Ergovaline and ergovalinine and tall fescue content of pastures in central Kentucky

P.W. Long, J.C. Henning and L.P. Bush
University of Kentucky, Department of Agronomy, Lexington, KY 40546, USA, Email: pwlong@uky.edu

Keywords: tall fescue, endophyte, alkaloids, herbage

Introduction Kentucky has >2Mha of tall fescue (*Festuca arundianacea* Schreb.) grown mainly for livestock consumption. Many alkaloids in tall fescue are produced in a mutualistic association between tall fescue and an endophytic fungus *(Neotyphodium coenophialum)* (Long *et al*., 2002). Ingestion of tall fescue by livestock may depress reproduction and growth (Schultz & Bush, 2002). Not all Kentucky fields of tall fescue are thought to be infected with endophyte, but forage samples from all surveyed pastures had measurable ergopeptine alkaloids. Therefore, it is reasonable to assume that some of the tall fescue plants in these fields were infected. We estimated tall fescue content and evaluated ergopeptine alkaloids in tall fescue monocultures and composite pastures of several central Kentucky horse farms.

Materials and methods In spring 2002 and 2003, tall fescue and composite grab herbage samples were selected randomly from 13 (2002) and 12 (2003) central Kentucky farm pastures every 2 weeks from March to June to determine the level of ergopeptine alkaloids present. Tall fescue frequency in the sward was estimated by a trained observer. Tall fescue and composite herbage samples, clipped manually from 6-10 sites/field, were dried and powdered for alkaloid analysis. Ergovaline and ergovalinine (E+E) analyses were done by HPLC with fluorescence detection.

Results E+E alkaloids were assayed in 631 samples (260 of tall fescue monocultures and 371 of composite herbage) on 75 fields. E+E levels in tall fescue were low (<0.50ppm) before 11 April and peaked between 23-30 May (Figure 1). E+E in composite herbage samples peaked in late June and were higher than tall fescue alone for the previous reporting period. Percent tall fescue in the pastures increased relative to other forage species for 2003 compared to 2002 (Figure 2). Environmental conditions (greater rainfall and cooler temperatures than normal) may have caused the increased percentage of tall fescue in the swards in 2003.

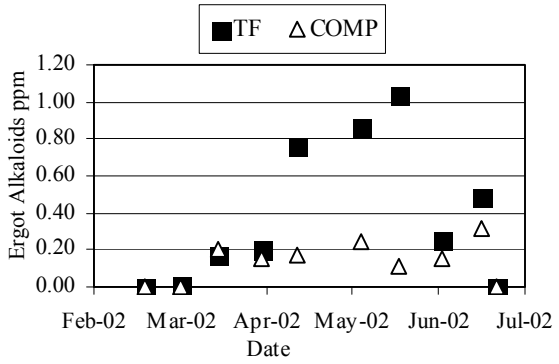

Figure 1 Seasonal levels of ergovaline + ergovalinine in tall fescue and composite herbage samples (ppm)

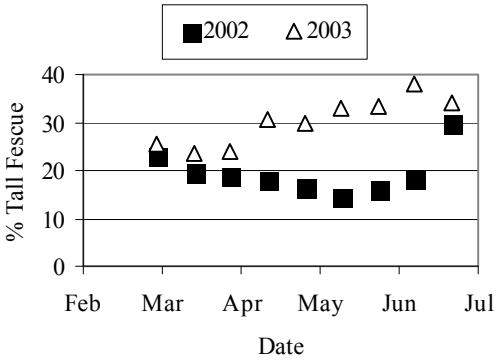

Figure 2 Percent tall fescue in central Kentucky pastures (spring 2002-03)

Conclusions E+E herbage samples from tall fescue plants and in multispecies pastures increased from near zero in late April, peaked in mid May, followed by secondary peak in late June. E+E exceeded 0.3ppm, a threshold for animal response, in herbage from some pastures with <20% tall fescue. Environment (rainfall and temperature) and farm management practices play a role in E+E levels and tall fescue content of pastures.

References

Long, W., J. C. Henning, B. Coleman, L. Lawrence, C. Peterson & A. Reinowski (2002). Overview of the mare reproductive loss syndrome monitoring program for 2002. *Proceedings of the First Workshop on Mare Reproductive Loss Syndrome*, Univ Kentucky, AES, SR-2003-1, 102-112.

Schultz, C. & L. P. Bush (2002). The potential role of ergot alkaloids in mare reproductive loss syndrome. *Proceedings of the First Workshop on Mare Reproductive Loss Syndrome*, Univ Kentucky, AES, SR-2003-1, 60-63.