

4 weeks ($P = 0.04$) and 5 weeks ($P = 0.05$) compared to goats who had received COWP. Results indicate that the onset of FEC reduction with COWP is later and the duration longer, compared to CY and CP, which demonstrated a comparable result in reducing FEC, but shorter in duration. Thus, as an affordable alternative treatment, CP might be considered for a short-interval dosing regimen.

Key words: cayenne pepper, goats, anthelmintic

T397 Effects of immunomodulatory substances added to milk replacer on white blood cell populations during weaning. S. Paez Lama, A. Morales-de-la-Nuez, V. Mendoza-Grimon, L. E. Hernandez-Castellano, D. Sanchez-Macias, N. Castro, and A. Arguello*, *Universidad de Las Palmas de Gran Canaria, Arucas, Las Palmas, Spain.*

To investigate the effect of immunomodulatory substances added to milk replacers on white blood cell populations during the first week of weaning, 21 goat kids (Majorera dairy breed) were randomly allotted into 3 groups. The first group was a control (CON), the second group received a daily dose of 200 mg/kg BW of *Echinacea purpurea* (ECH) and the third group received a daily dose of 20 mg/kg BW of *Polypodium leucotomos* (POL). Goat kids were artificially raised with a milk replacer ad libitum until they reach 10 kg of life BW. After that, animals were enrolled in the weaning protocol. Starter and fresh water were available throughout the weaning period. The first weaning week goat kids received 1 L/d of milk replacer twice daily (morning and afternoon). A blood sample was obtained before starting the weaning protocol and at the end of the first week in heparin containers. Immediately after collection, 50 μ L of unclotted blood were added with 5 μ L of CD4 (FITC) and 5 μ L of CD8 (RPE) monoclonal antibodies (Sero-tec, Dusseldorf, Germany) and the reaction ran for 15 min at room temperature. After that, 50 μ L of Optilyse (Beckman Coulter, Brea, CA) were added and the reaction ran for 15 min at room temperature to lyse red blood cells. Subsequently, 150 μ L of saline serum were added to clarify the solution. Fifteen minutes later, the samples were red-dened using an FC500 flow cytometry device (Beckman Coulter, Brea, CA). An ANOVA (with repeated measures) procedure from SAS was used. Two white blood cell populations were observed clearly, lymphocytes plus macrophages (L+M) and polymorphonuclear (PMN) at both tested times. Control L+M, PMN and CD8 lymphocytes per mL were lower ($P \leq 0.05$) than in preweaning samples but no differences were observed with ECH and POL. Control and ECH CD4 lymphocytes per mL were lower ($P \leq 0.05$) than preweaning samples and POL kids. The addition of immunomodulatory substances would improve the immune status during the weaning in goat kids.

Key words: goat kid, weaning, immunomodulatory

T398 Goat browsing for invasive shrub and internal parasite control. J. C. Warren*¹, D. J. O'Brien¹, C. Heckscher¹, R. Beaman², and N. C. Whitley³, ¹Delaware State University, Dover, ²Delaware Department of Transportation, Dover, ³North Carolina A&T State University, Greensboro.

The objectives of this study were to determine whether goats were effective in the control of Autumn Olive (AO; *Elaeagnus umbellata*), Multiflora Rose (MR; *Rosa multiflora*), and Japanese Honeysuckle (JH; *Lonicera japonica*) and whether browsing controls internal parasites in goats. 1.95 ha of land was divided into 5 fenced paddocks with 3 treatment (TRT; with goats; 0.45 ha each) and 2 control (CON; without goats; 0.30 ha each) paddocks at the study site, Wrangle Hill (WH). At the University farm site, Hickory Hill (HH), 1.35 ha of mixed grass/

legume pasture was divided into 3 fenced paddocks (0.45 ha each). Seventy crossbred meat type goats averaging 745 \pm 146 d of age and 39.3 \pm 7.2 kg BW from the HH herd were used in the experiment ($n = 35$ /location). Goats at WH were used to browse each TRT for 14 d, after which they were moved to the next TRT. At HH, goats grazed paddocks in the same 14-d rotations concurrently with WH goats. The study lasted 112 d. On rotation days, WH paddocks were analyzed for percentage ground cover and visual estimates were made for AO, MR, and JH using the double DAFOR method; additionally, at this time, for both sites, animal BW and FAMACHA scores were measured and recorded and fecal samples were collected to determine fecal egg counts (FEC) in eggs per gram (epg) using the modified McMaster's technique. All data was analyzed using the PROC MIXED procedure of SAS. Visual Estimates of both AO and MR were similar between treatments, but JH decreased ($P < 0.01$) in the TRT paddocks compared with the CON over the study period. Browsing goats did not influence groundcover percentage. Goat BW and FAMACHA scores were not influenced by site and averaged 43.2 \pm 3.3 kg and 3.1 \pm 0.1, respectively. There was a location by d effect with WH goats having lower FEC ($P < 0.05$) than HH goats on d 14 (216 \pm 90 and 476 \pm 90 epg, respectively), d 42 (33.0 \pm 63 and 206 \pm 63 epg, respectively), d 56 (45.0 \pm 66 and 368 \pm 68 epg, respectively), and d 112 (219 \pm 83 and 621 \pm 82 epg, respectively). In summary, browsing reduced FEC in goats and decreased JH during one grazing season. Multiple grazing seasons may be required to have an impact on AO and MR.

Key words: goat, parasites, invasive shrubs

T399 Gastrointestinal nematode (GIN) resistance and GIN management on small ruminant farms in the mid-Atlantic U.S. D. J. O'Brien¹, K. K. Matthews*¹, E. K. Crook², N. C. Whitley³, B. Storey⁴, S. Howell⁴, and R. Kaplan⁴, ¹Delaware State University, Dover, ²Virginia Maryland Regional College of Veterinary Medicine, Blacksburg, ³North Carolina A & T State University, Greensboro, ⁴University of Georgia, Athens.

The objective was to characterize gastrointestinal nematode (GIN) anthelmintic resistance and parasite control programs on 20 goat and 13 sheep farms in DE (10 farms), MD (10 farms), VA (3 farms), WV (4 farms), and PA (6 farms). Farms were evaluated for GIN resistance to benzimidazole (BZ), ivermectin (IVM), moxidectin (MOX), and levamisole (LEV) using the DrenchRite Larval Development Assay. Fecal samples were collected rectally from at least 10 animals on each farm, placed into labeled zippered bags, and shipped to the University of Georgia for analysis. Completion of a survey to determine previous anthelmintic use and current integrated parasite management methods as part of an overall parasite control program was required of farmers participating. On 100% of farms tested, BZ was ineffective; IVM was ineffective on 79% (26/33) of farms, and MOX was ineffective on 48% (16/33) while LEV was only ineffective on 27% (9/33) of farms tested. Rotational grazing, FAMACHA, fecal egg counts, or mixed species grazing were strategies utilized to help control parasites on 62, 48, 14, and 7% of farms, respectively. The most common anthelmintics previously used by producers was a combination of BZ, IVM, and MOX on 72% of farms. Overall, 90, 79, and 31% of producers had previously utilized macrocyclic lactones (IVM and MOX), BZ and LEV, respectively; 86% of producers had utilized 2 or more classes of anthelmintics, while 17% of producers had utilized all 3 classes of anthelmintics. When asked about frequency of anthelmintic treatments, most participants utilized selective drenching techniques (41%) or used anthelmintics one to 3 times per year (41%). The remaining 17% treated with anthelmintics more than 4 times/year. Results indi-