiation) range of the spectrum that plants rely on for growth. The diffusion causes fewer shadows cast by structural members and prevents burning of plants that might come with concentrated light. It also reduces condensation and offers 100 percent UV protection, she said.

Meanwhile, Temp-Cool™ is a new double layer product from Berry Plastics. Young said the bottom poly layer reflects infrared waves, helping keep the greenhouse cooler. "This can be an advantage in warmer climates," he said. "But, in cloudier regions, like Oregon, this would not be the best choice."

Words of warning

It's important to replace coverings according to manufacturer recommendations.

"Everyone is tempted to not replace at recommended time spans and then the poly can fail catastrophically," Guntermann said.

It's easy to avoid changing coverings, he said, because it is hard work requiring good weather and lots of people. Further, there are few contractors that can do it reasonably cost effectively and on time.

Guntermann also cautioned growers about new, out-of-industry sellers who see the nursery industry as a way to solve their slow sales. To avoid a bad experience, some questions growers might ask include:

- **Does the manufacturer change distributors often?**
- **Do they have stateside warehouses capable of rapid product replacement should a shipment be lost or damaged?**
- **What kind of warranty is included? Where would you have to go to file a claim?** Getting claims settled in China, to name one example, can be difficult.

• **What is the company's track record?** If they are a manufacturer's representative doing business on the Internet, with an office park address somewhere, rather than a reputable entity, then it might be best to avoid them.

"The energy crisis in the nursery industry, coupled with the corresponding economic recession, creates this situation," Guntermann said. "They come in, like carpetbaggers, and leave when the consistently low margins are replaced by higher margins in architectural markets elsewhere." ☺

Miles McCoy is the owner of Sustainable Hort LLC, a sustainable and organic products marketing firm. He has 25-plus years of green industry experience in marketing, communications and research. He can be reached at miles@hevanet.com.

Contents

DIGGER

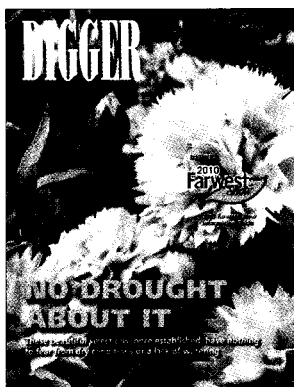
July 2010
Vol. 54 No. 7

COLUMNS

- 7 President's Message
- 17 Pivot Points
- 19 Leader Profile
- 41 Growing Knowledge

DEPARTMENTS

- 9 Calendar
- 10 Northwest News
- 36 Classifieds
- 39 Subscription Info
- 39 Advertisers Index
- 43,45 Digger Marketplace



Cover: Conservation-minded homeowners — or those with tight budgets — are demanding garden plants that perform well in dry conditions. Growers and breeders are responding with selections that don't compromise on beauty, such as *Dianthus* 'Candy Floss', part of the Scent First line, which was bred in England. Photo courtesy of Skagit Gardens.

This page: Which greenhouse covering is best for your situation? Explore the options — and take a trip down history lane — in our article on greenhouse coverings, starting on Page 21. Photo by Miles McCoy.



Printed in Oregon on domestic recycled paper when available.



21

COST-EFFECTIVE COVERINGS

A nursery's choice of greenhouse materials has an impact on plant quality as well as the grower's bottom line

17

AS YOU 'LIKE' IT

It may be just a link on a web page, but Facebook's 'Like' button has the potential to revolutionize your word-of-mouth marketing.

18

SEEKING NEW OPPORTUNITIES

Sunset Chapter President Clayton Moore Jr. finds inspiration in his interaction with the nursery industry and its people.

27

BEYOND THE SHADOW OF A DROUGHT

These beautiful selections, once established, have nothing to fear from dry conditions or a lack of watering.

41

WHEN MITES MAKE RIGHT

Predatory mites allow growers to control some pest problems in the nursery while reducing chemical exposure.

Special Supplement

AFTER
P. 24

2010 FARWEST SHOW INFORMATION GUIDE

Everything you need to know to make the most of your visit to the Farwest Show, Aug. 26–28 in Portland, Ore.

