Strategies for Reducing Prolonged Drought Damage of Herbaceous Plant Materials©

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INTRODUCTION

Atypical meteorological conditions impact both natural and artificial plant communities. The effects can minor, or in the case of an extended drought, be devastating to plant morphology and reproductive processes. This presentation gives an overview of several strategies used to prevent or lessen the damage sustained by plants, either in display beds or established stock material, exposed to excessive high temperature, and in some cases, inadequate supply of water – either from lack of rain fall, or municipal watering restrictions.

BACKGROUND

This past summer in the Upper Midwest of the United States has been a challenge for farmers, horticultural professionals, and residential gardeners alike.

A season long drought created atypical conditions, which has led to crop failure, plant stress and even death. This weather condition also necessitated the implementation of watering restrictions throughout the Chicago Land area. As this phenomenon unfolded, it was apparent that I would have issues in various gardens and landscapes, owing to the selection of plants that had been installed, or being grown for stock plants.

Over the years, in addition to the usual assortment of perennial plants, I have utilized many larger and riparian herbaceous plants, owing to their dramatic presence in a garden setting. The riparian plants require a site which will mimic the conditions that they usually grow in. Preparations required such as water retentive soil and protection from excessive wind and sun are necessary. Larger growing specimens need space to develop landscape presence. As observed this year, the conditions that resulted this season were opposite to what these plants typically grow in. This required some creative thinking to lessen the effects this weather had on these plants.

Among the plants monitored during this phenomenon were *Darmera*, *Rodgersia*, *Astilbe*, *Arctostaphylos*, *Pachysandra procumbens*, *Rheum tanguticum*, and various *Epimedium* taxa. I also keep note of the impact the drought had on various species and cultivars of *Alocasia* and *Colocasia*, as well as the bamboos, *Fargesia rufa* and *Phyllostachys bissetii*.

Fig. 1. *Darmera peltalta*: Native to the Pacific Northwest, it is a gem of a plant. A true

riparian perennial, it requires moisture throughout the growing season. This picture is one of the plantings in my own garden. You can see leaves turning brown on the edges, some of the tears or holes are from falling branches, and this planting resides underneath a mature basswood. Since seed set is early in the season, a respectable crop was harvested before the onset of the hot weather. It was cut back by Labor Day.

ISSUES AND ACTIONS

To begin, many of the plants were already installed into landscapes that had been manipulated to provide favorable growing conditions. The majority of the landscapes or gardens that these plants are growing in, are visited multiple times a week. In the event of a change in the conditions, given the frequency of visits, one would be able to respond to any changes in conditions that could change the status quo.

With regards to the continued lack or rain fall, and in several locations, the rationing or restriction of supplemental watering, it became clear rather quickly, that steps would have to be taken to keep plants in good health.

To begin with the amount of mulch layer that was over the root zone of the plants was examined. As a matter of practice, either hard wood or pine bark fines, or a combination of these mulches is generally used. Another compost bark mix of the above mentioned wood by products and a mix of garden waste compost is also placed over the soil to aid in moisture retention, and eventually to be incorporated into the soil matrix.

Often times a 1½- to a 2-inch layer of this or a similar mulch will aide in moisture retention, and suppress rapid soil drying. So the first action was to inspect landscape beds for mulch density and correct this if necessary.

The next issue was the leaves of various plants, and their exposure to wind and sun.

The surface area of some plants' leaves can result in a more rapid transpiration rate, and tissue density can contribute to a lack of resistance to sun scalding. *Ligularia* would be, in my opinion, a text book example of this. Normally with deciduous woody plants or conifers, an application of an anti transpirant will help to prevent desiccation. With the nature of herbaceous perennials this is not possible in many cases. I conducted several trials of different concentrations of Wilt-Pruf®, and had varying results. In most cases the solution did cause some "burning" of leaves, and after trying this out on *Ligularia*, *Astilboides*, *Peltoboykinia*, and *Rodgersia*, I concluded, at least for my own efforts, that this course was not productive.

The next thing to look at was the density of a planting. Hostas for example, can shade their own roots after several years as they grow and crowd out weeds and even some of the garden neighbors. Plants such as *Podophyllum* can also produce this effect, when they grow in dense colonies. In such cases, the moisture retention can be better, since the plants form an umbrella over there spot in the landscape. Initially, these types of plantings seemed to be holding their own. With the prolonged drought, supplemental watering aided this type of growing habit. In cases where the watering did not occur, as the subsoil drying began to worsen, these plants were wilting and in some cases not recovering.

This led to another attempt to stave off of drought damage, and even desiccation. Often times I incorporate a soil moisture retention product, in initial plantings to help plants establish root systems. These products hold moisture in the root zone, can reduce frequency of watering, and of course reduce labor expenses. Adding this into an already established bed, can be done, but in a few cases, not so readily.

One criterion is to hydrate the product before adding to the soil, this makes for better incorporation into the soil mix. In a few cases, there was a visible improvement. Care must be taken not to damage an overt amount of herbaceous roots, since that act will lead to wilting and plant stress. Indeed, working around established plants with a trowel or type of pronged trowel was not the easiest of tasks. I would say that this task had mixed results.

Temporarily erecting a shade cloth or floating row cover over some beds afforded shade and reduced plant stress. The down turn was the aesthetic of having pieces of fabric

hanging in various gardens, which detracted from the garden display. Of course plants that were grown in containers, could be moved to more advantageous spots in the garden, and fared better.

The bamboos and aroids actually did not suffer any real damage during this drought.

The bamboo is watered once a week, with the heat and drying conditions, it was necessary to water in some weeks twice. The *P. bissetii* is a 5-year-old colony which occupies about 100 ft^2. The culms are over 10 ft in height on average, and are between ¾ and 1 inch in diameter.

Fig. 2. *Phyllostachys bissetii*: I have been growing and observing various bamboos in Chicago gardens for many years. This grove is now 6 years old, having come to my garden as a rescued clump. It now occupies 100 square feet, and the culms are over 10 ft tall. Came through the drought with no significant damage.

With other bamboo, *F. rufa*, one clump is about 2 ft in diameter, and has been in its location for over 2 years. Another clump is about 3½ ft in diameter, and was planted by clients themselves.

I have a numbers of *Colocasia* and *Alocasia* specimens planted throughout a number of gardens. These plants, along with other tropical plants, really start to grow once the soil temperature begins to rise above 65°F. They are typically planted outdoors between the 3rd week of April and the 1st week of May. They usually sit for several weeks before a real noticeable growing phase begins. Once the summer heat arrives, these plants really thrive. Similar minded plants like *Musa* and *Canna*, act the same. These plants did not show any major signs of drought or heat damage, as long as they received water at regular intervals. These plants are fertilized weekly with either a specially formulated tropical-plant fertilizer, or a similar formulated water-based fertilizer.

Another action taken if plants were showing drought stress was to consider cutting back the failing leaves, this forces the plant to flush out new growth. This was enacted on several different types of perennials, at various times from late June through the beginning of August. Obviously, this action will result in a new flush of leaves in a relatively acceptable amount of time.

In addition to the effects of heat and in some cases the lack of water, there were some problems associated with various insect garden pests. Flea beetles, Colorado potato beetles, assorted weevils, were more prevalent this year. Japanese-beetle season was

delayed due to the drought, and in many areas of Chicago, were not as invasive as previous seasons. The use of dusts to suppress these pests was the preferred method for me. Since there was a lack of rain, the dust when applied to plant structures, or even adjoining surfaces, would stay in place longer, affording for better control measures.

Fig. 3. Tropical Plants: These plants had little trouble with the weather. *Canna musafolia* and *Dahlia* 'Firepot' were reliable garden performers this year.

Some liquid based insecticides could have phytotoxic results, given the weather conditions we were experiencing. Indeed herbicide treatments, in my experience, were not practical, since if no rain or supplemental was applied, the various products would not be able to work.

Obviously, after many months of extreme weather, a great deal of turf, horticultural, and agricultural areas were impacted by this weather. Many landscapes had damage of varying degrees, by the end of the season. The acid test that many gardens underwent, as well as the people who had to deal with these situations, may give us a better understanding of how to approach this situation, if it should reoccur. This may not be the case in other gardens or growing conditions. The accompanying photos, illustrate some of the plants and their condition at various times of the growing season. It has been my pleasure to share my experiences with you, I hope you will find this information of use in your horticultural endeavors.