

Herbaceous Perennials: *Pachysandra terminalis*

Part nine of our 13-part series on herbaceous perennials takes a look at the ground cover *Pachysandra terminalis*.

by **GENHUA NIU, ERIK RUNKLE, ROYAL HEINS, ART CAMERON, and WILL CARLSON**

MANY gardeners appreciate ground covers as practical alternatives to turf grass. Used under trees and shrubs, ground covers eliminate the tedious necessity of mowing and trimming grass around and under these plants. Trees and shrubs can also benefit from shallow-rooted ground covers that break up the soil and help increase porosity and organic content.

In this article, we intend to share our research experiences with one of the popular ground covers –

Pachysandra terminalis.

Pachysandra is a widely cultivated ground cover in today's landscape. Commonly known as Japanese spurge or Japanese pachysandra, *P. terminalis* is an evergreen, semi-woody subshrub that reaches six to 12 inches tall and spreads indefinitely by underground stems. It is native to Japan and is hardy in USDA zones 4 to 8. The shiny, dark, evergreen leaves are grouped in whorls at the ends of stems. In the landscape, pachysandra can be used on a moderate to large scale under trees, around shrubs, near walkways, and around building foundations (Figure 1).

While the plants are grown mainly for their foliage, the male flowers are pleasantly fragrant and spike-like, giving rise to the generic name pachysandra, which comes from the Greek pachys (thick) and andros (masculine) in reference to the thick stamens. The second part of the Latin name, terminalis, implies that the flowers are borne terminally (at the ends of the stems).

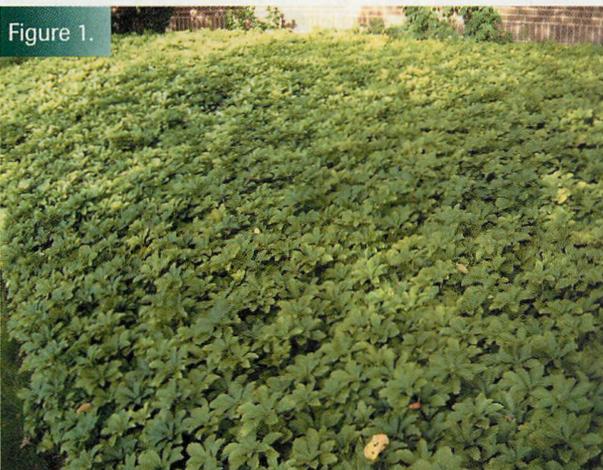


Figure 1. *Pachysandra terminalis* makes an attractive ground cover in the landscape.

Schedule

Michigan State University researchers' 13-part series on herbaceous perennials covers topics from light to plant growth regulators to various species.

January: Light

February: Series Did Not Run

March: Noteworthy Plants

April: Propagation

May: Series Did Not Run

June: *Heuchera*

July: Plant Growth Regulators

August: *Phlox subulata*

September: *Scabiosa*

October: Ground Cover I

November: Ground Cover II

December: Fast-cropping

January 2002: *Hemerocallis*

February 2002: Postharvest

March 2002: *Tiarella/Heucherella*

In our research at Michigan State University, we have studied the response of pachysandra to photoperiod, cold treatment, and growing temperature. The following results are related to rapid production and propagation for pachysandra.

1. Stock Plant Management

Many growers obtain vegetative cuttings from outdoor beds during the

11, I was watching the TV while talking to a grower here in South Florida. I remember from being there that the elevators and stairs were in the middle of the towers. When I hung up, I told my wife that the people who were on the upper floors above where the planes struck just never had a prayer of getting out alive."



*Joe Cialone
Tropical Ornamentals, FL*

"At the company, we immediately set up a television in our cafeteria and many employees went there to view the happenings. I stayed at my desk. I had one voice mail from my son who needed to contact me and so I returned his call. I got his voice mail and, as I was answering his message, I couldn't speak - I was choked up. I guess hearing the voice of my son made all my feelings real...it made me aware that thousands of parents around the United States would be going through the horrible reality of dealing with the grief of losing a child because of these wretched people."



*Ben Walraven
PanAmerican Seed Co., IL*

"With disbelief, sorrow, shock, anger, prayer, praise, and resolve. The attack has galvanized us as a nation to protect what we and those before us have built. It has dissolved our differences, rekindled our deep patriotism, and has reunited us with an outpouring of help and support to our citizenry."



*Dennis Kirven
Ohio Florists' Association, OH*

"As the day my world changed. All the troubles in the world were brought home to the United States of America, when they had been somewhere 'over there' all my life. I felt, and still feel, that our way of life was being threatened, and I'm determined to not let that happen, especially for my kids. I am prouder than ever to be American, and I want to do whatever I can to eradicate this threat from the world. At the same time, I am concerned about the rising tide of prejudice against the Middle Eastern cultures."



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*Joel Goldsmith
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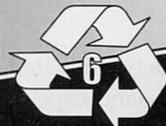
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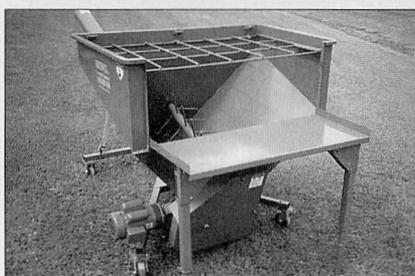
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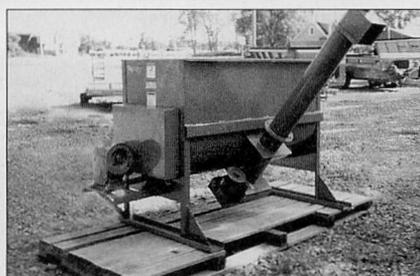
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Figure 2.

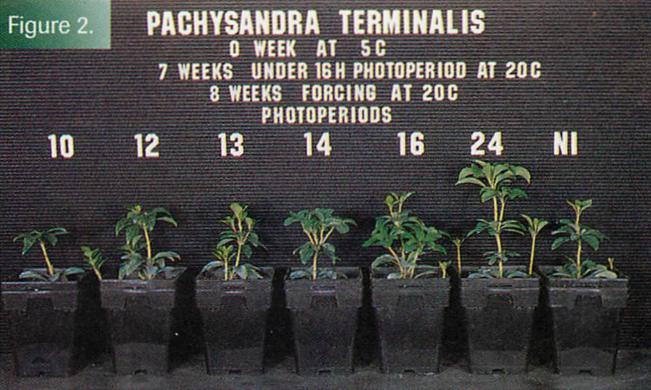


Figure 2. Rooted pachysandra cuttings (one cutting per pot) were grown under 16-hour photoperiods for seven weeks before they were grown under various photoperiods. Plants grow slowly under photoperiods less than 14 hours, and those grown under 10-hour photoperiods were essentially dormant.

summer. These cuttings are removed from plants that have overwintered and developed new shoots under the increasingly long and warm days of spring and summer. The advantage of taking these cuttings is that they are relatively cheap to obtain. The disadvantage is that cuttings are propagated during the summer for a crop that will not be sold for perhaps 10 or 11 months.

One alternative is to produce cuttings from stock plants that allow propagation to occur closer to the selling date. To produce cuttings at any time of year, stock plants should first be given a six-week cold treatment at 41°F (5°C), then grown under a photoperiod of 14 hours or longer at approximately 65°F to 70°F (18°C to 21°C). At these growing temperatures, cuttings can be taken from stock plants

Formula For Success: *Pachysandra terminalis*

1. Obtain freshly matured shoot-tip cuttings from stock plants in a stock bed or from stock plants.
2. To produce fresh cuttings from stock plants, first cold treat plants for six weeks.
3. Grow stock plants under photoperiods of 14 hours or greater.
4. Bulk rooted cuttings under photoperiods of 14 hours or greater.
5. Grow plants at warm temperatures (68°F to 75°F).
6. Pinch cuttings to promote development of multiple lateral shoots.

approximately every seven to eight weeks.

Our experience is that cuttings from the first flush will be largest, and cuttings from subsequent flushes become smaller to the point where stock plants should be rejuvenated following the third

flush. We have limited experience in rejuvenation techniques but believe plants should be grown for six to eight weeks under natural photoperiods for bulking and recovery prior to another six-week cold treatment.

2. Propagation

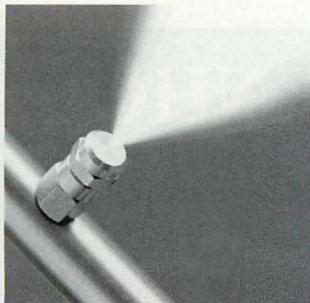
Pachysandra can be propagated by division or cuttings. Cuttings are relatively slow to root, often taking four to five weeks to root sufficiently enough to be removed from propagation, even under ideal propagation conditions (e.g., media temperatures of 77°F [25°C]). Under cooler media temperatures, cuttings can take much longer to root.

Although stock plants should be grown under long photoperiods (≥14 hours), cuttings can be rooted under any photoperiod. Four weeks after cuttings were stuck, we observed no difference in rooting (length or number) when propagated under photoperiods ranging from 11 to 15 hours.

In a separate experiment, rooting was not influenced by cutting age or size. Dipping the base of unrooted cuttings into a 2,000 ppm IBA solution promoted rooting, but IBA at 10,000 ppm reduced rooting percentage. Therefore, we recommend taking cuttings from plants grown under long days, quick-dipping the base of stems into a 2,000 ppm solution of IBA, then rooting cuttings in a mist or fog house for approximately five weeks. Follow all other standard vegetative propagation protocols.

3. Cold Treatment And Photoperiod

We obtained plants in mid-September and grew them under vari-



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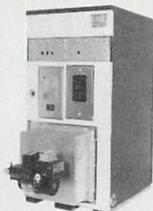
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ous photoperiods either without, or following, a 10-week cold treatment at 41°F (5°C). Without cold, plants grew slowly under photoperiods less than 14 hours, and plants under the 10-hour photoperiod were essentially dormant (Figure 2).

New shoots emerged and developed from plants grown under photoperiods of 14 hours or longer. Under continual light (24-hour photoperiods), new shoots developed predominately from terminal buds. In contrast, new shoots developed from lateral buds or from underground runners when plants were grown under other photoperiods.

Following 10 weeks of cold treatment, new shoots developed vigorously from terminal buds, regardless

of photoperiod. Time for shoots to elongate was not influenced by photoperiod (Figure 3).

When we removed these newly flushed cuttings for propagation, plants produced multiple lateral shoots, irrespective of photoperiod. Growth of these new lateral shoots was more rapid, and the newly formed shoots were longer when plants were grown under long photoperiods (≥14 hours). Lateral shoots that developed from plants under photoperiods of 13 hours or less were short (one to 1.4 inches) and development was slow.

Therefore, our experiments indicate that vegetative development of pachysandra is promoted by long days, and under short daylengths, plants can become dormant. Plant dormancy can be overcome by exposing plants to cold temperatures for at least six weeks.

4. Temperature

Pachysandra growth is more rapid as temperature increases (Figure 4). But leaves became chlorotic when plants were grown under temperatures greater than 80°F. For rapid growth of pachysandra, we suggest growing plants at temperatures from 68°F to 75°F (20°C to 24°C). **GG**

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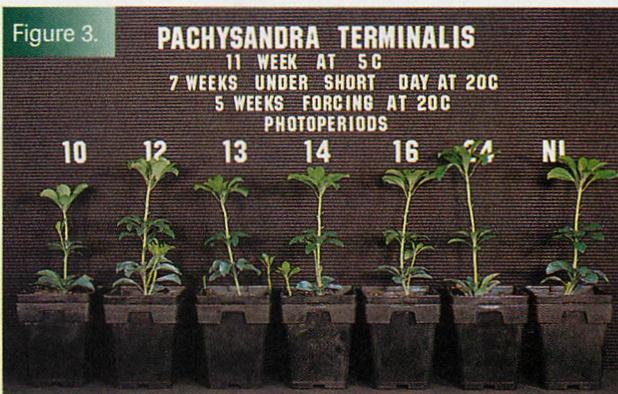


Figure 3. Single rooted pachysandra cuttings were grown under nine-hour (short day) photoperiods for seven weeks before being cold-treated for 11 weeks at 41°F (5°C). After cooling, plants developed new shoots from terminal buds under all photoperiods.

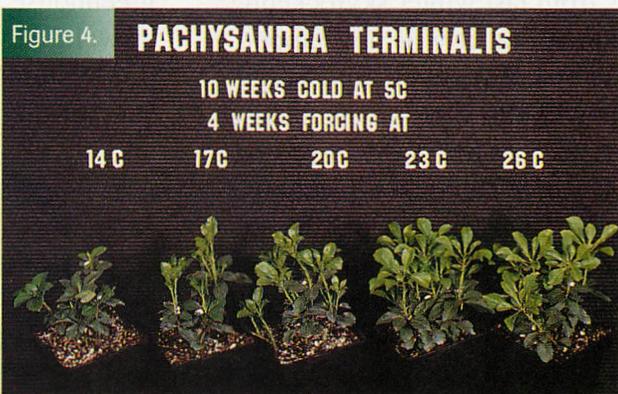


Figure 4. Plant development is more rapid as forcing temperature increases. For rapid growth of pachysandra, we suggest growing plants at temperatures from 68°F to 75°F (20°C to 24°C).