

"Otvos, Imre" <iotvos@PFC.Forestry.CA>

12/31/2002 01:24 PM

Contribution to the minutes of the WHL and the defoliator
working group meeting

Colleagues:

Attached please find an Excel document containing the summary of the pheromone trap data on the western hemlock looper (WHL) from 1992 to 2002 from BC. The pheromone trap data collection was initiated by the former Forest Insect and Disease Survey (that was eliminated in 1995) at 23 locations in the interior of BC, see the upper four groups of locations representing the Nelson-, Kamloops-, Prince George- and Cariboo Forest Regions. Monitoring at the last 3 groups of locations (Vancouver Island, Greater Vancouver watershed and UBC's Research Forest) representing the coastal region of BC was started much later (in 2000) as can be seen in the table in the attachment. Originally, only pheromone traps were operated at these 23 sites, but since I took it over in 1995 we also took a 3-tree beating sample to determine the larval density to see if we can find some correlation between male moth catches, larval numbers and defoliation. Once we judged larval density "high enough" then we also put out burlap traps to collect pupae and to have some idea of % parasitism of the western hemlock parasites tachinids seem to be more important in BC. In fact one of these, *Withemia occidentice* was introduced from BC to Newfoundland where it not only became established but also became the dominant parasitoid. My research technician is on holidays and I cannot find the larval numbers or the % parasitoids figure to add to this table - when he comes back from holidays would you like us to add larval number and resend the attachment or just forget it for the time being and do it for next year?

Populations of western hemlock looper have increased throughout Province for about 4 years and defoliation was detected in 2002 in the interior. We do not know for how long this increase has been going on the coast since we only started monitoring in the watershed after we have been asked. However, defoliation was detected at least one possibly 2 years earlier - suggestion that the outbreak started on the coast a couple of years earlier.

In the Nelson Forest Region (Interior), the number of adult males caught in the traps, with the exception of the Illecillewaet sample location, have increased from 2.0- to 12.5-fold over last year's counts. Adult moth catches at the four locations where moderate defoliation was observed range from ca. 1,100 to 3,200 moths. Rearing of the larvae and examination of the burlap traps collected at these locations indicate that there were very low levels or a complete absence of pathogens in these populations. Percent parasitism (mostly by Hymenoptera) of the larvae averaged 1.5% for all locations (ranging from 0 to 2.9% of larvae reared). Pupal parasitism was higher in the burlap traps (19.6% for Martha Creek and 3.5% for Goldstream). Given the number of male moths collected in the traps, and the relative

absence of parasitoids and diseases from the population, it is very likely that populations of western hemlock looper will increase and defoliation will be more severe at most locations in the Nelson Forest Region next year. It is possible, given the relatively high (ca. 20%) levels of parasitism in the pupal traps at Martha Creek that this population may collapse or at least decrease in 2003.

Populations of western hemlock looper also increased in the Kamloops Forest Region, although not to the same degree as in the Nelson Forest Region. Adult male catches increased 1.3- to 3-fold at 5 of the 7 permanent sample locations, and remained at about the same level at the Helmcken Falls plot. One location, Peddie Mountain, had a decrease in trap catch counts, but it is too early to determine the cause for this. Larval parasitism in the Kamloops Forest Region was less than 1%, and all the parasitoids were reared from one, the Clearwater Lake collection. The highest levels of larval parasitism was 6.1% from a collection made at Inks Lake Road near Kamloops. It should be noted that the hemlock looper infestation at this site was in Douglas-fir, not western hemlock. Outbreaks generally start and occur western hemlock stands in BC.

In the Prince George Forest Region there was a significant increase in the number of male moths collected at two permanent sample locations (Hungary Creek and Sugarbowl), these represent a 7-fold and 4.5-fold increases in trap catches, respectively. Unfortunately, no larvae were collected during the 3-tree beating samples from either location during the summer, so there are no indicators to suggest what will happen to the insect population over the next year.

In the Cariboo Forest Region western hemlock looper populations increased substantially in 2002, resulting in light defoliation occurring at one location along the Bouldery Creek Road (Km 6109). The number of male moths caught at this location increased about 2.3-fold over 2001. Percent parasitism of larvae collected at this location was ca. 6.1%, while data from the burlap traps indicates that percent pupal parasitism is as high as 48%. If this is the case, it is possible and likely that the infestation at this location may collapse in 2003. Unfortunately, the pheromone trap at Km 6117 was destroyed by a bear prior to adult emergence of the moth, therefore, no data was collected at this site in 2002.

Pheromone trap catches of male moths made in Strathcona Park on Vancouver Island remained relatively low (<50 moths per trap). These numbers have remained relatively stable at low levels, and it is unknown if any outbreaks will develop in this park or not.

There was a substantial decline in 2002 in western hemlock looper populations at both sample locations in the GVRD Coquitlam Watershed compared with 2001. Trap catches of male moths in the watershed decreased to about 10% of the previous year's levels, and percent larval parasitism was 13% on the west side of the reservoir and 21% on the east side (average percent parasitism for the watershed was 16.1%). Both of these factors suggest that the infestation at this location is collapsing. This is further supported by the qualitative general observation that defoliation was less severe in 2002 than in 2001.

Western hemlock looper populations were also lower in 2002 in the UBC Research Forest compared with 2001. Percent parasitism of larvae collected from the Research Forest was 41.7%, while male moth counts for 2002 were about 5% of those caught in the pheromone traps in 2001. Both of these data indicate that the western hemlock looper outbreak in the UBC Research Forest is collapsing, and the insect may even return to its endemic population levels in 2003.

SUMMARY

Western hemlock looper populations are "predicted" to continue their decline in both the GVRD Coquitlam Watershed and UBC Research Forest. However, it should be noted that these outbreaks started about 2-3 years earlier and we only started sampling in 2001 (PheroTech has a contract with the GVRD to monitor insect populations in the watershed).

In the interior, western hemlock looper populations have been increasing since 1998, as indicated by the pheromone trap catches. Examination of the raw trap catch data suggests (no statistical analysis has been done to date) that when pheromone trap catches reach between 200-300 male moths per trap (baited with 10ug lure) and increases 3-fold the next year, an outbreak accompanied by visible defoliation will likely occur the following year.

Had more traps been placed at each sample location we would have been able to have a more accurate measurement of the threshold level and relate it more reliably to defoliation. From 2003 on we will be using 3 traps per site.

<<WHL Trap and Larval Count02.XLS>>

It would be interesting to find out, even if it based only on casual, visual observation and/or on people's recollection, when western hemlock looper populations started to increase in Idaho, Washington and Oregon. Is it the same patten as with as the Douglas-fir tussock moth (i.e. starts to increase in the states first then the outbreak or higher insect populations appear to next in the southern part of BC then moves up North) or is it the reverse.? In BC WHL populations increase first in the Kamloops Forest Region (southern part, near the border) then it moves North first Nelson and Cariboo then in the Prince George Forest Region).

Btk was first registered for control of the eastern hemlock looper in Newfoundland in the 1990s. In 2002 this registration was extended to include the WHL and the BC Ministry of Forest is planning to do a field test of using this biological product.

May be somehow we (our respective organizations) could notify each other of the increasing population/damage regardless what insect and/or disease it is - OR better yet, it would be highly practical if we could unite/amalgamate/join our monitoring systems! Would it be fair to suggest this? Is this only a dream or does it have some practical merits? Any comments from either of you?

John, feel free to modify (rearrange, delete or mutilate) the text to suit

your style and the intended length of the minutes.

May we all have a successful year in 2003!

Imre

P.S. We have a number of publications on various sampling methods on the hemlock looper. If you want I can send you a list not only for your information but for possible inclusion in the minutes for those people who might be interested in knowing, but do not want to waste time searching/looking for the references.

P.P.S. This note is on a different topic, the DFTM. Do you have any plans to continue field testing the DFTM pheromone in 2003 or do you feel that the population is collapsing and the results you may obtain in declining population would be misleading?



WHL Trap and Larval Count02.XL