GROWING PALMS

Horticultural and practical advice for the enthusiast

Edited by Randal J. Moore

Contents

Boron Deficiency, Phenoxy Herbicides, Stem Bending and Branching in Palms – Is There a Connection?

It was with great interest that I read the short horticultural articles in the Growing Palms section of recent issues of PALMS by Don Hodel, Dave Romney, Mike Marika and Randy Moore on the subject of palm stem bending and abnormal branching. My article on "Boron (B) Deficiency Symptoms in Palms" (PALMS 15: 115–125) was submitted when this discussion began. I was wishing I had had the opportunity to discuss the possible relationships between boron deficiency and these two disorders.

Dave Romney's experiences with phenoxy herbicides (2,4-D and related compounds) on coconut palms point out the effects of excess auxins (phenoxy herbicides are potent synthetic auxins) on palm growth and appearance (PALMS 15: 57–58). When we first observed symptoms of epinasty (leaf twisting) on palms in the early 1980s in Florida, we attributed these symptoms to phenoxy herbicide injury, yet we had no evidence that such products had ever been used on or near these isolated palms. Our first clue that B deficiency might be a cause of stem bending came from our sand culture studies with *Dracaena marginata*. Boron-deficient *D. marginata* invariably began to grow sideways. Eventually the apical meristem died, and a proliferation of subapical shoots followed.

Although we had often observed branched palms, we were never able to determine the cause of this malformation. Recently, however, we observed two *Syagrus romanzoffiana* at the University of Florida's Fort Lauderdale Research and Education Center that were exhibiting multiple symptoms of B deficiency (Fig. 1). Each palm had two actively growing shoots, one of which grew laterally and downward and the other more or less upward. The branching occurred at the same time that the other B deficiency symptoms such as epinasty, little leaf, crumpled leaf, and puckered leaf were first observed. The palm shown in Fig. 1 was treated with a soil drench of Solubor (4 oz in 5 gal of water) six months before this photo was taken, and it is now producing normal new leaves. However, the side shoot continues to grow downward even though the new leaves are fairly normal in appearance.

Stem bending and other epinastic growth responses are considered tropic responses and are well-known to be regulated by auxins in plants. Thus, while the proximate cause of the stem bending

we see in palms is undoubtedly excess auxin, the ultimate causes may be multiple. Boron-deficient plants, including palms, are known to contain elevated levels of auxin in their leaf tissue (Exp. Agric. 8: 339–346), and exposure to potent synthetic auxins such as phenoxy herbicides would obviously result in elevated auxin levels within the plant. Still, there may be other, as yet unidentified, biotic and abiotic factors that also promote the production of auxin within palms that may result in similar symptoms being expressed. One means of determining if stem bending is caused by B deficiency vs. phenoxy herbicides is to observe the distribution of affected plants. If a herbicide is involved, it will likely also affect other nearby plants or plant species, while B deficiency, like most micronutrient deficiencies, occurs almost randomly among plants in a given area and will typically affect only one species of plant.

1. *Syagrus romanzoffiana* exhibiting branching, little leaf, crumpled leaf, epinasty,and other symptoms of boron deficiency.

The idea that stem bending in palms is caused by B deficiency has met with some skepticism among horticulturists. If B deficiency is the problem, why do soil tests in California often show adequate amounts of B, and why have applications of soluble B fertilizers not consistently corrected the problem? First, plant uptake of B is known to be poorly correlated with soil B concentrations. Also, B becomes tightly bound to mineral soils as they dry out, and this drying process affects applied B fertilizers as well as native soil B (Plant Soil 193: 35–48). High soil pH also contributes to soil binding of B. On the other hand, in areas with higher rainfall, leaching of B out of the root zone is the primary cause of B deficiency, and this leaching also affects applied B fertilizers. Thus, B fertilization of palms is at best an imperfect science and, for the reasons just mentioned, is likely to remain that way.

As for palm branching, the multi-branched *Phoenix roebelenii* illustrated by Marika and Moore (PALMS 15: 58–62) does not show any characteristic B deficiency symptoms in the photo to implicate this cause, but their description of "leaf distortion and whorled pinnae" are characteristics of B deficiency. The necrotic leaf tips of the *Livistona chinensis* they illustrated in Fig. 5 is very typical of B deficiency in palmate-leaved palms (PALMS 15: 115–125), and the tight branching is characteristic of B deficiency in other plants such as *D. marginata*. Finally, the three-stemmed *Hyophorbe lagenicaulis* illustrated in their Fig. 6 displays traces of epinasty and little leaf (the oldest leaf on the far left shoot appears abnormally compressed). Since B deficiency is often transient and recurring, the deficiency that caused the branching, at least in these *Phoenix* and *Hyophorbe* examples, may no longer be as severe. Thus, normal foliage may eventually emerge from each of the shoots on some branched palms. Clearly, the B deficiency experienced by the *Livistona* is a chronic one.

Death of the apical meristem, followed by a proliferation of subapical shoots is a common symptom of B deficiency in other plants. However, there does not appear to be any documented

link between excess auxin and branching in plants, so the relationship between B deficiency and branching may be a more direct one. Although there is evidence that B deficiency can cause branching in palms, this does not rule out alternative causes. Bud injury, caused by frost, chemicals, diseases, insects or mechanical damage, may also be responsible for some of the branching observed in palms. – *Timothy Broschat, University of Florida, Ft. Lauderdale Research & Education Center, Ft. Lauderdale, Florida, USA*

Product Review: New Pole Saw for Palms

Along with a shovel, the most important piece of garden equipment in the palm garden is probably a pole saw. However, most pole saws are poorly designed and not up to the rigors of heavy use, especially during the growing season. A new pole saw from ARS now makes it much easier to prune palm leaves and inflorescences on tall palms.

The ARS pole saw allows for the longest reach of any arborist saw available (Fig. 1). Most pole saws do not go beyond 14 or 16 feet. The longer reach eliminates climbing taller palms. The gardener can stay on the ground, and this is faster, less costly and safer than tree climbing or ladders. Although the entire rig of telescoping poles and saw head will cost about US$200, the cost is quickly recouped over the cost of alternative methods of pruning tall palms.

1. The long reach of the new ARS pole saw allows pruning of tall palms while staying on the ground.

Three lengths of telescoping poles are available: a 10′9″, a 16′ and a 20′. The 20 ft. (6.1 m) model telescopes in three sections to an extended length of 20 ft. to the tip of the saw blade. Adding a person's height gives a total reach of about 25 ft. (7.6 m) allowing for some angle of cutting. The collapsed length of this model is 9 ft. (2.7 m) to the saw tip.

The telescoping and locking mechanism on this pole pruner is also ingenious. It is far superior to the collar threaded locking rings on

2. The saw head and mount cuts on the back-stroke and has sawdust-removing gullets.

most pole pruners. Collar locking rings have a tendency to slip and also the thread can bind. The end section of the new pole saw extends to a fixed length only and is held by two retractable spring bolts. The middle section uses a clever gearing mechanism and locking clamp (Fig. 3) so that it can be extended quickly to any desired length and locked into place.

The pole is constructed of light-weight durable aluminum. The light weight is critical since the pole telescopes to 20 feet. Use of a heavier material would make impossible to handle at this great length. However, the sturdiness is not compromised because of its unique design and construction. The pole is not round in cross-section, but instead oblong (Fig. 3) similar to an iron construction beam. This elliptical shape minimizes flexing in the pole when cutting. When fully extended, it is still possible to get leverage on the blade when cutting because the pole maintains its rigidity.

3. The 3-section telescoping pole extends to 20 feet and uses a unique gear and locking clamp mechanism that allows adjustment to any length quickly and without slipping.

The saw heads (Fig. 2) are purchased separately and attach easily to the telescoping pole. The ARS Turbocut™ blades are made of a hard chrome nickel plated rust-resistant finish with very sharp teeth and gullets (gaps) between each group of teeth to remove sawdust. Two saw head lengths are available: (1) a 13" (33 cm) blade with 22" overall length including the mount and (2) a thicker 16" (40.6 cm) blade with an overall length of 25".

The saw blade draws itself into the cut on the push stroke, and allows for a full cutting stroke on the back pull. It gives a nice clean cut. The blade is hooked on the end. This is especially useful when working on palms. The hook can be used to pull an inflorescence or sheath horizontal before cutting, and to full a frond down that is trapped in the crown or held by just a few fibers. An adaptor is also available for mounting a pruner head to the telescoping pole.

The ARS Super Turbo™ Cut Pole Saw is available through A.M. Leonard Horticultural Supply (www.amleo.com or 800-543-8955). The 20 foot telescopic pole (catalog #EXP55) discussed here currently is priced at US$152.99. The 13 inch saw head and mount (catalog #34EXP) is sold separately and is currently priced at US$40.49. – *Randal J. Moore, Poway, California USA*

Palm Seed Poaching

There is no evidence that humans have ever acted to conserve and sustain the resources they depend on, but in the past primitive technology and small human populations meant our impact was not so dramatic. Now we have larger populations and better technology, we can harvest plants and their products more quickly, but we also have better understanding of the consequences of our actions. The key is for us to not only understand what a sustainable level of harvest is, but also to actually implement this 'on the ground', where plants are being harvested. – Botanic Gardens for Conservation International

What do *Dypsis decaryi, Acanthophoenix rubra, Coccothrinax borhidiana* and *Chamaedorea tuerckheimii* have in common? Each of these palms is both threatened and coveted by collectors.

Many of the world's most highly desirable palms are already battling the effects of habitat loss, invasive species, pollution, climate change and/or unsustainable collection of plants, leaves and seeds. Some of these species have only small populations to begin with and/or low levels of reproduction. And yet it seems the more rare the palm, the more collectors want it. Some collectors will risk the continued existence of a species in the wild for the reward of adding a coveted palm to their own collection.

Since palms are our passion, our goal should be to protect them, not poach them, if for no other reason than the continued enjoyment of our favorite plant family. Instead, it seems that the rarer a species is, the more we want it. And the more we want it, the more likely we are to take the opportunity to grab some seeds when we get the chance regardless of the consequence of our action.

But before we take that next handful of seeds, we need to give a thought to the effects of our unregulated seed collection. It can adversely affect the regeneration of palm species, especially threatened species. If a palm is rare, or exists in isolated populations, stripping a plant of all or the majority of its seeds may have serious consequences on the population including the loss of genetic diversity within that species. When a group of palm collectors leaves an area barren of seeds, they may take with them the ability of the area to establish a healthy new generation. Palms that produce little viable seed (or have low germination rates) are particularly vulnerable. A good example of how poaching can affect palms is the case of *Chamaedorea tuerckheimii*, the potato chip palm, whose survival in the wild is now threatened because of over-collection (Hodel, D.R. 1992. *Chamaedorea Palms, The Species and Their Cultivation*).

The act of collection itself often damages palms. This is especially true when collectors cut down a palm to harvest seeds that are too high to reach. Palms are also damaged as collectors bend tall stems or break off stems, making the plant more vulnerable to attacks by pests and disease. Depending on the extent of the damage, we may contribute to even longer-term negative effects as the pollinators, seed dispersers, plants and animals that rely on a healthy ecosystem are affected by population decline and species loss.

To add insult to injury, much of the collected seed never actually germinates. A seed that is taken away from forest may never result in a viable plant thereby losing its potential if it had been left alone. Believing they may never have another opportunity to collect a species, collectors may harvest seeds before they are mature. They may store them poor conditions or sow them in less than ideal conditions for germination.

Advice for keeping palms wild includes:

Do not pay for threatened or rare palms "by the pound" from people that collect from the wild. When we pay for seeds to be collected, especially from members of poor communities, our demand will be met out of a desire to put food on the table and not to harvest palm seeds sustainably. Rather than collecting from the wild, buy, trade or ask for seeds from *cultivated* sources such as nurseries, other palm enthusiasts and botanic gardens, or purchase from community groups actively involved in conservation.

Take a tip from conservationists in the big-game hunting community who now take a shot with a camera instead of gun when their quarry is in their sights.

If you must collect from the wild, first and foremost obtain the proper permits from the country from which you will be collecting.

Never take all the available seed. Collect only a small percentage of the total available seed, and collect from several different plants, rather than stripping one plant completely.

Collect with care, and use the proper tools to avoid damaging the plants. Use secateurs (pruners) to make good cuts when collecting seeds and a pole cutter to gather seeds safely from tall specimens.

Look where you are going. Take care not to trample small palms and seedlings.

If the seed is from a rare species, leave some of the seed with a botanic institution in the country of origin.

And of course encourage others to engage in ethical collection practices.

If you should chance to see a seed-laden *Chamaedorea pumila* on the upcoming IPS Biennial in Costa Rica, please think twice before pocketing the seeds! It will not be possible to collect seeds from protected areas during the IPS Biennial. Our role should be conserving not jeopardizing the health of the very plants we love the most. – *Heather duPlooy, Curator, Belize Botanic Gardens (www.BelizeBotanic.org), San Ignacio, Belize*

Call for Articles

Collectively, the members of the International Palm Society embody a great wealth of knowledge on the horticultural issues of palms. While many topics have been addressed in detail in past issues of Principes/PALMS, new horticultural issues, products and methods are continually arising.

For example, many areas in the world are experiencing severe droughts that threaten the fresh water supplies essential to palm hobbyists and commercial growers. Is the use of recycled water a viable alternative? What are the water quality issues involved on salt-sensitive palms? How will commercial growers confront water rationing and minimize water use while remaining economically viable?

Articles can be of any length and may be a follow-up response to a prior Growing Palms article. If you have an article to submit, a suggested topic or a referral for a potential article please e-mail it to Horticultural Editor Randal J. Moore at Randal.Moore@cox.net