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Scientists discover gene to waterproof rice

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THE ARTICLE

Scientists discover gene to waterproof rice

Biologists have identified a gene that will allow rice plants to survive being submerged in water for up to two weeks – over a week longer than at present. Plants under water for longer than a week are deprived of oxygen and wither and perish. The scientists hope their discovery will prolong the harvests of crops in regions that are susceptible to flooding. Rice growers in flood-prone parts of Asia lose an estimated $US one billion annually to excessively waterlogged rice paddies. They hope the new gene will lead to a hardier rice strain that will reduce the financial damage incurred in typhoon and monsoon seasons and lead to bumper harvests. This is good news for people in these vulnerable regions, who suffer from food shortages as a result of heavy rains. Rice yields must increase by 30 per cent over the next 20 years to ensure a billion people can receive their staple diet.

The research was carried out by teams from the University of California and the International Rice Research Institute. Their findings have been published in the science journal *Nature*. Dr David Mackill, one of the paper's authors, said scientists had been trying to develop a water resistant breed of rice without success for half a century. He explained that: "Several traditional rice varieties have exhibited a greater tolerance to submergence, but attempts to breed that tolerance into commercially viable rice failed to generate successful varieties." Another team member, Dr Pamela Ronald, added: "Our research team anticipates that these newly developed rice varieties will help ensure a more dependable food supply for poor farmers and their families." The discovery is bound to add food for thought to the debate on the need for genetically modified rice.

WARM-UPS

1. STAPLE FOOD: Look at these staple foods from around the world. Talk with your partner(s) about how important each are to you. Research the ones you don't know:

bananas / pasta / cassava / tapioca / lentils / rice / bread / beans / sorghum / potato / yams

2. CHAT: In pairs / groups, decide which of these topics or words from the article are most interesting and which are most boring.

Biologists / genes / rice / oxygen / flooding / typhoons / vulnerable regions / staple diets / research / science / tolerance / food supply / poor farmers / debate / GM rice

Have a chat about the topics you liked. For more conversation, change topics and partners frequently.

3. VERSATILE: Rice is one of the most versatile foods in the world. Which of these ways of eating rice from around the world sound delicious to you?

- boiled rice with hot tea
- rice for breakfast
- rice and curry
- savory rice crackers
- rice cake with a strawberry inside
- pickled plum rice balls
- paella / risotto / gratin
- rice baked in milk and sugar
- sushi
- other _____

4. QUICK DEBATE: Students A believe the water-resistant rice is a great idea. Students B believe any kind of genetically modified food is dangerous. Debate this with your partners. Change partners often.

5. OPINIONS: In pairs / groups, write down the opinions of the following people or creatures on the new water-resistant rice. Change partners and exchange opinions. Talk about whether or not you agree with these opinions.

a. Rice farmer
b. Organic rice grower
c. Greenpeace activist
d. Very poor consumer
e. Scientist
f. An insect that lives in a rice paddy
g. Supermarket owner
h. Other_____

6. RICE: Spend one minute writing down all of the different words you associate with rice. Share your words with your partner(s) and talk about them. Together, put the words into different categories.

7. GM: Brainstorm a list of natural produce. Write down how each could be genetically modified. Share your ideas with your partner(s). Would you eat the genetically modified produce you discussed?

BEFORE READING / LISTENING

1. TRUE / FALSE: Look at the article's headline and guess whether these sentences are true (T) or false (F):

a. Divers and swimmers can soon eat a new type of underwater rice. T / F
b. Rice plants usually die if they are under water for a week. T / F
c. Asian rice farmers lose a billion dollars a year due to floods. T / F
d. Rice yields must rise 300 percent in the next 20 years. T / F
e. Scientists developed water-resistant rice plants fifty years ago. T / F
f. There are dozens of kinds of commercially viable, water-resistant rice. T / F
g. The new gene will help guarantee rice farmers better harvests. T / F
h. The new discovery will get more people talking about GM food. T / F

2. SYNONYM MATCH: Match the following synonyms from the article:

a.	perish	feasible
b.	hardier	at risk
c.	paddies	main
d.	vulnerable	conducted
e.	staple	more resilient
f.	carried out	displayed
g.	tolerance	die
h.	exhibited	sure
i.	viable	fields
j.	bound	resilience

3. PHRASE MATCH: Match the following phrases from the article (sometimes more than one combination is possible):

a.	a gene that will allow	rice strain
b.	wither and	viable rice
c.	regions that are susceptible to	must increase by 30 per cent
d.	a hardier	dependable food supply
e.	Rice yields	rice plants to survive being submerged
f.	Their findings	food for thought to the debate
g.	scientists had been trying to	have been published
h.	commercially	perish
i.	ensure a more	develop a water resistant breed
j.	bound to add	flooding

WHILE READING / LISTENING

GAP FILL: Put the words in the column on the right into the gaps in the text.

Scientists discover gene to waterproof rice

Biologists have identified a gene that will allow rice plants to survive being _____ in water for up to two weeks – over a week longer than at present. Plants under water for longer than a week are _____ of oxygen and wither and perish. The scientists hope their discovery will _____ the harvests of crops in regions that are susceptible to flooding. Rice growers in flood-_____ parts of Asia lose an estimated $US one billion annually to excessively _____ rice paddies. They hope the new gene will lead to a hardier rice _____ that will reduce the financial damage incurred in typhoon and monsoon seasons and lead to _____ harvests. This is good news for people in these vulnerable regions, who suffer from food shortages as a result of heavy rains. Rice _____ must increase by 30 per cent over the next 20 years to ensure a billion people can receive their staple diet.

waterlogged
deprived
yields
prone
submerged
strain
bumper
prolong

The research was _____ out by teams from the University of California and the International Rice Research Institute. Their findings have been published in the science journal *Nature*. Dr David Mackill, one of the paper's _____, said scientists had been trying to develop a water _____ breed of rice without success for half a century. He explained that: "Several traditional rice varieties have _____ a greater tolerance to submergence, but attempts to breed that tolerance into commercially _____ rice failed to generate successful varieties." Another team member, Dr Pamela Ronald, added: "Our research team anticipates that these newly developed rice varieties will help _____ a more dependable food supply for poor farmers and their families." The discovery is _____ to add _____ for thought to the debate on the need for genetically modified rice.

viable
bound
authors
exhibited
ensure
carried
food
resistant

LISTENING

Listen and fill in the spaces.

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AFTER READING / LISTENING

1. WORD SEARCH: Look in your dictionaries / computer to find collocates, other meanings, information, synonyms … for the words **'wither'** and **'perish'**.

- Share your findings with your partners.
- Make questions using the words you found.
- Ask your partner / group your questions.

2. ARTICLE QUESTIONS: Look back at the article and write down some questions you would like to ask the class about the text.

- Share your questions with other classmates / groups.
- Ask your partner / group your questions.

3. GAP FILL: In pairs / groups, compare your answers to this exercise. Check your answers. Talk about the words from the activity. Were they new, interesting, worth learning…?

4. VOCABULARY: Circle any words you do not understand. In groups, pool unknown words and use dictionaries to find their meanings.

5. STUDENT "RICE" SURVEY: In pairs / groups, write down questions about rice and its being genetically modified.

- Ask other classmates your questions and note down their answers.
- Go back to your original partner / group and compare your findings.
- Make mini-presentations to other groups on your findings.

6. TEST EACH OTHER: Look at the words below. With your partner, try to recall exactly how these were used in the text:

- gene
- wither
- prone
- hardier
- bumper
- staple
- carried
- findings
- century
- viable
- supply
- thought

DISCUSSION

STUDENT A's QUESTIONS (Do not show these to student B)

a. Did the headline make you want to read the article?
b. Did anything in the article surprise you?
c. What do you think of the idea of GM rice?
d. Do you think genetically modified food can be a good thing?
e. What are the arguments for and against GM food?
f. What do you think Asian farmers will think about the new discovery?
g. Are you a big rice lover?
h. Don't you think GM rice should be grown if it helps feed millions of people who might otherwise starve?
i. What question would you like to ask a scientist who genetically modifies food?
j. What do you think his/her answer would be?

STUDENT B's QUESTIONS (Do not show these to student A)

a. Did you like reading this article?
b. What do you think about what you read?
c. Do you think the new discovery is an important one?
d. What role does rice play in your life?
e. What is the best way to eat rice?
f. How would you adapt if your staple food suddenly disappeared?
g. What adverse knock-on effects of the new water-resistant rice do you think there could be in the rice paddy eco-system?
h. If you were a rice plant, would you like to be genetically modified to be able to survive longer under water?
i. Should rice be baked in milk and sugar, with perhaps cinnamon, raisins or even strawberry jam added, as with British rice pudding?
j. Did you like this discussion?

AFTER DISCUSSION: Join another partner / group and tell them what you talked about.

a. What was the most interesting thing you heard?
b. Was there a question you didn't like?
c. Was there something you totally disagreed with?
d. What did you like talking about?
e. Which was the most difficult question?

SPEAKING

GM FOOD: With your partner(s), create the advertising copy for the following new products:

Chicken eggs with four times the protein	
Strawberries that are ten times tastier	
Beef that has zero fat content	
Spinach that cures baldness in men	
Tomatoes the size of soccer balls	
Milk that helps you relax and sleep longer	

Change partners and exchange your ideas. Decide on who has the best adverts.

2-MINUTE RICE DEBATES: Face each other in pairs and engage in these fun 2-minute debates. Students A take the first argument, students B the second. Change partners often.

a. Rice is better than bread. vs. Bread is better than rice.
b. Brown rice is nicest. vs. White rice is nicest.
c. American rice is tastiest. vs. Indian / Thai / Japanese rice is tastiest.
d. Boiled rice is best. vs. Fried rice is best.
e. Rice pudding (rice baked in milk and sugar) is delicious. vs. That's no way to cook rice.
f. Boiled rice is great for breakfast. vs. Boiled rice is best for dinner.
g. Rice is more versatile than potatoes. vs. Potatoes are ten times more versatile.
h. Rice is boring. vs. You must be joking.
i. Sticky rice for me. vs. Real rice is fluffy.

HOMEWORK

1. VOCABULARY EXTENSION: Choose several of the words from the text. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

2. INTERNET: Search the Internet and find more information about rice. Talk about what you discover with your partner(s) in the next lesson.

3. STAPLE FOOD: Research staple foods from around the world. Show where different staples are grown around the world and the different ways they are used.

4. LETTER: Write a letter to the biologists who discovered the gene for the water resistant rice. Tell them what you think of their discovery. Ask them three questions. Read your letter to your classmates in the next lesson. Your partner(s) will answer your questions. Which letter did you like best and why?

ANSWERS

TRUE / FALSE:

a. F b. T c. T d. F e. F f. F g. T h. T

SYNONYM MATCH:

a.	perish	die
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c.	paddies	fields
d.	vulnerable	at risk
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PHRASE MATCH:

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f.	Their findings	have been published
g.	scientists had been trying to	develop a water resistant breed
h.	commercially	viable rice
i.	ensure a more	dependable food supply
j.	bound to add	food for thought to the debate

GAP FILL:

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Biologists have identified a gene that will allow rice plants to survive being **submerged** in water for up to two weeks – over a week longer than at present. Plants under water for longer than a week are **deprived** of oxygen and wither and perish. The scientists hope their discovery will **prolong** the harvests of crops in regions that are susceptible to flooding. Rice growers in flood-**prone** parts of Asia lose an estimated $US one billion annually to excessively **waterlogged** rice paddies. They hope the new gene will lead to a hardier rice **strain** that will reduce the financial damage incurred in typhoon and monsoon seasons and lead to **bumper** harvests. This is good news for people in these vulnerable regions, who suffer from food shortages as a result of heavy rains. Rice **yields** must increase by 30 per cent over the next 20 years to ensure a billion people can receive their staple diet.

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