

APPLIED BIOLOGY 360: FOOD & ENVIRONMENT II (Agroecology II)
Faculty of Land and Food Systems
University of British Columbia

Animals and Plants as Components of Agricultural Ecosystems

Course Description: APBI 360 uses a systems approach to investigate the functions and interactions of plants and animals in select agricultural ecosystems. Students will develop an appreciation of how animals can contribute and/or impact on sustainable food production systems. Throughout this course, students will have opportunities to apply principles of agroecology/sustainability from APBI 260/265 (prerequisite) or those introduced in class when we discuss the basic design, analysis and management of agroecosystems. Animals in agroecosystems add a new dimension of complexity into any agroecosystem and students will be challenged to further develop their problem-solving and team skills in this area.

The concepts explored and integrated into this course will be based on BC examples but are of global significance for sustainable agriculture and community development. Abiotic factors will be examined in utilizing a systems approach; however, some emphasis will be on select crop and livestock species (rangeland plants, fruit & vegetable crops, sheep, cattle & poultry) and the design of certain systems for mixed food production. As both insects and wildlife (*the impact of wildlife on food production and the impact of food systems on wildlife*.) have significant impacts on many food systems, short presentations/assignments by both the students and the instructor (guest speaker(s)) will be included. (Note: topics may include insect population ecology relating to insect pests and their natural predators).

A combination of background lectures/research-discussion sessions and 3 short Team-Based Learning (TBL) cases (about 2-4 weeks each) are provided in this learner-centred experience, with an emphasis on progressive-formative evaluation and feedback for students. Actual & virtual field trips are incorporated at certain points to allow students a first hand look at some existing mixed farms, to facilitate a sharing of information/experience between farmers and students, and to allow students a chance to consider/evaluate various indicators of sustainability for food production agroecosystems.

“Connect” will be utilized for sharing assigned course readings and general information; group internet-discussions, research reports and assignment submissions will be on Connect &/or Google-doc. Guests will include farmers/ranchers and other lecturers in Land & Food Systems.

Instructor: Dr. David McArthur david.mcarthur@ubc.ca MacMillan 133 [Office hours: T/Th 11:00-12:00, or by appointment]. Dr. McArthur has a background in mixed plant-animal farming and has research/teaching experience with vegetable & fruit crops, statistics, plant nutrition/physiology/symbioses, pomology and the control of berry crop pests with IPM/reduced-risk pesticides.

Example References (Selected readings/sections tba):

BC Ministry of Agriculture and Lands (2009) Berry Production Guide: Beneficial Management Practices for Berry Growers in British Columbia. 279 pp

BC Ministry of Agriculture and Lands (2010) Vegetable Production Guide for Commercial Growers. 319 pp

BC Cattlemen’s Association (1998) Rangeland Handbook for BC Ed Campbell CW & Bawtree AH/ 204 pp

Gliessman, S.R. 2007. Agroecology – The Ecology of Sustainable Food Systems. Second Edition. Boca Raton: CRC Press LLC, Taylor and Francis Group. ISBN# 0-8493-2845-4.

Pretty J, Sutherland WJ, Ashby J, Auburn J, Baulcombe D, Bell M,...and Pilgram S (2010) The top 100 questions of importance to the future of global agriculture, International Journal of Agricultural Sustainability, 8:4, 219-236

Other peer-reviewed journals available in UBC's library system. Selected papers will be used as reading materials for class discussion/background - notifications will be given in advance.

Course Times:

Lectures/seminars/discussions/*field trips: Tuesdays 1:00 – 4:00 MCML 258.

Discussions/TBL group activities/*field trips: Thursdays 1:00-4:00 MCML – rm 258

*Field trips may be scheduled in either the Tuesday or Thursday periods.

Course Learning Outcomes:

By the end of this course, students will have:

- Identified the essential abiotic & biotic components of a sustainable mixed food production system
 - Reviewed & applied design principles for sustainable mixed food production systems with input from farmers/ranchers/lectures & through independent research/class discussion
 - Evaluated mixed food production systems in terms of indicators of sustainability and will have assessed key determinants of crop and livestock health/productivity
 - Applied appropriate agroecological principles to mixed food production systems to make recommendations on enhancing their sustainability (e.g. nutrient conservation)
 - Reviewed & discussed the impacts and interrelationships between agricultural systems and associated ecosystems (with respect to wildlife issues) and considered options in order to lessen impacts by and on wildlife (including some insect species)
 - Demonstrated critical-thinking, problem-solving skills and effective independent research as applied to mixed farm systems
 - Actively participated in the team-based-learning format & improved team-building skills
-

AGRO360 – Evaluation

25% Case 1: Design a Sustainable Mixed Farm– TBL-groups

15% Group presentation with Farm design & rationale (+references & multipliers: participation & input review by peers & instructor)

10% Group Letter to the Farmer: farm design & recommendations (+references & input review by peers)

10% - Quiz 1: Review/application of agroecological principles; mixed farm design/application issues

15% - Wildlife Issues Mini-group (2/group) presentations (10 minutes)

25% Case 2: Combining cattle on the range while diversifying into vegetable production

5% Work sheet completion after field trip to Hopcott's Farm

10% Group presentation with Cow Math & Cattle Rotation (+references & multipliers: participation & input review by peers & instructor)

10% Individual report: recommendations to the rancher/farmer with references

10% - Quiz 2

15% - Rapid Farm Assessment exercise (small groups presentations)

5% Work sheet completion after field trip to Crophorne Farm

10% Small group (2-3/group) presentations (10 minutes)

No Final Exam

Late submissions will receive a 10% penalty per day

All written assignments are marked for professional quality & style (with 1.5X spacing; 12 font)

References should follow American Psychological Association (APA) Style.

<http://www.library.ubc.ca/pubs/apastyle.html>

Term 2 (January – April 2016) Tentative Schedule:

Note Cases/lecture schedule may be altered depending upon the field trip schedule:

Week 1-2: Course Introduction & Topics

Overview of course requirements, learning objectives, schedule (topics & field trips)

A quick review of the Gliessman approach (presented in detail in APBI 260):

- the functional components of an agroecosystem; the whole system approach
- food animal production as it is mainly
- growing food plants with animals in agroecosystems

Looking for sustainability: what are the ecological, social & economic/marketing considerations in combining plant & animal food production?

Week 2-5: Case 1: Combining Plant Crops & Livestock:

Main cultural systems for case 1: overview of select berry crops in BC (**Visit to UBCFarm/Hort-Greenhouse**)

Overview of major food-animal species in BC: basic husbandry; shelter, nutrition, budget; vet issues.

About sheep and lamb operations

Case 1 research & discussions (Team-based Learning): exploration of the case agroecosystem & its suitability for sustainable mixed-farming. Assignment: Groups are to propose a mixed farming model with discussion of pros & cons re. ecological, social & economic considerations.

Group-time in class for research/discussion (TBL); Q & A with Instructor

Group Assignment: Power Point presentation with Farm design & rationale plus a Group Letter to the Farmer with farm design & recommendations

Week 5-6:

Presentations & submissions.

Quiz 1

Time permitting: Overview of wildlife issues - what is the basis for the conflict between sustainable food production and wildlife (in BC)? How starlings impact on food production. Is this a two-way conflict?

Assignment of mini-group Wildlife topics.

Week 7: Midterm Break

Week 8-9: Wildlife Issues

Lecture/discussion (if needed): Free-time in class for research; Q & A with Instructor

Presentations and integrative discussion

Week 9-12: Case 2: Home on the Range – grass-fed versus feedlot beef versus vegetable production?

Some lecture overview of range cattle production in BC, basic cattle husbandry; nutrition; vet issues.

Grazing systems: range grasses, pasture/hay, feedlots: grain/corn/silage; Overview of range ecology in BC. Looking for sustainability; ecological, social & economic/marketing considerations.

Field trip to Hopcott's cattle feedlot & berry farm

Groups are asked to provide assistance to a new rancher in the Nicola Valley who needs ideas/answers now not later (this is condensed case). Groups review & discuss the current cow-calf feedlot model – how does it work? Can it be made more sustainable through innovation and diversification? Could a grass-fed beef to market model be feasible? What would be the pros & cons re. ecological, social & economic considerations. Is a mixed farm/ranch model what is needed now?

Group-time in class for research/discussion (TBL); Q & A with Instructor

A short presentation of the group's recommendation on cattle herd-size & rotation with supporting rationale is required. Individual Letters to the rancher with recommendations to the rancher on becoming a mixed ranch/farm are to be submitted.

Week 12-14: Quiz 2

Case 3: Mini-case: Rapid Farm Assessments (mini-group assignment)

What makes for a sustainable mixed farm? What has been learned from cases 1 and 2? Now apply knowledge from your past findings and on indicators of sustainability (Gliessman) in a virtual tour of organic farms in BC (one/mini-group). Groups assignment.

Field trip to Crophorne Farm Westham Island – straight talk from the owner of a successful mixed farm

Presentations of mini-cases

Course summary overview, discussion of learning outcomes