INTRODUCTION
Leaf beetles in the genera Chrysomela (Chrysomelinae, Coleoptera) specialize on trees in the Salicaceae. Their larvae secrete salicylaldehyde, a potent deterrent against predators, which they synthesize from the host-derived phenolic glycoside (PG) salicin (Fig. 1; Pastee et al. 1983). Besides salicin, host trees such as Populus tremula, contain large amounts of several other PGs known to degrade to salicin (Fig. 1; Ruuhola et al. 2003). Whether larvae use the salicin derived from these compounds to produce salicylaldehyde is unknown. P. tremula trees belong to one of four defined chemotypes with individuals high in either 2′-acetyl compounds (2′-Acetyl), cinnamoyl compounds (Cinnamoyl), both of these (2′-Acetyl/ Cinnamoyl), or neither (tremuloides-like*; Figs. 1 &2; Abreu et al. 2011; Keefover-Ring et al., unpub.).

The current work addresses two questions: 1) What is the fate of host PGs in the frass and defensive secretion of Chrysomela tremula feeding on four P. tremula chemotypes, and 2) Does host chemotype influence larval salicylaldehyde production?

RESULTS
Foliation PG profiles differed greatly from larval and adult frass and larval secretion, due to high amounts of salicortin, 2′-acetyl salicortin, tremulacin, and cinnamoylsalicortin in leaves (Fig. 2). Larval frass contained little to none of the major foliage PGs, but did have large amounts of their breakdown products, mostly due to loss of hydroxycyclohexen-oyl (HCH) groups. Larval frass contained a novel PG, putatively identified as 6′-benzoyltremuloidin (Fig. 1). The PG profile of adult frass was similar to larval frass within a chemotype, except for high levels of salicin and little 6′-benzoyltremuloidin or cinnamoylsalicortin. Salicin dominated larval secretions; however, the overall PG profile differed between chemotypes. Larval salicylaldehyde production remained unchanged, regardless of host chemotype (Fig. 3).

CONCLUSIONS
The lack of the more complex PGs in both larval and adult frass indicated that these structures break down easily once ingested; however, not all were completely converted to salicin. Tremulacin degradation appears to stop at tremuloidin and 6′-benzoyltremuloidin and cinnamoylsalicortin at cinnamoysalicortin. The high levels of salicin found in adult frass probably reflects their inability to synthesize salicylaldehyde (no defensive glands). The high levels of salicin in larval secretions showed incomplete conversion of this precursor to salicylaldehyde. Conversely, the low proportion of other PGs in secretions confirmed the selective transport of salicin into Chrysomela excretion glands (Discher et al. 2009).

Finally, larval defense did not differ with host chemistry.

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METHODS
• Grew replicate clones of 4 P. tremula PG chemotypes
• Separated just-hatched larval broods into three groups and placed ~10 each on separate small trees (n = 24)
• Collected defensive secretions (capillary tubes; n = 61) and frass from larvae (n = 67) and adults (n = 21)
• Freeze-dried and ground host foliages
• Solvent extracted all samples with MeOH and analyzed with UPLC-ESI-UV-TOF for PGs (TOF) and salicylaldehyde (UV)

REFERENCES