

MCQ Question · mcqquestion.com

Allelopathy: Role in Irrigated Cropping Systems

Free · Share

Allelopathy: Role in Irrigated Cropping Systems

Allelopathy is a chemical effect of one plant on another. The chemicals are called allelochemicals. **It is not the same as shading or taking water.**



A black walnut tree (Juglans nigra) in a field. Its roots release juglone, a classic allelochemical that suppresses sensitive crops. Photo: Adrian S Pye / Geograph Britain and Ireland, CC BY-SA 2.0, via Wikimedia Commons.

At a Glance

Four facts to hold on to.

01
Term

Coined by Hans Molisch, 1937.

02
Releases

Roots, leaf wash, crop residue, volatiles.

03
Use

Weed control in rice–wheat systems.

04
Limit

Dose, soil and weather change the result.

Allelochemical A chemical one plant releases that affects another.
Autotoxicity A plant harmed by its own chemicals.
Sorgaab Water extract of sorghum plants.
IWM Integrated weed management: several tools together.

The Chemical Link

Must Know

Competition versus allelopathy

Ordinary competition	Allelopathy
Plants seek the same light, water and nutrients	A plant releases a chemical into its surroundings
No chemical action needed	The chemical changes seed or root growth, or soil life

- Hans Molisch used the word in 1937. His meaning included helpful and harmful effects.
- Farm studies often focus on harm to weeds.
- Black walnut releases juglone. Sensitive plants nearby may suffer.
- That does not prove every small crop fails near every walnut.

Release routes

1. Roots release chemicals.
2. Rain or irrigation washes leaves.
3. Crop remains break down.
4. Soil moves or changes the chemicals.

- Soil microbes may break the chemicals down.
- Some bind to soil and become less active.
- Sources: field-evidence review; plant chemicals and soil conditions.

Quick check 1. Hans Molisch's 1937 definition of allelopathy covered both harmful and beneficial effects. *(True or False?)* See answer ↓

Irrigated Farming

Good to Know

What irrigation changes

- Irrigation helps crops grow. It can help weeds too.
- Water can carry or dilute plant chemicals.
- The effect depends on how much water arrives and when.

Roots, residue, extracts

- Living roots release small amounts of chemicals. Some rice varieties slow weeds more than others. Shade also matters.
- Straw blocks light and slows weed seeds. As it rots it may release chemicals. Field studies struggle to split the two.
- Researchers soak plant parts in water and spray the extract. Dose, crop stage and weed change the outcome.
- A cover crop may hold weeds back. Its remains may slow the next crop.
- An ICAR-linked Karnal study tested rice straw in a rice–wheat system. Residue amount changed the weed groups in wheat. Source: ICAR-linked study.
- Do not burn straw to keep this effect. Burning removes the residue.
- See conservation agriculture and zero tillage.

> **Quick check 2.** Burning rice and wheat straw preserves its weed-suppressing value for the next crop. *(True or False?)* See answer ↓

Trials and Limits

Great to Know

Sorgaab

- Sorgaab is a water extract of sorghum.
- In a Pakistan cotton trial, sorgaab with reduced pendimethalin cut weed dry weight by 73% (half dose) or 82% (one-third dose).
- That is trial evidence, not a promise for every crop.
- Sources: sorgaab field trial; authors' 2005 summary.

Weed-suppressing rice

- Some rice lines hold weeds back better than others.
- IRRI studied rice allelopathy in field and lab work. It noted how hard it is to split chemical action from competition. Source: FAO, IRRI research.
- A line that works on one weed may not work on all.
- Seed choice must still meet yield, disease and weather needs.

Why results change

- A weak dose may do little. A strong one may hurt the crop.
- Soil microbes, rain, irrigation, weed type and spray time matter.
- Autotoxicity is real: a crop can be harmed by its own chemicals.
- Allelopathy can join integrated weed management with rotation, clean seed, timely weeding and careful herbicide use.
- Natural does not always mean harmless or enough.

Think it through: why is a lab allelopathy result not a proven field saving?

Soil, microbes, dose, rain and timing change real fields. Shade and competition can also explain part of an effect. A farm trial must separate them.

Quick check 3. Sorgaab with a reduced herbicide dose cut weed dry weight by 73–82% in a cotton trial. *(True or False?)* See answer ↓

Quick check 4. A crop can never be harmed by its own allelochemicals. *(True or False?)* See answer ↓

Exam Edge

Previous Year Questions

UPSC Mains 2016 asked about allelopathy.

Quick check 5. UPSC Mains 2016 asked about allelopathy in the major cropping systems of irrigated agriculture. *(True or False?)*

See answer ↓

Quick check 6. IRRI has never studied allelopathy in rice. *(True or False?)* See answer ↓

Quick Q&A

Coined by?

Hans Molisch, 1937.

Walnut chemical?

Juglone.

Sorgaab?

Sorghum water extract.

Self-harm?

Autotoxicity.

Mains 2016 Q8?

Allelopathy in irrigated systems.

🎲 Practice: Allelopathy in Irrigated Farming

4 verified questions from this topic.

🎲 More Environment and Ecology Practice

Related Topics

All Environment and Ecology Articles

Conservation Agriculture: The Three Real Principles

Zero Tillage: How It Changes Wheat and Rice Farming

Eco-Friendly Agriculture Practices Recognized in India

System of Rice Intensification: Less Seed, Less Methane

Practice MCQs

1. Who coined the term 'allelopathy'?

A. Charles Darwin

B. Hans Molisch

C. Gregor Mendel

D. Norman Borlaug

See answer ↓

2. Which chemical released by black walnut trees suppresses sensitive crops planted nearby?

A. Juglone

B. Chitin

C. Auxin

D. Nicotine

See answer ↓

3. Why are allelopathic rice varieties prized in irrigated rice cultivation?

A. They tolerate saline soils

B. They need no irrigation water

C. They suppress weeds such as barnyard grass

D. They fix nitrogen from the air

See answer ↓

4. Consider the following statements:

1. Allelopathy always harms neighbouring plants.

2. Allelopathic crop residues can suppress weeds in the next crop.

3. Allelopathic effects do not depend on concentration or soil microbes.

Which of the statements given above is/are correct?

A. 1 and 3 only

B. 2 only

C. 2 and 3 only

D. 1 and 2 only

See answer ↓

Answer Key

1. **B.** Correct because Hans Molisch, an Austrian botanist, coined the term allelopathy in 1937. His definition covered both harmful and beneficial chemical effects between plants. Modern usage stresses the suppressive effects on other plants. ↑ Q1
2. **A.** Correct because black walnut roots and leaves release juglone, a classic allelochemical. Juglone inhibits tomatoes, potatoes and many other sensitive plants. It is one of the best-documented examples of allelopathy. ↑ Q2
3. **C.** Correct because allelopathic rice varieties release compounds that inhibit weeds such as barnyard grass. This natural suppression cuts herbicide use in paddy fields. It fits integrated weed management in India's irrigated rice systems. ↑ Q3
4. **B.** Correct because statement 2 is true and the others are false. Molisch's definition included beneficial effects, so allelopathy is not always harmful. Allelopathic effects vary with concentration, soil type and microbial breakdown. ↑ Q4

Quick-check answers

1. **True.** ↑ 1
2. **False.** ↑ 2
3. **True.** ↑ 3
4. **False.** ↑ 4
5. **True.** ↑ 5
6. **False.** ↑ 6

Curated by Arsalan Zuberi · mcqquestion.com

Scan to read online

https://mcqquestion.com/articles/enveco0211-allelopathy-role-in-irrigated-cropping-systems/