

PINE MANAGEMENT THEORY

PART 4



By
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Replacement Shoots

After decandling, new buds are quickly produced at decandling sites as well as on interior adventitious sites. Replacement shoots then emerge rapidly. They do not emerge as a white candle, but rather appear green and progress quickly to the porcupine phase. The faster replacement shoots appear and the greater the number of replacement shoots per decandling site, the stronger the health of the branch and tree.

Longer replacement shoots are more vigorous than shorter replacement shoots and will produce longer and coarser growth in the future. The largest replacement shoots and the greatest number of replacement shoots will appear from sites that previously had the strongest candles. Up to seven replacement shoots are

produced at the strongest candle sites in the strongest zones of a Japanese black pine. The earlier decandling occurs, the more vigorous will be the replacement shoots. Earlier decandling allows more time for the replacement shoots to grow resulting in more vigorous shoots with longer internodes, longer needles and larger buds.

Pitch

When candles are removed, in late spring, pitch will ooze at the decandling sites. The faster the appearance of pitch, the greater the amount of pitch, the stickier the pitch and the more intense the smell and taste of the pitch, the more vigorous is the branch and tree. In spring while the sap is rising in the tree, the pitch should appear within a few seconds and not later than thirty seconds.

During autumn and winter, after branch removal, sap will be slower to appear. Remember that five needle pine varieties have a tendency to ooze or bleed pitch over a prolonged period. This can greatly weaken the branch and the tree. For this reason,

when a large branch is removed from a five needle pine, a stub is left and wound sealant is used to reduce pitch loss. This stub may be left on the tree for a year or longer after the branch is removed. Waiting until autumn or winter to remove large branches also reduces sap loss.

Needles

Healthy pine needles should be straight, erect, dark green, free of deformations and twists, hard, waxy, glossy, tightly attached within the fascicle, thick and sharp. Needle clusters should be closely spaced. Longer and thicker needles are found on the more vigorous portions of the tree. Ideal needle morphology is degraded by summer fertilization and overwatering.

Pine needles should be cool to touch even on hot, dry and sunny days. Healthy needles constantly transpire water and the resulting evaporation keeps the needles noticeably cooler than the ambient temperature. If the needles are warm it indicates a weak branch or tree that is not transpiring well. This is

FIG. 10

SIGNS OF VIGOR IN A PINE REPLACEMENT SHOOTS

HIGH VIGOR	LOW VIGOR
Large number of replacement shoots	Small number of replacement shoots
Long replacement shoots	Short replacement shoots
Thick diameter replacement shoots	Thin diameter replacement shoots
Straight replacement shoots	Crooked replacement shoots
Vertical replacement shoots	Diagonal replacement shoots
Firm replacement shoots	Soft replacement shoots
Presence of non-nodal shoots	Absence of non-nodal shoots
Green replacement shoots	Soft yellow-green replacement shoots
Early reappearance of shoots	Late reappearance of shoots

FIG. 11

SIGNS OF VIGOR IN A PINE PITCH

HIGH VIGOR	LOW VIGOR
Rapid appearance of pitch	Slow appearance of pitch
Intense resin smell	Weak resin smell
Very sticky pitch	Less sticky pitch

Note: The appearance of pitch after wounding will vary greatly by season. Pitch will appear within five seconds after cutting a vigorous pine in spring. The same tree may take thirty seconds or more to produce pitch in winter.

Japanese five-needle pine, Pinus parviflora, trained in the slanting style This bonsai was exhibited at the 2000 Grandview Bonsai Exhibition in Kyoto, Japan.



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frequently due to a weak root system or root rot. If warm needles are an isolated event the tree may simply need to be watered, but if it is chronic, a root problem should be suspected. Likewise, any tree whose soil is slow to dry is either weak or suffering from a root problem. The faster the soil dries, the more physiologically active and vigorous the tree.

In autumn the oldest needles, from three to five years old, will turn yellow. These yellow needles are shed over the course of the autumn and winter. The earlier in the year

this yellowing and shedding occurs the weaker the branch and tree. Each species and individual tree is programmed to hold needles for varying periods, but dropping needles less than three years of age is a sign of stress. The later in the fall retained needles turn from deeper summer color to paler winter color, the stronger the tree or the milder the fall.

Likewise in spring, the earlier the tree takes on its deeper summer color the healthier the tree. Black pine needles should be a deep green in summer. Japanese white pine needles are a glaucous blue-green with a white vertical stripe. Japanese red pine needles and pitch pine needles are a medium green in summer. Scots pine needles vary by strain. Mugo pine needles are a deep green.

Ponderosa pine needles have a decidedly grayish cast, and appear more gray than green in winter.

Putting The Signs Of Vigor Together

An experienced grower can read signs of health and assess the overall vigor of a tree quickly. Rapidly available information includes: when the tree was collected or last repotted, the age of the tree, sun exposure, frequency of watering, adequacy of fertilization, recent insults and all-around care of the pine. Veteran growers can rapidly distinguish those individual pines most suitable for bonsai culture. Desirable characteristics include: good vigor, short and straight needles, deep green color and short internodes.

FIG. 12
SIGNS OF VIGOR IN A PINE
NEEDLES

HIGH VIGOR	LOW VIGOR
Many needles	Few needles
Absence of tip burn	Tip burn present
Firm needles	Soft needles
Early return of summer color	Late return of summer color
Late appearance of winter color	Early appearance of winter color
Only third year needles shed	Needles less than three years of age shed
Late yellowing of senile needles	Early appearance of needles yellowing
Few needles shed	Many needles shed
Long needles	Short needles
Waxy, glossy and shiny needles	Dull, lackluster needles
Absence of diseased or distorted needles	Presence of diseased and distorted needles
Needles tightly attached in fascicles	Needles weakly attached in fascicles
Sharp needles	Blunt needles
Needles held upright	Needles drooping
Needles cool to touch	Needles warm to touch
Needle clusters tightly spaced	Needle clusters loosely spaced
Thick needles	Thin needles
Straight needles	Twisted needles
Deep green needle color	Light green or yellow green needle color

Japanese black pine, Pinus thunbergi, trained in literati style from a collected specimen. This bonsai was exhibited at the 200 Grandview Bonsai Exhibition in Kyoto, Japan.



FIG. 13
SIGNS OF VIGOR IN A PINE
BRANCHES

HIGH VIGOR	LOW VIGOR
Upward orientation of branches	Horizontal or downward angled branches
Marked upward curving or cupping of branch tips	Flattened or drooping branch tips
Thick branches	Thin branches
Rapid branch thickening	Slow branch thickening
Rapid branch lengthening	Slow branch lengthening
Retention of low and interior branches (absence of dieback)	Yellowing or dieback of lower and interior branches (presence of dieback)
Absence of borer shothole wounds	Borer wounds (sawdust & sap ooze)
Large amount of foliage on the branch	Small amount of foliage on the branch
Large number and size of buds or candles	Small number and size of buds and candles
Large sized dominant terminal bud	Small sized dominant terminal bud
Large size terminal bud cluster	Small sized dominant terminal bud cluster
Many secondary buds on terminal bud cluster	Few secondary buds on terminal bud cluster
Late yellowing of needles	Early yellowing of needles
Minimal needle shedding	Heavy needle shedding
Cool foliage	Warm foliage



Vigor Assessment Is A Cornerstone Of Bonsai

Knowing the vigor level of a pine and recognizing whether the strength of the tree is improving or declining is paramount to guiding the selection of technique. Many times the most appropriate technique is allowing the tree to grow undisturbed and thus increase its strength. As opposed to an insult which is anything that decreases the vigor of the tree, recovery is anything that increases the vigor of the tree. Recovery involves improving the growing conditions of the plant, allowing it to increase photosynthetic capacity, stored energy or defensive chemical production. Insults are used to remove plant growth or stored plant energy in an effort to promote finer growth. In contrast to insults, recovery periods improve vigor, but at the risk of coarsening branches, thickening trunks, lengthening internodes and increasing foliage size.

All this said, the best way to become one of the aforementioned experienced pine growers is not by reading this or any article. To understand pines; all that is required is to grow and carefully observe pines. However, the most rapid progress will be made by those students who combine attentive daily care of their own pines with reading and instruction from experienced growers.



Japanese five-needle pine, Pinus parviflora, trained in the formal upright style. This bonsai was exhibited in the 2001 National Bonsai Exhibition in Tokyo, Japan.

ABOUT THE AUTHOR

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Greg Cloyd is a serious bonsai hobbyist who has studied pines for many years. He has organized an advance bonsai study group and invited many of the top pine specialists from the country for discussions and educational programs. The search for authoritative information on pine has recently led him to Japan where he visited many of the top growers.

Dr. Cloyd is a physician and member of the Cleveland Bonsai Club. He is also interested in native collected trees. He freely shares the results of his research and study by presenting programs and writing articles for publications. He maintains an impressive bonsai collection in Hudson, Ohio.