

## Southern Lab Consortium: pre-season planning and discussion

Greetings all! The following are just a few of the issues I think we need to talk about. I'm sure there are many others so feel free to add to this list and re-post! Cheers. Mark Dalusky, fall 2012

### Talking Points for 2013 Release Season

- Foliage collection for food: where and when?
- New release areas and supplemental releases: Ft. Mountain, Rock Creek, Butler Branch, Cartecay Tract (DNR Region 1), Shanty Creek and possibly Cloudland Canyon State Park may very well be our last new areas for expanding the predator release program; we have several old areas that appear to have sustainable populations of *Laricobius* spp. and St, and the hemlocks are looking pretty good in these areas. At some point (probably now) we should quit adding beetles to these areas as our original strategy called for an initial release followed by 2 to 3 supplemental releases; I'm sure we have 3 dozen sites that fit this criteria already. We have 140 distinct release sites in total, ranging from an acre to 40 acres in size. We still need to go back into recovering areas that have zero or limited beetle releases in them; to do this effectively we will need help from our USFS colleagues identifying likely areas. We can discuss what constitutes a "likely area" at some point.
- Nursery populations in lieu of rearing? We have several areas where Ln and St have been recovered in relatively high numbers in systematic sampling (see following). A nursery population has been established in the North Carolina High Country that is providing beetles to several clients and being used to establish other nursery populations. UGA has found that beetles from this population have high fecundity (up to 38 eggs/ twig) in a lab oviposition colony.
- We have a new predator of HWA (*Scymnus coniferarum*) that was approved for release this past Sept. You will need a PPQ526 permit to import and release this predator. Labs within the state of Georgia can operate off of UGA's permit. This lady beetle is native to western North America and compliments Ln beautifully in the Seattle/Tacoma area where we have consistently collected both Ln and *S. coniferarum*. We have found the adults feeding on HWA in October/November, and the larvae are abundant from late March/April through May when most Ln are aestivating in the soil. It is likely that co-evolution amongst *Scymnus coniferarum*, Ln and HWA has occurred. Who will rear this and what might a release strategy be??
- Incorporating predator beetles with soil injection sites: possible??; what strategy??; evidence that this might work??
- *Laricobius osakensis* : Joining the party.....or crashing the party??  
Like St, this predator is from Japan. It is currently reared at VPI and UTK. Researchers at VPI conducted a sleeve cage study in VA last spring, and we may be asked to participate. In the lab, Lo has been observed mating with Ln, but no viable eggs are produced. Several questions regarding this phenomenon remain unanswered. Are eggs produced as a result of hybrid mating? If so are they actually sterile or just not viable (does insemination occur)? Can Ln females mated by Lo males subsequently mate with an appropriate male (Ln or Lr) to produce viable eggs? Lo has been described as very aggressive. Can it tolerate a high density of other predators in the immediate feeding environment? Ln can occur in very high numbers over a relatively small foliage area. Sixty-six adult Ln have been recovered from one branch with the beat sheet technique in Banner Elk, NC (McDonald; persn.comm.). Given that this predator will compete in the same temporal and spatial environment as Ln and Lr, is it worth the risk?? How do we efficiently, economically and safely

collect this beetle to augment the genetic base of Lo lab colonies in the future?? VPI may have these answers already.

- St rearing issues?? Whatever happened to the attempt to augment the genetic base for our St lab colonies??
- Scw rearing issues?? Should Scw adults be collected in the West and directly released, or lab reared? Only a generalized rearing protocol (UGA) exists. Is optimized rearing a realistic goal? Can Scw be reared similarly to St?? UGA kept adults for 1 year in storage then placed these in rearing jars where they produced eggs. Scw stores well at low temps; it is an aggressive feeder and is very efficient with the food provided. UGA had good oviposition at 15°C; Mike Montgomery reared at 16-20°C, and UTK had high mortality at 25°C.
- Ln issues: North Carolina Ln are now available to purchase at a reasonable cost for release or for lab colonies; UGA compared a NCHC (North Carolina High Country) Lari colony to the Seattle version, and numbers of eggs per twig and colony mortality were very similar; one twig from a NCHC ovi-jar had 38 Ln eggs on it.

### **Predator Recovery History in Georgia (data from Cera Jones, MS student UGA Entomology Dept. and from UGA Predator Rearing Lab)**

Georgia has an impressive predator recovery history, perhaps as good as any in the East especially regarding recovery of St. The sampling protocol calls for collecting 10 twigs per tree from 15 trees for a total of 150 twigs and rearing these in the lab to collect possible predator larvae and adults. These twigs must have new growth from the preceding year at the time of sampling. Sites that had insufficient recovery of new growth to yield a full complement of twigs were not included in the highlights below. The only question I was interested in was frequency of occurrence of predator beetles at sites with adequate new growth recovery.

The following is a synopsis of recovery by year.

**2009:** 9 sites had sufficient new growth to sample and 78% of these had predators; Blood Mountain, Dockery Lake and Upper Panther Creek had 19 to 29 Ln each (88 total all sites) while Slaughter Creek had an impressive 157 St adults (near Jarrard Gap intersection) in the sample

**2010:** 15 sites had sufficient new growth and 67% of these had predators; numbers (75 Lari, 137 St) were somewhat lower than the previous year except for Dockery Lake with 182 total predators in the sample.

**2011:** 10 sites had sufficient new growth and 100% of these had predators; Blackwell Creek (65 total preds.), Dockery Lake (72 total), Waters Creek:Beaver Pond (26 total), and Wolf Pen Gap (110 total) all had good recoveries; totals were Lari 204 and St 93

**2012:** 9 sites had new growth and 100% of these had predators; all but 2 sites were in double digits; Slaughter Creek, Dockery Lake, Blackwell Creek, Wolf Pen Gap, and Noontootlah Creek range from 48-226 predators recovered in samples (Lari 196 St 331)

To sum, viable populations are established at most sites where hemlocks have recovered sufficient new growth to sample, and one site- Dockery Lake- had good populations every year.

The only 3 species currently recovered are *Laricobius nigrinus*, *Laricobius rubidus* (native eastern Lari) and *Sasajiscymnus tsugae*. Ln and Lr will hybridize (Havill et al., in press) and potential F2 and F3 hybrids may be in the woods (awaiting DNA results). Reproducing hybrids will be good news indeed, as evidence that the “sterile hybrid” scenario does not seem to be in play with these 2 species of *Laricobius*. We have precedence from an area in NC high country near Banner Elk/Boone that strongly suggests biocontrol can take as long as 6 years post-initial release to become measurable in the woods. We are near that inflection point on multiple sites, and have reason to be confident given that outright mortality is rare on our release sites. Trees do decline, hit a low point then begin a comeback. Best case for us may be that predators moderate the decline, then help speed up the recovery where they have the potential for amassing sufficient numbers to hold damage by HWA below some critical damage threshold. The addition of an efficient second generation predator (maybe Scw) could be a linch pin for successful biocontrol in north Georgia.

Please consider contributing to the cause of saving Georgia’s hemlocks through a monetary contribution. Sources of money independent of large granting agencies are vitally important to continue the struggle here in the So. Appalachians.