

## An explanation for the "sudden surge" of purple loosestrife in Wisconsin in 2010

First, the obvious increase in purple loosestrife flowering this year does not mean there has also been a great increase in the number of purple loosestrife (PL) plants, though we have seen a few more first year plants in some places than in recent years. The amount of flowering will naturally vary with weather, and years with warmer and wetter conditions than usual—as we've had this summer—will increase vigor and flowering of PL, including plants that haven't flowered recently or at all. Thus, we should remain concerned about PL, but not be alarmed.

Some local areas may be affected more than others, and some folks who have spent time battling the plant may be particularly chagrined at seeing it appear to "come back" when they thought it was gone, but statewide the plant just seems to be more obvious, not much more plentiful.

In fact, PL is much less dominant in many wetlands around the state now due to the success of biocontrol over the last decade. Our research in Wisconsin has shown that biocontrol greatly reduces the vigor of PL in just several years on most sites. This control is generally sustained over time, though it's sometimes variable from year to year and site to site. (We need more research & monitoring to understand how much variability to expect over long time periods and in different field conditions.) Flowering and seed production usually all but disappear, stem heights are typically cut in half (from 10 feet tall to 4 or 5), and PL dominance is markedly reduced.

Cooperators (citizens and citizen groups in our program who have raised and released biocontrol beetles locally) have generally reported similar results, and most land managers and cooperators have been ecstatic about the quick reductions in their PL with biocontrol. (Hundreds of these cooperators, working through the WDNR/UWEX biocontrol program, have produced most of the 28 million control beetles released at several thousand sites in the state, to date!)

However, it's important to understand that monophagous biocontrol beetles reduce PL dominance and dispersal, but rarely kill their only host plants. This allows other plants, when present, to out-compete PL and sometimes eliminate it. Thus, biocontrol will rarely eliminate PL by itself, but should give us acceptable control. Overall, biocontrol has been more effective, less disruptive, and cheaper than more traditional methods such as pulling, cutting, and herbicide work, though each of these other methods should still be used in appropriate situations.

Unfortunately, we estimate that our biocontrol sites still represent only about 40% of all PL sites statewide. Also, on many sites no effort has been made to ensure the presence of competitive native plants. (To solve the latter problem we try to help everyone understand that restoring native plants to recovering wetlands is often a necessary step in long-term PL control.)

Drier weather over the last several years has undoubtedly played a supporting role in reducing PL vigor and flowering, especially in the North where it has been driest. It's probable that this has also reduced germination of PL seeds, especially those dispersed to new, drier sites. Dry weather and some feeding by biocontrol beetles that disperse on their own have likely also reduced growth and flowering on such sites, many that we may not even be aware of if they don't flower.

Thus, the paucity of purple loosestrife flowering and its shorter stature in recent years on many sites with control beetles has unfortunately often led people to think that their PL was gone (due to "out of sight, out of mind" and, perhaps, a strong desire to feel they've beaten at least one invasive!) Thus, any increase in flowering is likely to convince them more PL plants have appeared. (Smaller, non-flowering, green PL plants can be difficult to distinguish from other plants, and we often need to show folks that their PL is still around—albeit much reduced.)

Thus, the weather-induced increase in flowering on existing plants on biocontrol sites, where the plants were presumed gone, is likely to give the false impression there is a sudden great increase in PL plants. Many of these sites are large sites and in the public eye, such as along roadsides,

contributing to a general sense of alarm. While the increase in flowering does show that there is still a lot of PL around that is of concern and that needs control over the long term, it should be understood as a short-term variation in the context of a substantial reduction in the size and vigor of much PL statewide from biocontrol insects released over the last 10 to 12 years.

It should also drive home the message that no control of an invasive plant that we allow to establish here—PL infested an estimated 40,000 acres statewide in the late 1980s—will be easy or short term or be accomplished with one method. (Society must be in this fight long term and do everything possible to conduct it as efficiently and cheaply as possible. Thus, we increasingly emphasize preventing establishment of new invasive species. We must also tell our elected representatives to spend more dollars now on biocontrol research for other invasive species so we know how effective those methods may be, and so they can be used as soon as possible.)

More weather induced germination of PL seed and better growing conditions have also likely given us a few more first year plants, and added their flowering to what people are now seeing. This increase in plants is a concern that does need to be addressed with more control efforts. Because these plants are often easily pulled our recent press release made a special plea that citizens and land managers use this method now where possible, but fall back on biocontrol where it isn't.

Some may ask why biocontrol hasn't done a better job of reducing added flowering this year and the answer lies largely in the timing of our weather. Much of this season's wet weather has come later in summer, after typical early beetle feeding is done. This has allowed plants that usually recover somewhat from early beetle damage to do so quicker and more completely than usual, resulting in healthier plants and more flowers. (More control species might solve this problem.)

Thus, the real effectiveness of biocontrol on these plants should start to become more apparent over the next couple years as beetle feeding catches these plants in spring and early summer, and beetle numbers increase to match the availability of healthier plants and more food.

Later and heavier rains and mid summer flooding could also have drowned some entire beetle populations present in the ground as pupating larvae. This is an undesirable aspect of the beetle's univoltine lifestyle (one generation a year) wherein a whole population may exist at flood time as only one, vulnerable life stage. This could set back biocontrol in a number of areas next year, forcing us to reevaluate where our efforts are needed and to reestablish these populations. Also, if we are seeing a longer term shift in climate that creates similar weather patterns in the future, such as many climate models predict, our current biocontrol insects may become less effective. More research may be needed to explore how to better utilize the control species we have, or even look for more or different control species.

Statewide biocontrol of PL has always depended primarily on citizen involvement due to the need to locate local PL infestations and produce enough beetles to establish viable local populations throughout the state. (Some other states have taken a more government-run approach, but this is much more expensive and misses out on many citizen educational opportunities.) More recruits are necessary and to attract them they must be made aware of invasive species and know enough about associated problems to want to participate and be useful in doing so.

We need to reach out to new recruits, so UWEX is trying to find funding for a Wisconsin Citizen Naturalist Program that promises to make statewide, local training available to all citizens. All efforts should be made to support this program since I believe involvement of many citizens is key to protecting our landscape from invasive species! Let legislators know if you agree.

I'd be pleased to answer any questions or add further details about our biocontrol program and its effectiveness to date.

Brock Woods, Wisconsin Purple Loosestrife Biocontrol Program Coordinator      20 August, 2010