AGR 6233 - Tropical Grassland Agroecosystems – Fall 2017

Dr. L.E. Sollenberger
3111 McCarty Hall B
Phone: 273-3420; Email: lesollen@ufl.edu

Office Hours: Monday and Wednesday: 1:00 p.m. - 2:30 p.m.

Meeting Times:
Period 8-9 (3:00-4:15) Monday and Wednesday (2108 McCarty Hall B)

Course Description:

Importance, ecology, ecosystems services, physiology, management, and utilization of sown grasslands in the tropics and subtropics. Emphasizes interactions between grassland plants and the environment, other plants, and grazing herbivores.

Course Objectives:

1. To learn the important anatomical, physiological, and morphological characteristics of forage plants and relate these characteristics to forage responses to management and to their performance in production systems.

2. To understand and integrate the important ecological concepts that determine relationships among forage plants, between forage plants and the environment, and between forage plants and the animals that consume them.

3. To recognize the potential and limitations of livestock production on planted and native tropical grasslands.

4. To be aware of the role of forages in integrated food crop-livestock systems in warm climates and to understand how this impacts forage introduction and utilization in these systems.

5. To recognize the environmental impact of tropical forage-livestock systems and to be aware of the potential of good management to minimize negative environmental effects.

6. To know the ecosystem services provided by grasslands and their impact on the global environment.

7. To organize a volume of references that describes pertinent tropical plant-animal research and production worldwide.

8. To gain proficiency in synthesis of content from journal articles and literature reviews and in the ability to report this synthesis in written form.

Instructor's Approach:

We cover a wide range and significant quantity of material. Most sources of information and assigned readings are review articles or original research papers. I assume significant interest in the subject matter area and willingness to put forth appropriate effort to learn the material. If you have not had an introductory forage course and some training in animal nutrition, you may need to do some extra reading to aid your progress in the course. The material provided on Canvas will aid you in organizing course material.

The course is not an applied management course. Because of the diversity of your interests and eventual work assignments, we will try to develop the important biological concepts, i.e., relationships that are true in, or can be adapted to, a wide range of situations and environments. Applied information will arise in classroom discussions and course handouts. Examples used from the literature will also highlight individual species, but these examples will not provide comprehensive coverage of each important tropical legume or grass.

Text:

There is no text. Assigned readings and complete lecture outlines will be provided on Canvas by the instructor.

Other References of Interest (does not include journals):

Barnes, R.F, C.J. Nelson, M. Collins, and K.J. Moore (ed.). 2004. Forages, Volume I - An introduction to grassland agriculture, Iowa State Univ. Press, Ames, IA.

Barnes, R.F, C.J. Nelson, K.J. Moore, and M. Collins (ed.). 2007. Forages, Volume II - The science of grassland agriculture. Blackwell Publishing. Oxford, UK.

Bogdan, A.V. 1977. Tropical pasture and fodder plants. Longman, New York.

Chapman, G.P. 1996. The biology of grasses. CAB International, New York.

Chapman, G.P., and W.E. Peat. 1992. An introduction to the grasses. CAB International, New York.

Fahey, G.C., M. Collins, D.R. Mertens, and L.E. Moser. 1994. Forage quality, evaluation, and utilization. American Society of Agronomy, Madison, WI.

Humphreys, L.R. 1991. Tropical pasture utilisation. Cambridge Univ. Press, New York.

Humphreys, L.R., and F. Riveros. 1986. Tropical pasture seed production. FAO, Rome.

Jung, H.G., D.R. Buxton, R.D. Hatfield, and J. Ralph. 1993. Forage cell wall structure and digestibility. American Society of Agronomy, Madison, WI.

Lemaire, G. et al. (ed.). 2000. Grassland ecophysiology and grazing ecology. CABI Pub., New York.

Mannetje, L. t=, and R.M. Jones. 1992. Plant resources of Southeast Asia 4: Forages. Prosea, Bogor, Indonesia.

Mannetje, L. t=, and R.M. Jones. 2000. Field and laboratory methods for grassland and animal production research. CABI Publishing, New York.

Marten, G.C. et al. 1989. Persistence of forage legumes. American Society of Agronomy, Madison, WI.

Minson, D.J. 1990. Forage in ruminant nutrition. Academic Press, Harcourt Brace Jovanovich, New York.

Moser, L.E., B.L. Burson, and L.E. Sollenberger. 2004. Warm-season (C_4) grasses. ASA/CSSA/SSSA, Madison, WI.

Nelson, C.J. (ed.). 2012. Conservation outcomes from pastureland and hayland practices: Assessment, recommendations, and knowledge gaps. Allen Press, Lawrence, KS.

Sotomayor-Rios, A., and W.D. Pitman. 2001. Tropical forage plants: development and use. CRC Press, Boca Raton, FL.

Wedin, W.F., and S.L. Fales. 2009. Grassland: Quietness and strength for a new American agriculture. ASA/CSSA/SSSA, Madison, WI.

Course Requirements:

1. Regular attendance at class meetings.
2. Completion of two exams (9 October and 6 December). Exams will cover material from the lectures indicated in the class schedule.
3. Completion of 10 reading briefs.
4. Lead one 30-40 minute classroom discussion and regularly prepare for and participate in discussions

Grading:

There will be a total of 400 possible points. The basis for assigning grades is indicated below. The grading scale may be lowered, but you are guaranteed at least the grade listed if you obtain the appropriate number of points.

Item	Points	Total Points	Grade
First exam	100	372-400	A
Second midterm	100	364-371	A^-
Reading briefs	100	356-363	B^+
Discussion leadership	40	348-355	B
Discussion participation	60	336-347	B^-
Total	400	320-335	C^+
		308-319	C
		292-307	C^-

Reading Briefs:

The purpose of the reading briefs is to provide a framework that encourages greater synthesis of the assigned readings by the students and greater integration of this content into the course by the instructor.

Reading briefs will be due the day the content will be discussed in class. Each student must submit at least 10 reading briefs via Canvas during the semester. Assigned readings will be made available at least one week in advance of the day that they will be discussed in class and when the reading brief will be due. There will be more than 10 assigned readings (> 20), so you need submit only a subset of the possible reading briefs. Briefs will be graded on a scale of 0 to 10 points each. In many cases, I will pose questions for you to answer in your brief based on your reading of the assignment.

Reading brief assignments will be posted on Canvas, and your brief should be submitted using Canvas. In most cases, a one-page response (double spaced text, 12-point font) will suffice. You can choose the readings from which you wish to prepare a brief, so long as by the end of the semester you have submitted at least 10. If you submit more than 10, I will count only the highest 10 scores. Remember that the briefs are due by class meeting time the day of the lecture on that topic.

Discussion Leadership and Participation:

During many class periods we will have a designated ~30-40 minute period for group discussion. Each student must lead one discussion during the semester. The intent is that you will choose the content for which you wish to lead the discussion, based on the topic being covered. The discussion will be based on the paper(s) assigned for the lecture that you have chosen, or alternatively you may choose to discuss one or more papers you have found so long as it is relevant to the content for that lecture. If you choose a paper or papers, they must be made available to the instructor at least one week in advance of the discussion period so that they can be distributed to the other members of the class. **Please note that a discussion is not a lecture**. The leader is asked to prepare a series of questions that you will pose to the group that will direct

the discussion and help to draw out the most important points in the paper. The remainder of the class will be expected to respond to your questions with informed discussion based on having read the assigned papers. Forty points will be awarded based on your leadership of the discussion period, and 60 points will be based on your participation in discussions during the entire semester.

Academic Honesty:

In the process of enrolling and registering for classes at the University of Florida, every student has signed and presumably understands the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

Use of Library, Personal References, PC Programs, and Electronic Data Bases:

These items are university property and should be utilized with other users in mind. Never remove, mark, modify nor deface resources that do not belong to you. If you are in the habit of underlining text, do it only on your personal copy. It is inconsiderate, costly to others, and dishonest to use common references otherwise.

Software Use:

All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

UF Counseling Services:

I hope to establish a class relationship and encourage dialogue so that students feel comfortable discussing academic problems directly with me. In addition, resources are available on campus for students having personal problems or lacking clear career and academic goals, and whose academic performance is suffering as a result. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575 (personal and career counseling);

2. Student Mental Health, Student Health Care Center, 392-1171 (personal counseling);

3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161 (sexual assault counseling); and

4. Career Resource Center, Reitz Union, 392-1601 (career development assistance and counseling)

Students With Disabilities:

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must thenprovide this documentation to the course instructor when requesting accommodation."

AGR 6233 - Tropical Grassland Agroecosystems

Class Schedule – Fall 2017

Month	Date	Topic
August	21	**NO CLASS**
	23	Course introduction; Lecture 1 - Description of warm-climate environments
		Lecture 2 - Centers of origin of tropical forages, plant introduction, and evaluation
	25	Lecture 3 – The importance of tropical grasslands
		Lecture 4 - Factors limiting livestock production in warm-climate grasslands
	28	Lecture 5 - The case for integration of crop and livestock production
		Lecture 6 - Integrated food-crop and forage-livestock systems in warm climates
	30	Lecture 7 - Leaf anatomy of grasses
September	04	**LABOR DAY HOLIDAY – NO CLASS**
	06	Lecture 8 - Carbon fixation pathways
	11	Lecture 9 - Nitrogen fixation
	13	Lecture 10 – Nitrogen and forage quality contributions of legumes to grass-based forage systems in warm climates
	18	Lecture 11 - Temperature effects on forage plant growth and development
		Lecture 12 - Moisture effects on forage plant growth and development
	20	Lecture 13 - Light effects on growth, morphology, and development
		Lecture 14 – Effects of shading on forage plants
	25	Lecture 15 – Role of fire in grasslands
		Lecture 16 - Climate change and grassland ecosystems
	27	Lecture 17 - Ecosystem services of grasslands
		Ecosystem services of grasslands – Soil carbon
October	02	Ecosystem services of grasslands discussion – Greenhouse gases
	04	Ecosystem services of grasslands discussion – Wildlife habitat and pollinators
	09	**Exam 1 – Lectures 1-17**
	11	Lecture 18 – Silvopastoral systems (Dr. Jose Dubeux)
	16	Lecture 19 – Characteristics of tropical soils and plant responses to fertilization
		Lecture 20 – Nutrient competition and allelopathy among forage plants
	18	Lecture 21 - Forage plant interactions with mycorrhizae
		Lecture 22 - Flowering and seed production
	23	**ASA/CSSA/SSSA Meeting – NO CLASS**
	25	**ASA/CSSA/SSSA Meeting – NO CLASS**

	27	Lecture 23 - Pasture establishment
	30	Lecture 24 - Animal effects on pastures: Defoliation, selection, and treading
November	01	Lecture 25 - Animal effects on pastures: Excreta deposition and nutrient cycling
	06	Lecture 26 - Plant-animal interactions and factors affecting intake
	08	Lecture 27 - Forage quality: Definition and factors affecting forage quality
	13	Lecture 28 - Forage quality: Laboratory measures to predict forage quality
	15	Lecture 29 - Cell wall structure, composition, function, and role in forage utilization
		Lecture 30 - Forage antiquality factors
	20	Lecture 31 - Grazing systems and grazing management
	22	**Thanksgiving Holiday – NO CLASS**
	27	Lecture 32 - Grazing intensity and frequency
	29	Discussion – Grazing management
		Discussion – Mixed herbivore species grazing
December	04	Lecture 33 - Hay and silage production from C_4 Grasses
		Lecture 34 - Supplementation of forage diets and use of forage banks
	06	**Exam 2 (Lectures 18-34)**