Key Words: leaf separation, tanniferous forages, tree canopy harvest, agroforestry, ruminants

Abstract Title (30 of 30 words):
Tree/Shrub Leaf-Silage; Production using a Chain-Flail Leaf-Separator Machine Prototype, Labor Efficiency, Cattle, Sheep and Goat Free-Choice Intake Rates, Effect on Milk Qualities and Yield, and Analyses of Nutrition and Toxins

Abstract content (300 of 300 words):
Tree and shrub leaf-silage was regeneratively harvested from field edges using a prototype Chain-Flail Leaf-Separator, (Project FNE22-013 funded by Northeast SARE and NIFA). We generally pollarded trees with a 9’ pole chainsaw, and coppiced shrubs with a brush-saw. Cutting, limbing and stacking took ¾ to 2 person-hrs per 30 gal barrel of intact leaves; machine leaf-separation took 10 to 15 minutes per barrel, varying with species leaf-attachment. Scooping armfuls of leaves into lever-top barrels, set within the 60 gal receiving bin, took 5-10 minutes, including stick removal. Contents averaged 52 lbs per sealed barrel of intact leaves with some twigs; twig content varied by species fragility and choice of feed and flail speed settings. Yields averaged about 4 lbs leaf-silage per LFT field edge, with mean site-average of 12 ft per 30 gal barrel. The leaf-separator successfully took up to 20 ft x 3½“ butt D trunks, and stiff leafy branches; 3 of 23 species proved partially or wholly impractical.

Ruminants at four farms ate substantial recorded amounts of this leaf-silage as free-choice winter supplement; milk yields (goat and cow) were maintained or enhanced. Nutritional results on leaf-silages are in process (FNE24-083 additionally funded by Northeast SARE); so far tests confirm much higher NFC, RFV, and mineral content than in grass hay, and lower protein content with probable exception of two species. Tests of hydrogen cyanide in cherry species including young and wilted leaves, and of gallotannin in maple species and sumac, are underway, comparing fresh to ensiled.

Two collaborators have samples from SARE FNE22-013: Wayne Zeller (US Dairy Forage Research Center) is examining tannin content to determine digestive and health benefits for ruminants, and Yulica Santos Ortega (Maine Health Institute for Research) has identified lipids, and will identify proteins, in goats’ milk with and without leaf-silage.

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