

Plants & Society: BIOB38



Course Syllabus

Course description and objectives

BIOB38H provides an introduction to the scientific foundation and practice of food production. How do plants directly and indirectly feed the human population? Students will learn about the origin of agriculture and what traits people have been altering in domesticated plants over the course of the last 10,000 years. Emphasis will be on an understanding of the changes in how crops are grown since the 20th century, i.e. the Green Revolution and its legacy. A good portion of the lectures will be dedicated to a discussion of the most important plants that feed the world ('the top 20'). Since ancient times, people have used herbs and spices to add interest to their meals and the course will discuss the (historical) importance of these plants. Often, it is a fine line between healing plants and plants of addiction and we will learn about plant secondary compounds involved in both these purposes. Plants are also used to produce alcoholic beverages and the course will showcase how beer is brewed and from what plants. Lastly, plants are also very important for the fibers that keep us warm and also for the production of paper, which triggered the development of our culture and complex societies.

Instructor

Ivana Stehlik

Phone: 416-287-7422

Email: ivana.stehlik@utoronto.ca

Office hours during January: Mon 12 – 1.30 PM, or by appointment (just send me an email suggesting a few possibilities fitting your schedule and we will make it work!), SW563C

Office hours week 5 to end of course: Tue 12 – 2 PM, SW563C

Breakdown of marks

Quizzes about the two movies (1% each)	2%
Quercus practice quizzes on lecture material	3%
Spice treasure hunt	3%
Writing of one long-answer question about the lecture material	9%
Midterm exam (lectures 1-12)	33%
Final exam (cumulative 1-24)	40%
Poster	10%

Course times and location

Course lecture time and place: Tue, 3–5 PM, SY110; Tutorial time & place: Thu, 5–7 PM, ARC AC223

Lectures and other course material

Lectures will be posted on Quercus as PDF files, typically 24 h before class. You will need your UTOR ID to download the files.

Course schedule/Important dates

Dates in red are related to the poster project: please find detailed instructions in the file dedicated to this project in the Quercus course site 'Integrative Biology Research Poster Project'. Attendance in tutorial sessions is mandatory.

Week	Date	Lectures	Lecture topic/presentations
1	1/7	1/2	Origin of agriculture
2	1/14	3/4	Plant domestication
2	1/16	Tutorial: Communication of poster assignment expectations	
3	1/22	5/6	Methods of domestication
3	Outside class time: Look up your poster group #. Complete the personality test		
3	1/23	Tutorial: Meet your group members; group building activity	
3	1/24, by 5pm: Complete online quiz about how to deal with scientific sources; watch online video first		
4	1/28	7/8	Green Revolution I
4	1/30	Tutorial	Movie time: 'Dirt!' (including quiz after movie)
4	1/30	At the end of the tutorial	Group sign-up for long-answer question
5	2/4	9/10	Green Revolution II
5	2/6	Tutorial: group work session (work together in person)	
5	2/7, by 5pm: Online research topic registration for your group (SignUpGenius)		
6	2/11	11/12	Plants that feed the world I
6	2/14 Watch video on poster design, complete online quiz		
Reading week			
	2/23	Submit your long-answer question and answer about lecture 5/6 to turnitin	
7	2/25	13/14	Plants that feed the world II
7	2/27	Tutorial	Movie time: 'King Corn' (including quiz after movie)
8	3/4	15/16	Plants that please the palate
8	3/4-5	Complete 'Spice Treasure hunt in HL170	
8	3/6	Tutorial in ACC223: work on poster project	
9	3/11	17/18	Plants that heal the sick
9	3/13, by 5pm: Submit your poster draft via Turnitin for written feedback		
10	3/18	19/20	Plants that hook the mind and body
10	By 3/20: consult QUERCUS site to determine whether your group attends the 5-6pm or 6-7pm session on 3/21		
10	3/21	Tutorial: Peer feedback on poster (bring 6 printed copies of <u>letter-size version</u>)	
11	3/25	21/22	Plants the world thirsts after
11	3/27	Tutorial: group work session (work together in person)	
12	4/1	23/24	Plants of warmth and strength
12	4/3	Poster presentation day! Bring and present your final poster version	
April TBA (exam period) Final exam (cumulative; lectures 1-24)			

Communication policy

Students are required to regularly and often check their UTOR email to receive announcements or updates relating to the course. To inquire about course-related issues, students are strongly encouraged to solely use their UTOR email, as hotmail or other email providers are spam-filtered on a regular basis. It is the responsibility of you as the student to make sure your email reaches the instructor.

The instructor will not answer any questions related to material discussed in class or during the tutorials by email (unless it is a clear yes-no answer), but the student is encouraged to ask these questions before or after class or the tutorial, during official office hours or to schedule a meeting outside office hours by email.

Accessibility

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach the course instructor and/or the AccessAbility Services Office as soon as possible. Enquiries are confidential. The UTSC AccessAbility Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca.

Readings

There is no required reading, but most topics introduced in the lectures are covered in the book (Levetin and McMahon. 2007. Plants and Society. McGraw-Hill), which is the recommended course book. The book is available at UTSC's book store (hopefully both new and used books). The course's approach in regard to exam questions is as follows: questions will only cover material introduced in class. If you do not understand certain concepts, the recommended sections of Levetin and McMahon's book should be consulted, but anything present in the book yet not covered in the lectures will not be on the exam.

In case a certain topic is not covered in Levetin and McMahon's book, the lecture material originated most probably from primary scientific literature. In each such case, there is a reference provided on the slide along with e.g. a table or figure. This reference will help you to find the article using either ISI web of science (with your UTOR ID and password, on the website of the Gerstein library; <http://www.library.utoronto.ca/gerstein/>) or through Google scholar (does not work in all cases).

Penalty for late assignments

You can only get a copy of the quiz, in person and one per person, and hand it in on the day of the movie. This is non-negotiable unless you bring a valid doctor's note. There will be a penalty of 5% per day for the long-answer assignment received late. There are two days during which you can do the spice walk. Weekend days count as individual days. Unless there are extenuating circumstances (e.g. medical reasons with a medical certificate), a mark of zero will be applied to assignments submitted one week late or more. Heavy workloads or malfunctioning computer equipment are not legitimate reasons for late submission. If you know ahead of time that you have a legitimate reason why you cannot hand in the assignment, let the course instructor know before the due date.

Missed exams or assignments

Students who miss an exam or a deadline of an assignment for reasons entirely beyond their control must notify the instructor within 3 days that you missed the exam or deadline of the assignment. In case you do not do this, you will receive a 0 on the exam or assignment. Then submit your doctor's note or other documentation to Jennifer Campbell in SW421D. You may submit the doctor's note or other documentation for the reason AFTER you notify the instructor, ie you need to first and foremost notify the instructor for missing the exam or assignment. A make-up will be scheduled within 10 days of the original date, unless you provide a second form indicating that your problem has persisted. The appropriate documentation is the official University of Toronto medical certificate (www.utoronto.ca/health/form/medcert.pdf).

Academic integrity policy

According to Section B of the University of Toronto's *Code of Behaviour on Academic Matters*, it is an offence for students to:

- use someone else's ideas or words in their own work without acknowledging that those ideas/words are not their own with a citation and quotation marks, i.e. to commit plagiarism.
- include false, misleading or concocted citations in their work.
- obtain unauthorized assistance on any assignment.
- provide unauthorized assistance to another student. This includes showing another student completed work.
- submit their own work for credit in more than one course without the permission of the instructor
- falsify or alter any documentation required by the University. This includes, but is not limited to, doctor's notes.
- use or possess an unauthorized aid in any test or exam.

Violation of the Code of Behaviour on Academic Matters will force the instructor to provide a written report of the matter to the Chair/DeanProvost's and a penalty according to the U of T's guidelines on sanctions will be put into place.

Assignment to the whole class: Long-answer questions and answers about lecture

Purpose

The purpose of this assignment is to encourage you to think about course material in a critical way. You will be expected to determine the key points underlying a given block of course material (Lecture 5/6 Methods of Domestication), and then use logic and creativity to design a good question to assess understanding of these points. Finally, you will have to outline a complete answer key for marking your question.

Overview

This assignment will be completed in a group of 2-3 students and your group will hand in a single assignment. For this assignment, you must create a written-answer question suitable for an exam along with an answer key for your question, based on assigned material covered in lectures (lecture 5/6 Methods of Domestication). You may select your own group, or be assigned to a group. Your group needs to be registered by TBA. Please write the names of your group members on a piece of paper and give it to Ivana Stehlik in class or during office hours.

Due date

The deadline for submission is Sun TBA by midnight (11:59 PM). You will need to submit the assignment to Turnitin.com. Internet traffic on turnitin probably is enhanced just before midnight, thus don't wait to the last minute... No extensions will be granted unless with legitimate documentation. Late assignments receive a penalty of 5% per day.

Evaluation

Your mark will depend on our assessment of the quality and clarity of your question and answer, and the extent to which it tests understanding of concepts, rather than just straight recall of details (marking rubric see below).

Equal work-load assessment

To get a mark for this assignment, **each member of your group must hand in a confidential assessment of work-load sharing** in which they briefly outline whether work was shared equally by all group members (this can be hand-written and dropped into the box in front of SW563). You must put your full name and student# on this assessment, which **only** Ivana Stehlik will review. Ivana Stehlik will keep these reports confidential, they will not be read by anyone else, and will be destroyed after final marks are submitted. If everything was fine, then you need only write: 'equal work by all group members'. If you feel that someone in your group did not do their fair share, you should outline the problem, along with the name of this group member. If there is consensus within a group that one member did not do a fair share of the work, then a penalty may be applied to that individual's mark. Hand in your equal work-load assessment by the first class after submitting your assignment to turnitin.

Format guidelines

1. Your question should result in an answer worth approximately 15-20 marks. Your answer key must clearly indicate which points would receive marks, and the total mark-value of the question.
2. You may construct multi-part questions as long as the parts are related to each other. You may include figures or tables for interpretation questions if you wish.
3. You may refer to real organisms, places, data, or situations, or you may invent hypothetical ones for your question. For example, you may choose to write a question about *Planta edulis*, a plant that has been recently discovered in Fairyland.
3. This assignment should be between 1 and 2 written pages plus one additional page for any figures or tables you may use. Font size is 11pts in Times Roman, and the line spacing is 1.5 lines.
4. Your answer key must be clear and understandable, but can be written in point form.
5. The best questions/answers will test understanding of material, rather than straight recall of memorized facts.

Tips for writing a good question & answer

Tip 1: One approach to designing an exam question is to first decide on the main points you wish to have emerge in a good answer to your question, then work backwards to design a question that should elicit these answers. Your group should work out together which aspects of the topic you want to highlight in your question.

Tip 2: One way to split the work of this assignment fairly across your group and to ensure your question and answer are reasonable is:

Four group members: have 2 group members write the first draft of a question (without discussing it with the rest of the group!), then have the other 2 group members read the question and compose what they think is a good answer to the question, with assigned marks (without discussing it with the two people who wrote the question!). Then meet as a group of 4 and fine tune the question and answer and discuss what was intended versus how it was interpreted.

Three group members: have one person draft a question (without discussing it with the rest of the group), have each of the other 2 members independently sketch out an answer to the question. Meet as a group—did both members interpret the question the same way? Work together as a group to fine-tune the question and answer.

I strongly advise you to follow Tip 2 when writing your assignment. The most common error on this assignment arises when a group is unable to objectively recognize what answers would reasonably arise from their question, or does not anticipate how a naïve audience will interpret their question.

Handing in your assignment

- Each group must submit ONE digital copy of their assignment via Turnitin.com by the due date (see overview table page 3). Your assignment must have the full names of all group members and your assigned group number printed on the first page.
- Each individual must submit their own confidential work-load assessment into the box outside SW563.
- Marking of this assignment is by your course TA.

Submission of long-answer question/answer to Turnitin

Students will be asked to submit their long-answer questions and answers to **Turnitin.com** for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their work to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site:

(<http://www.utoronto.ca/ota/turnitin/ConditionsofUse.html>)

Turnitin.com is most effective when it is used by all students; however, if and when students object to its use on principle, the course offers a reasonable offline alternative. The student will then be asked to meet with the course instructor to outline and discuss the report before its final submission to demonstrate the process of creating the report according to the academic integrity policy.

Marking scheme (max total 25 pts)

Tests understanding (5 pts max)

- Requires application of concepts to novel data or examples and/or explanation of concepts
- Minimizes straight recall

Question & answer are correct (5 pts max)

- Accurate representation of course material and other published data in the subject area

Question would reasonably lead to answer given (5 pts max)

- Interpretation of question is clear
- Informed person in this course would be likely to give answers on key after first exposure to the question

Clarity and quality (5 pts max)

- Grammar, vocabulary and structure contribute to ease of reading and interpretation
- Citations given where needed
- Question is at the right level for this course

Answer has clear and appropriate mark distribution (2.5 pts max)

- Item of more importance or requiring more explanation have higher marks assigned to them than less important or straight recall answers
- Items of similar difficulty have similar mark value.

Creativity (2.5 pts max)

Correct length: -10% of the total mark if too long or too short

'Spice treasure hunt'

Sharpen your senses and learn about the most often used herbs and spices, in parallel to the in-class lecture material! In week 8 and during your allotted time window of 4 hours, take the 'spice treasure hunt' which will be set up in the 2nd floor corridor of the SW wing (where the BIO labs are located or where Karolyn Keir's office is). Near one of the back staircases leading into the corridor, there will be a reference table with all the top most important spices, where you can see and smell the spices and herbs connected with their names. Lining the sides of the corridor, there will be stations with anonymous spices for you to identify using the reference station, your nose and your eyes (and your smartphone). Beyond the names, you will also have to answer some questions connected to the spices. You can answer the questions directly while taking the quiz on Quercus, or write down your answers and answer the Quercus spice assignment later. There will be more instructions about the specifics of the 'spice treasure hunt' at the spice reference table. This assignment is worth 3% of your final grade.

Practice questions on the lecture material

Similarly as in my portion of BIOA02, I have assembled a vast question bank to practice the lecture material of BIOB38. All questions are based directly on my slides and are hence fully relevant for the midterm and final exams. There is an average of 90 questions per double lecture (with a minimum of 77 and a maximum of 110 questions). I will not answer any questions about the quizzes, but if you feel that some answers are wrong (2019 is the first time these questions are used...), please email me at ivana.stehlik@utoronto.ca.

Question banks will be open to practice approximately one week before the class and will remain open until the final exam, but the actual deadline for doing the individual quizzes is two weeks after the lecture has happened. You can retake all the quizzes as many times as you like and your latest try will be used towards a maximum total of 3% of your final grade. In other words, each quiz is worth $3\%/12 = 0.25$ pts.

Poster assignment

Purpose

The effective communication of information to an intelligent, but naïve, audience is a critical skill in many professions. Professional communication may take many forms, from an informal presentation of ideas in a group engaged in problem-solving tasks, to a formal oral presentation at board or executive meetings, to the creation and presentation of a written report or poster at conferences and elsewhere. Professional communication also demands that the ideas being presented are supported by evidence, as in many cases, the audience receiving the information will demand such evidence so that they can properly assess the merit of the ideas.

1. The purpose of this assignment is manifold: Learn to communicate scientific concepts and ideas effectively in both oral and written forms.
2. Develop a capacity to work collaboratively with diverse group members by managing workload, time, and group dynamics.
3. Acquire information literacy skills (such as searching, evaluating, and critically reading scientific sources) and academic skills (such as taking detailed notes, thinking critically and creatively, and respecting academic integrity).
4. Integrate knowledge across various biological disciplines.

Assignment Support

All communications and support for this assignment will be provided through the dedicated project-specific Quercus site entitled ***Integrative Research Poster Project – Winter 2018***. Please ensure that you check this site regularly for updates and announcements. Note that this site is separate from the Quercus sites for the individual B-level courses, which you would access for course materials, syllabi, etc. Deadline reminders, instructions, and announcements with regards to project logistics will be available on this project-specific Quercus site **only**.

Please note: While the course instructors value your learning in this assignment and may be willing to answer your questions, the project-specific TA should be your main point of contact for all communications and support for this project. Note that office hours held by individual course instructors cannot be used as assignment support sessions, as this would limit the quality of instructor help you would receive for each courses' exams and evaluations.

Evaluation

This assignment constitutes **10% of your final grade in each of the up to three core courses for which you are registered** in the Winter term. [E.g., a student enrolled in both BIOB11H3 and BIOB51H3 in the Winter will have their poster project grade count towards 10% of their final grade in BIOB11H and in BIOB51H].

The grade for this research poster project will be based on your poster presentation in Week 12 of the semester: Thursday, April 5th for Winter 2018. Multiple judges will evaluate your poster on the presentation day. The grading rubric that they will use will be posted on the project-specific Quercus site so you understand the criteria for assessment.

You will be required to complete multiple tasks during the semester leading up to the poster presentation day. The tasks and mini-deadlines are detailed in the *Assignment Timeline and Due Dates* section in the specific file on this topic under the Quercus course 'Integrative Biology Research Poster Project'. **Please note that you will receive a penalty of 2% of your final grade in each course for every task that you do not complete by a given deadline.** For example, if you fail to complete the tasks assigned to mini-deadlines 1 and 2, then you can achieve at most 6% of the 10% grade allotted for this poster project in each of the 3 courses.

Research Topic Registration

You are required to register your group's research poster topic in Week 5 of the semester. Winter term deadline: Friday, Feb 9th before 5pm. Registration will take place via "SignUpGenius", and a link to the registration site as well as instructions for registration will be made available at the start of Week 4. Each topic can be selected up to five times, and topic registration will be first-come, first-served. Groups can only register for one topic.

Possible poster topics, generated by Ivana Stehlik

See more topics on QUERCUS under the course 'Integrated Biology Research Poster Project'

Ancient DNA reveals how agriculture changed our height, digestion, and skin color

It's long been known that farming changed humans forever, right down to our DNA, but until now those changes have been pieced together by looking at genetic variations in today's populations, which are simply echoes of what happened back then. The new research, however, allows scientists to see those changes almost in real time.

<https://www.sciencealert.com/ancient-dna-suggests-agriculture-triggered-changes-linked-to-height-digestion-and-skin-colour>
<https://phys.org/news/2011-06-farming-blame-size-brains.html>

Importance of shattering genes for domestication of grasses

Seed shattering (or pod dehiscence, or fruit shedding) is essential for the propagation of their offspring in wild plants but is a major cause of yield loss in crops. Research into the genetic mechanism underlying seed shattering provides a premier prerequisite for the future breeding program for harvest in crops.

[https://en.wikipedia.org/wiki/Shattering_\(agriculture\)](https://en.wikipedia.org/wiki/Shattering_(agriculture))
<https://www.frontiersin.org/articles/10.3389/fpls.2015.00476/full>

Mutation breeding in rice

New varieties of rice made using nuclear techniques have helped Bangladesh increase its rice production three-fold in the last few decades. This in turn has enabled the country to stay one step ahead of its rapid population growth.

<https://www.iaea.org/newscenter/news/bangladesh-triples-rice-production-with-help-of-nuclear-science>
<https://www.iaea.org/newscenter/news/plant-mutation-breeding-helps-bangladesh-to-feed-its-growing-population>

Evolutionary history of cultivated citrus species

Citrus fruits - oranges, lemons, limes, kumquats and grapefruits - are among the most important commercially cultivated fruit trees in the world, yet little is known of the origin of the citrus species and the history of its domestication. Now, researchers have performed the largest and most detailed genomic analysis on 30 species of citrus, representing 34 citrus genotypes, and used chloroplast genomic data to reconstruct its evolutionary history

<https://www.sciencedaily.com/releases/2015/04/150414212311.htm>
<https://www.genomeweb.com/sequencing/analysis-citrus-genomes-offers-peek-domestication-oranges-mandarins>

Domestication and evolution of Canola

Scientists recently published the genome of *Brassica napus* -- commonly known as canola. Their discovery paves the way for improved versions of the plant, which is used widely in farming and industry.

<https://www.sciencedaily.com/releases/2014/08/140822084252.htm>
<https://phys.org/news/2014-08-science-canola-oil-nutritious-broccoli.html>

Can GM save our bananas against deadly fungus strain?

Genetically modified banana trees can resist the deadly fungus that causes Panama disease, which has devastated banana crops in Asia, Africa, and Australia and is a major threat for banana growers in the Americas.

<http://www.sciencemag.org/news/2017/11/gm-banana-shows-promise-against-deadly-fungus-strain>
<https://www.popsci.com/worlds-bananas-under-attack-disease>

Insects are increasingly evolving resistance to genetically modified crops

For more than 20 years, farmers across the globe have been planting crops, including corn, cotton, and soybeans, that have been genetically modified to express insecticide genes from the bacterium *Bacillus thuringiensis* (Bt). When susceptible pests munch on these “Bt crops,” they get poisoned. But insects that have developed resistance to Bt toxins can live on undeterred, and that resistance is growing.

<https://www.the-scientist.com/?articles.view/articleNo/50640/title/Insects-Are-Increasingly-Evolving-Resistance-to-Genetically-Modified-Crops/>
<https://www.the-scientist.com/?articles.view/articleNo/39495/title/Agricultural-Pest-Out-Evolves-GM-Crop/>

Importance of dormancy on speciation

Seeds that sprout as soon as they're planted may be good news for a garden. But in the wild, a plant whose seeds sprouted at the first warm spell or rainy day would risk disaster. More than just an insurance policy against late frosts or unexpected dry spells, it turns out that seed dormancy has long-term advantages too: plants whose seeds put off sprouting until conditions are more certain give rise to more species.

<https://www.sciencedaily.com/releases/2014/04/140418141238.htm>

Importance of wild relatives to crop plants and food production

Reinstating genes lost during domestication can make crops tougher and provides an alternative to using foreign genes to modify plants. New techniques that tinker with DNA, swapping in genes from undomesticated relatives, can make crops more similar to their original wild versions.

<https://www.sciencenews.org/article/restoring-crop-genes-wild-form-may-make-plants-more-resilient>
<https://www.sciencedaily.com/releases/2017/09/170920095922.htm>

Importance of genetic diversity in crop plants for food production

The vast diversity in gene sequences are what create the large variety of plants and animals we see today. Genetic diversity is crucial for adapting to new environments, as more variation in genes leads to more individuals of a population having favorable traits to withstand harsh conditions. Low genetic diversity, on the other hand, can be very problematic during changing environments, as all individuals will react similarly.

<http://www.Quercusc.com/news/science-environment-26382067>
<http://sitn.hms.harvard.edu/flash/2015/challenging-evolution-how-gmos-can-influence-genetic-diversity/>

The genetics of drug addiction - common gene mutation linked to drug addiction

With an ever-growing number of reports that certain individuals may inherit their susceptibility to drug addiction, in this day and age we can no longer put the blame on the social and environmental pressures that our society yields to. Certain individuals may be genetically predisposed to opioid dependence.

<http://www.nature.com/news/1998/980813/full/news980813-6.html>
<https://www.newscientist.com/article/dn2384-common-gene-mutation-linked-to-drug-addiction/>

When genes from GM crop plants escape to the wild

Agricultural practices create opportunities for crop DNA to invade wild plant gene pools. This allelic introgression concerns conservationists because the resulting changes in genetic diversity can reduce a population's ability to withstand changes like climatic shifts, disease, or pest outbreaks

<https://www.sciencedaily.com/releases/2016/04/160405182946.htm>
<http://www.nature.com/news/2010/100806/full/news.2010.393.html>

Mechanisms of heterosis in corn

Hybrid plants provide much higher yield than their homozygous parents. Plant breeders have known this for more than 100 years and used this effect called heterosis for richer harvests. Until now, science has puzzled over the molecular processes underlying this phenomenon.

<https://www.sciencedaily.com/releases/2012/12/121203081840.htm>
<https://www.sciencedaily.com/releases/2009/11/091119141046.htm>

Domestication history of cotton

Upland cotton came into existence more than a million years ago when two separate species hybridized, creating a plant that has multiple genomes. Unlike humans, who have two sets of chromosomes (from a mother and a father), the Upland cotton genome is configured with four sets, adding multiple layers of complexity.

<https://www.sciencedaily.com/releases/2012/04/120402093938.htm>

<https://www.sciencedaily.com/releases/2015/04/150420122836.htm>

Integrated pest management in rice – intersection of evolution and crop management

To prevent devastating insect pest outbreaks in rice that cause millions of dollars of damage, the International Rice Research Institute has called for a ban on certain insecticides in rice production

<https://www.sciencedaily.com/releases/2011/03/110317093349.htm>

<https://www.sciencedaily.com/releases/2012/01/120105112156.htm>

Genetics may halt worldwide wheat epidemics

Genetics is the most economical strategy to minimize losses in wheat, be it to fight rust fungi, blast fungi, or fly infestations.

<https://www.sciencedaily.com/releases/2017/11/171116132647.htm>

<https://www.sciencedaily.com/releases/2011/04/110420111904.htm>

<https://www.sciencedaily.com/releases/2017/11/171108215700.htm>