



# Научные публикации по сельскому хозяйству из КНР в Национальной инфраструктуре знаний Китая (CNKI)



*Липенский А. В.  
Эксперт по электронным ресурсам  
ООО «Датаграмм»*



**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ НАУЧНОЕ УЧРЕЖДЕНИЕ  
«ЦЕНТРАЛЬНАЯ НАУЧНАЯ СЕЛЬСКОХОЗЯЙСТВЕННАЯ БИБЛИОТЕКА»**

# 2025 Research Fronts Report

Annual report identifies 110 hot and 18 emerging Research Fronts

Clarivate and the Chinese Academy of Sciences (CAS) released the 2025 Research Fronts, an annual report that identifies key areas of research to watch. This report marks the 12th annual collaboration between the two organizations and was launched at a ceremony held in Beijing.



Complete the form to download the report.

First Name\*



DECEMBER 8, 2025

# New Clarivate Report Reveals Mainland China as Emerging Global Biopharma Innovation Leader



*Out-Licensing Deals Reach \$50 Billion as Chinese Biopharma Innovators Drive Breakthrough Science*

**LONDON, U.K. December 8, 2025** Clarivate Plc ([NYSE: CLVT](#)), a leading global provider of transformative intelligence, in partnership with Healthcare Executive (E 药经理人), one of the most influential information and resources platforms of the Chinese pharmaceutical industry, today released its latest report, [Mainland China Biopharma Innovation 2.0: from rapid growth to quality driven development](#). The report reveals Mainland China has reached a historic milestone in global pharmaceutical innovation, emerging as the world's second-largest market for first launches of new molecular entities (NMEs), capturing an 18% share in 2024. Now in its seventh year, the report highlights a fundamental transformation of Mainland China's biopharmaceutical sector, from the Innovation 1.0 Great Leap Forward era of rapid expansion to an Innovation 2.0 phase defined by sustainable, quality-focused growth and global recognition.

<https://clarivate.com/news/new-clarivate-report-reveals-mainland-china-as-emerging-global-biopharma-innovation-leader/>

# A landmark insight from Clarivate.

Mainland China is now **the second-largest market for new drug launches**, driving global biopharma transformation. Our latest report, [China Biopharma Innovation 2.0](#), reveals how supportive policies, cutting-edge technologies, and strategic partnerships are shaping the future of healthcare.



## 18%

of global first launches of NMEs



## 450%

growth in patents since 2020



## \$50B

in out-licensing deals



## 38%

share of global TPD publications

Position	Institution	Share 2023	Share 2024	Count 2024
1 ★	<a href="#">Chinese Academy of Sciences (CAS), China</a>	2253.62	2776.90	9445
2	<a href="#">Harvard University, United States of America (USA)</a>	1206.87	1155.19	3915
3 ★	<a href="#">University of Science and Technology of China (USTC), China</a>	651.48	850.60	2609
4 ★	<a href="#">Zhejiang University (ZJU), China</a>	598.53	610.57	2110
5 ★	<a href="#">Peking University (PKU), China</a>	622.03	610.57	2110

## Leading Institutions

The 2025 Research Leaders are based on Nature Index data from 1 January 2024 to 31 December 2024.

[View table](#)

## Country/territory rankings

*i* Time frame: 1 September 2024 - 31 August 2025

Using the drop-down menus, choose the region of interest, and filter by subject area or journal group.

Region

Subject or journal group

Global

All

Apply

[Reset](#)

Showing 50 from 1 to 50 of 192 results

[Export table](#)

Position	Country/territory	Count	Share
1 ★	<a href="#">China</a>	<a href="#">43370</a>	37986.66
2	<a href="#">United States of America (USA)</a>	<a href="#">32455</a>	22202.39
3	<a href="#">Germany</a>	<a href="#">10838</a>	5015.05
4	<a href="#">United Kingdom (UK)</a>	<a href="#">9852</a>	3995.15
5	<a href="#">Japan</a>	<a href="#">5973</a>	3399.18

# Nature Research Intelligence Topics

 Time frame: 1 September 2024 - 31 August 2025

The [Nature Research Intelligence Topics](#) are created from networks of articles that cite each other, or articles that are very similar to each other, and we have over 30,000 topics at the most granular level, grouped into a 4-level hierarchy. On the Nature Index we show topics from the 2nd level of the hierarchy that have enough articles to provide insights on the topic.

All

Applied sciences

Biological sciences

Chemistry

Earth & environmental sciences






Health sciences

Physical sciences

Social sciences

Bar

Bubble

 Applied sciences  Biological sciences  Chemistry  Health sciences  Physical sciences

## 5-year topic growth

Position		Topic	% increase	◇	Count	◇
1	★	<a href="#">Organic Chemistry</a>	+138%		+3271	
2	★	<a href="#">Physical Chemistry</a>	+41%		+2138	
3	★	<a href="#">Chemical Engineering</a>	+97%		+2092	
4		<a href="#">Quantum Physics</a>	+102%		+1792	
5		<a href="#">Clinical Sciences</a>	+50%		+1742	
6	★	<a href="#">Electrical Engineering</a>	+2607%		+1434	
7		<a href="#">Bioinformatics and Computational Biology</a>	+195%		+1425	
8		<a href="#">Immunology</a>	+269%		+1003	
9	★	<a href="#">Macromolecular and Materials Chemistry</a>	+18%		+952	
10	★	<a href="#">Pharmacology and Pharmaceutical Sciences</a>	+158%		+927	

Position	Institution	Share 2023	Share 2024	Count 2024
1	<a href="#">Harvard University, United States of America (USA)</a>	530.01	530.58	1672
★ 2	<a href="#">Chinese Academy of Sciences (CAS), China</a>	307.69	376.55	1449
3	<a href="#">Max Planck Society, Germany</a>	245.15	284.97	1018
4	<a href="#">National Institutes of Health (NIH), United States of America (USA)</a>	278.37	276.88	735
5	<a href="#">Stanford University, United States of America (USA)</a>	188.37	222.57	752

[View full table >](#)



## Leading institutions in biological sciences

The 2025 Research Leaders are based on Nature Index data from 1 January 2024 to 31 December 2024.

[View table](#)

Position	Institution	Share 2023	Share 2024	Count 2024
★ 1	<a href="#">Chinese Academy of Sciences (CAS), China</a>	420.35	529.57	1729
2	<a href="#">Nanjing University (NJU), China</a>	128.55	150.91	479
3	<a href="#">Helmholtz Association of German Research Centres, Germany</a>	123.56	141.15	502
4	<a href="#">University of Chinese Academy of Sciences (UCAS), China</a>	92.01	130.38	682
5	<a href="#">Peking University (PKU), China</a>	107.56	128.34	512

[View full table >](#)

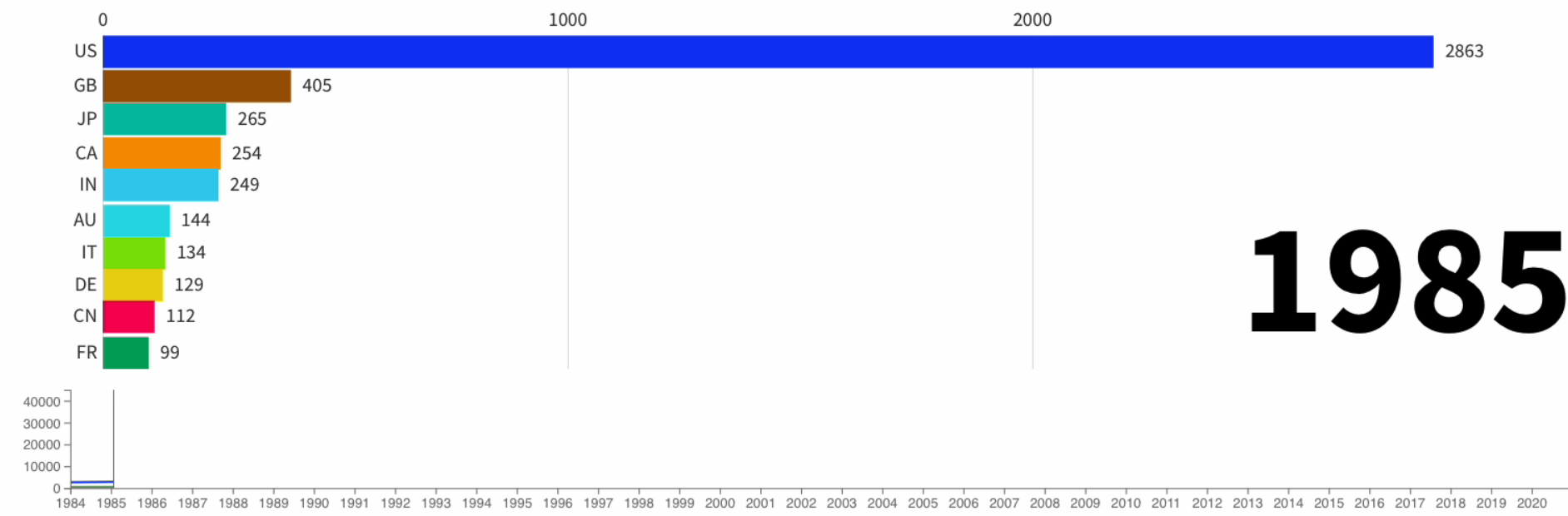
## Leading institutions in Earth & environmental sciences

The 2025 Research Leaders are based on Nature Index data from 1 January 2024 to 31 December 2024.

[View table](#)



# RENEWABLE ENERGY



From [Scinapse.io](https://scinapse.io)





南京理工大学  
NANJING UNIVERSITY OF SCIENCE & TECHNOLOGY

Файлы

основной

Перейти к файлу

- изображения
- README.md
- README\_EN.md

Синонг / README\_EN.md ↑ Вершина

Предварительный просмотр Код Обвинять Сырой

### Вертикальная крупномасштабная модель для общего сельскохозяйственного сектора



### Сбор данных и обучение модели

Опираясь на дисциплинарные особенности Нанкинского с обширные данные по конкретным поддисциплинам, таким

Тип данных	Объем
Книги	8863 тома
Документы	243 897 статей
Политики, стандарты, патенты и т. д.	196 748 документов

<https://github.com/njauzzx/Sinong/tree/main>



- Ключевой проект национальной информационной структуры Китая
- Ведущее национальное научно-исследовательское и информационно-издательское учреждение Китая
- В 1995 г. проект инициирован Университетом Цинхуа и Цинхуа Тунфан Холдинг Групп
- Поддерживается правительством КНР, ЦК КПК, Министерством образования, Министерством Науки и Технологий, Главным управлением по печати и публикациям и Национальным управлением по авторскому праву.
- Продвижение крупномасштабной оцифровки знаний Китая и создание ресурсов и платформы для глобального распространения контента и дополнительных сервисов
- Китайские цифровые библиотечные технологии собственной разработки и онлайн-платформа обмена ресурсами CNKI на передовом международном уровне

# Эволюция CNKI



1995

Цифровое издательство China Academic Journals (CD-ROM). Революция в издательской отрасли КНР

1999

China Journal Net – официальный запуск первого ресурса из проекта China National Knowledge Infrastructure (CNKI)

2003

Сотрудничество с Гонконгским университетом, послужившее началом международной экспансии: представительства в Германии, Японии, Южной Корее и на Тайване.

2008

Релиз Academic Misconduct Literature Check System – системы обнаружения нарушений в академической литературе

2020

Более 1000 партнеров по всему миру, завершение работы над World Knowledge Big Data Platform. Количество метаданных на иностранных языках достигло 100 миллионов записей.

2023

Запущена многоязыковая платформа CNKI International Platform, поддерживающая китайский, английский, японский, корейский, русский и арабский языки.

2023

Релиз Huazhi Large Language Model и CNKI AI

2025

Представлены революционные решения интегрированных информационных ИИ сервисов 'AI for Library,' 'AI for Knowledge,' 'ThesisWize.'

# Цифровые ресурсы CNKI: локальные и международные



200+

Стран

Международные  
сервисы



35 тыс.

Организаций

100% охват научно-  
исследовательских  
организаций в КНР



150 млн.

Пользователей



2,3 млрд.

Загрузок  
ежегодно



TOP3

По трафику  
пользователей

## AI Service Matrix

CNKI AI, AIGC Detection, AI Data, AI Pat+.....

## Technology Foundation

Huazhi LLM, MaaS Platform, AI KBase...



**Цифровые ресурсы:** World Knowledge Big Data, Ultra-large-scale Cross-industry LLM Corpus...



**Самый полный источник:** Охватывает более 95% академических публикаций КНР



**Высокие академические стандарты:** Разработано для университетов, широко используется в процессах академической интеграции.



**Глубокая связь со знанием:** От поиска литературы до новых открытий.

# CNKI дисциплины и коллекции



Естественные, технические науки, медицина						Социальные и гуманитарные науки				
10 Series	Mathematics/ Physics/ Mechanics / Astronomy	Chemistry/ Metallurgy/ <b>Environment</b> / Mine Industry	Architecture/ Energy/ Traffic/ Electromechanics, etc	<b>Agriculture</b>	Medicine & Public Health	Literature/ History/ Philosophy	Politics/ Military Affairs/ Law	Education & Social Sciences	Electronic Technology & Information Science	Economics & Management
168 Subject (Subdisciplin)	13	14	15	10	28	24	17	13	10	24

## Journals

- 64 million+ Full-text Articles
- 8,630+ Academic Journals
- 3,700+ Titles Back to Founding Years

## Dissertations

- 500+ Doctoral & 780+ Master Degree-granting Units
- 7.5M+ Dissertations & Theses

## Books

- 18,486 Volumes Books
- 5,400+ Types of Yearbooks
- 12,000+ Reference Works

## Proceedings

- 45,000+ Domestic Conferences and International Conferences
- 3 million+ Articles

## Newspapers

- 709 Major Newspapers
- 17.85 million+ Articles

## Patents

- 57.4 million+ Chinese patent records
- since 1985

## Standards

- 610,000+ Standards

## Achievements

- 1.2 million+ Achievements

## Statistics

- 2918 Types
- 34660 Volumes of Statistical Data
- 1251076 Indicators

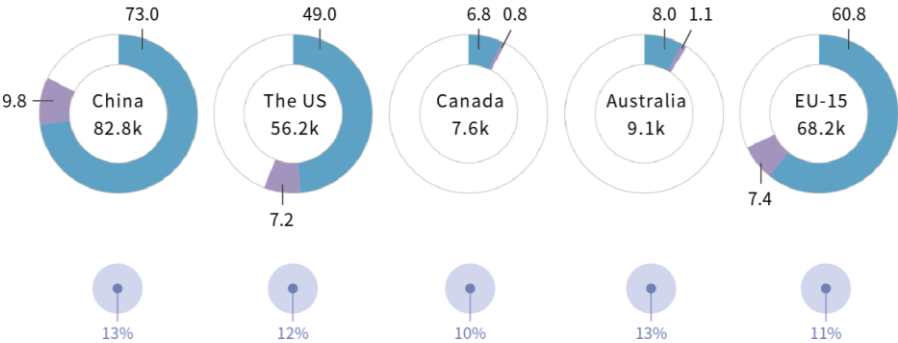
# Почему CNKI?

## Высокие показатели цитирования – признание

**13%** научных работ Китая входят в число 10% самых цитируемых в мире, что сопоставимо с показателями США и Европейского союза. По доле в 1% самых цитируемых статей Китай занимает первое место в мире (Digest of Japanese Science and Technology Indicators 2022, NISTEP)

Volume of papers in the top 10% and top 1%: China, USA, Canada, Australia and EU-15.

Proportion of Top 10% Highly Cited Papers by Country

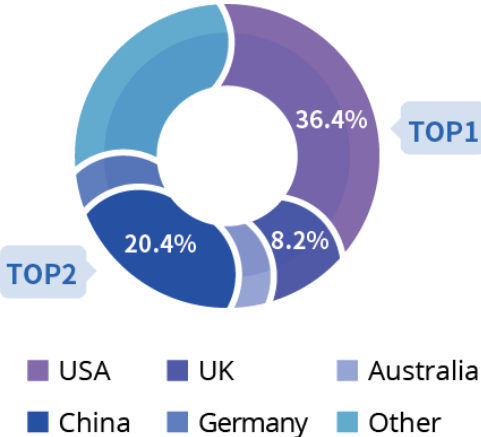


## Качество публикаций НИИ КНР

7 китайских исследовательских институтов входят в десятку лучших в мире по объему научных работ. (Nature Index 2024 Research Leaders)

## Стремительный рост количества высокоцитируемых авторов

В 2024 году в Китае насчитывалось 1405 высокоцитируемых исследователей, что составляет 20,4% от общего числа в мире. (Clarivate 2024 Highly Cited Researchers)



2026 中国知网和海内外用户、合作伙伴、作者与读者聚力同心贺新岁，策马扬鞭赴新程！

Тема ▾ | |



Межбазовый ▾

Поиск Публикаций

Расширенный Поиск

## ЦИФРОВЫЕ РЕСУРСЫ

### Журналы

Академические Журналы Китая  
Монографические Серийные Издания  
Китая

### Материалы конференций

Конференции Китая  
Международные Конференции

### Статистика

Экономическая и Социальная  
Статистика Китая  
Национальная Перепись Населения  
Китая

### Англоязычные Ресурсы

Academic Reference

### Диссертации

Докторские Диссертации Китая  
Магистерские Тезисы Китая

### Газеты

Основные Газеты Китая

### Патенты и Стандарты

Патенты Китая  
Стандарты CNKI

### Избранные Базы Данных

Восточный Сборник  
Правительственные Газеты Китая  
Служба Знаний TCM

### Книги

Ежегодники Китая  
Справочные Издания Китая  
Электронные Книги CNKI

### Законы и Правила

Юридические Знания Китая

### AI инструмент <sup>нов</sup>

CNKI AI  
AI DATA  
AI Pat+Система патентного поиска

### Служба тестирования

Выявление AIGC AI  
Проверка на Нарушение Академической  
Дисциплины



<https://oversea.cnki.net/rus/>



# Academic Reference

Your gateway to China's latest research developments

Search within title, abstract, keywords



Advanced Search



**18,814,924**  
Abstracts



**257**  
English Journals



**219**  
Translated Journals



**1,026**  
English Books

## Resources

**15,227,623** articles  
Journal article

**703,181** articles  
Doctoral dissertation

**4,683,813** articles  
Master's thesis

**1,400,151** articles  
Conference paper

**37,977** chapters  
Book chapter

**988,945** items  
Bilingual Glossary

**1,349,983** articles  
Yearbook entry

# Тематические серии

## Subjects



Mathematics/ Physics/ Mechanics/  
Astronomy



Chemistry/ Metallurgy/  
Environment/ Mine Industry



Architecture/ Energy/ Traffic/  
Electromechanics, etc



Literature/ History/ Philosophy



Electronic Technology &  
Information Science



Agriculture



Politics/ Military Affairs/ Law



Education & Social Sciences



Medicine & Public Health



Economics & Management

Search within title, abstract, keywords



Advanced Search

## Agriculture

Crop

Horticulture

Forestry

Animal Husbandry and Veterinary

Plant Protection

Fundamental Science of Agriculture

Agronomy

Aquaculture and Fishery

Agricultural Engineering

Silkworm and Honeybee, Wild Animal Pr



<input type="checkbox"/> Subscribed	2,003,099 results
<b>AVAILABILITY</b>	<i>Journal article</i> <i>Abstract Only</i>
<input type="checkbox"/> Abstract only	1. Harm of Environmental Pollution to Plant Leaves
<input type="checkbox"/> Full text	Chemical Education ,Issue02,2007
	XIA Zhiqing LI Hui(College of Chemistry and Environmental Science,Henan Normal University,Xinxiang Henan Province 453007)
	▶ Abstract    Full text (in Chinese)



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<b>AVAILABILITY</b>	<i>Journal article</i> <i>Full text access</i>	
<input type="checkbox"/> Abstract only	1. Prokaryotic expression of vp3 gene of Muscovy duck parvovirus,and its antiserum preparation for detection of virus multiplication	
<input checked="" type="checkbox"/> Full text	Chinese Journal of Biotechnology ,Issue01,2015	
	Yu Huang,Yumin Zhu,Shijuan Dong,Ruisong Yu,Yuanshu Zhang,Zhen Li	
	▶ Abstract    PDF    Bilingual	



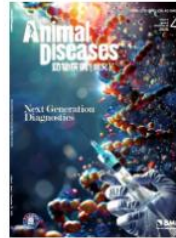
<input type="checkbox"/> Subscribed	1,881,800 results
<b>AVAILABILITY</b>	<i>Journal article</i> <i>Abstract Only</i>
<input checked="" type="checkbox"/> Abstract only	1. Harm of Environmental Pollution to Plant Leaves
<input type="checkbox"/> Full text	Chemical Education ,Issue02,2007
	XIA Zhiqing LI Hui(College of Chemistry and Environmental Science,Henan Normal University,Xinxiang Henan Province 453007)
	▶ Abstract    Full text (in Chinese)



## English Journals



Agricultural Science & T...  
Comprehensive IF:0.344  
Combined IF:0.484



Animal Diseases  
Comprehensive IF:0.056  
Combined IF:0.169



Animal Nutrition  
Comprehensive IF:1.753  
Combined IF:2.797



Chinese Forestry Scienc...



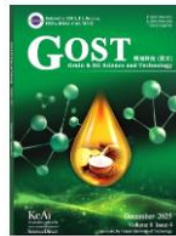
Chinese Rice Research ...



Forest Ecosystems  
Comprehensive IF:0.795  
Combined IF:1.199



Forestry and Society Ne...



Grain & Oil Science and ...  
Comprehensive IF:0.675  
Combined IF:1.175



Journal of Animal Scienc...  
Comprehensive IF:1.616  
Combined IF:2.669



Journal of Cotton Resea...  
Comprehensive IF:0.608  
Combined IF:0.824



Journal of Forestry Rese...  
Comprehensive IF:0.640  
Combined IF:1.120



Journal of Integrative Ag...  
Comprehensive IF:1.116  
Combined IF:2.024

# Академические издательства КНР



中国科技出版传媒股份有限公司  
China Science Publishing & Media Ltd.(CSPM)  
科学出版社



TSINGHUA  
UNIVERSITY PRESS



北京科学技术出版社有限公司  
Beijing Science and Technology Publishing Co.,Ltd.



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XI'AN POLYTECHNIC UNIVERSITY



THE CHINESE ECONOMISTS SOCIETY



湖南人文科技学院  
Hunan University of Humanities, Science and Technology



北京理工大学  
BEIJING INSTITUTE OF TECHNOLOGY



人民音乐出版社  
PEOPLE'S MUSIC PUBLISHING HOUSE

Journal article

[Full text access](#)

### 1. Investigation on the action mechanisms of taurine on rumen microbial crude protein synthesis and nitrogen metabolism in beef steers using sodi

动物营养(英文), Issue03, 2025

Manman Fan; Jinming Hu; Cheng Liu; Shuo Zhang; Yufeng Liu; Guangyong Zhao; State Key Laboratory of Animal Nutrition and Feeding, College of Animal Science and T...

▶ Abstract



PDF

Journal article

[Full text access](#)

### 2. Vitamin E inhibits inflammation and improves immune response of mud crabs(Scylla paramamosain) by activating an antioxidant enzyme system

动物营养(英文), Issue03, 2025

Xiangkai Li; Shichao Xie; Yuhang Yang; Zheng Tang; Yinqiu Tian; Haiqing Cao; Tingting Zhu; Min Jin; Peng Sun; Qicun Zhou; Laboratory of Fish and Shellfish Nutrition, Scho...

▶ Abstract



PDF

Journal article

[Full text access](#)

### 3. $\beta$ -Alanine decreases plasma taurine but improves nitrogen utilization efficiency in beef steers

动物营养(英文), Issue03, 2025

Shuo Zhang; Yufeng Liu; Jinming Hu; Cheng Liu; Mengmeng Li; Guangyong Zhao; State Key Laboratory of Animal Nutrition and Feeding, College of Animal Science and T...

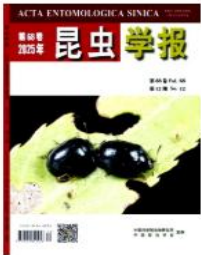
▶ Abstract



PDF



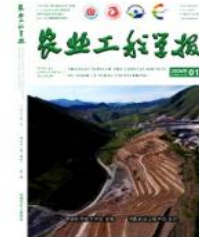
## Translated Journals



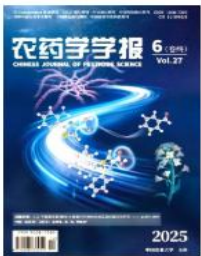
Acta Entomologica Sinica  
Comprehensive IF:0.958  
Combined IF:1.145



Acta Agronomica Sinica  
Comprehensive IF:2.425  
Combined IF:3.190



Transactions of the Chin...  
Comprehensive IF:2.615  
Combined IF:3.446



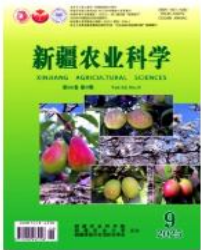
Chinese Journal of Pesti...  
Comprehensive IF:1.690  
Combined IF:1.971



Plant Protection  
Comprehensive IF:3.225  
Combined IF:3.563



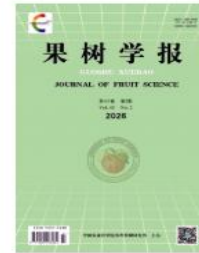
Scientia Agricultura Sinica  
Comprehensive IF:2.487  
Combined IF:3.191



Xinjiang Agricultural Scie...  
Comprehensive IF:0.732  
Combined IF:1.000



Journal of Tea Science  
Comprehensive IF:1.782  
Combined IF:2.156



Journal of Fruit Science  
Comprehensive IF:1.737  
Combined IF:2.170



Acta Agriculturae Univer...  
Comprehensive IF:1.010  
Combined IF:1.349



Chinese Journal of Radi...  
Comprehensive IF:1.115  
Combined IF:1.148



Journal of Northern Agric...  
Comprehensive IF:0.859  
Combined IF:1.17

*Journal article*

*Full text access*

### 1. Study on the Correlation between the Activities of Key Enzymes Involved in Anthocyanin Synthesis and the Content of Important Polyphenols in

Journal of Tea Science ,Issue06,2020

CAO Bingbing;WANG Qiushuang;QIN Dandan;FU Donghe;FANG Kaixing;JIANG Xiaohui;LI Hongjian;WANG Qing;PAN Chendong;LI Bo;WU Hualing

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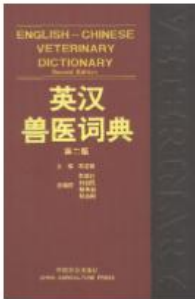
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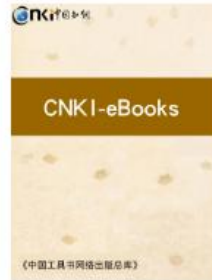
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English-Chinese Veterinary D...

陈凌风 (主编)

中国农业出版社

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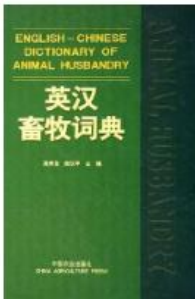
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# 中国南方与东南亚国家农作物病虫害综合防控科学与技术进展

Advances in Science and Technology of Integrated Crop Pests Control in Southern China and Southeast Asia

主 编：朱耀顺 孔宝华 杨林伟

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## TaSnRK2.1-2D Contributes to Drought Tolerance by Modulating ROS Production in Wheat

Nadeem Bhanbhro

10712

DOI: CNKI:CDMD:1.1025.435484

 KeywordsMQTL;TaSnRK2.1-2D;Drought tolerance;ROS;Wheat(*Triticum aestivum* L.) Abstract

Common wheat(*Triticum aestivum* L.)is one of the most widely consumed cereal crops globally,serving as a fundamental component of the daily diet for billions of people.As a staple food,wheat plays a pivotal role in global food security,providing a significant portion of the worlds caloric intake and serving as a primary source of protein,vitamins,and minerals.Beyond its nutritional value,wheat is a cornerstone of agricultural economies,contributing substantially to both domestic consumption and international trade.However,the productivity and sustainability of wheat cultivation are increasingly threatened by abiotic stresses,with drought being one of the most detrimental.Drought stress severely impacts wheat growth and development,leading to reductions in grain yield,plant height,and biomass production.These losses not only affect food supply but also have cascading effects on livestock feed production and agricultural economies.As global climate change exacerbates the frequency,intensity,and duration of drought conditions,understanding the molecular and genetic mechanisms underlying drought tolerance in wheat has become a critical priority for ensuring food security and agricultural resilience. (1)To address the challenges of drought stress in wheat,this study conducted a systematic review and meta-analysis of research published between 2000 and 2020,identifying 759quantitative trait loci(QTL)from 68 studies.These QTL were statistically integrated into 75meta-QTL(MQTL),revealing genomic regions with consistent effects on drought tolerance.A consensus genetic and physical map was constructed to pinpoint markers associated with these MQTL,providing a valuable resource for marker-assisted breeding.Additionally,113previously characterized drought-responsive genes were mapped,elucidating their allelic variations and potential roles in drought resilience.By consolidating fragmented genetic data,this study establishes a robust framework for molecular breeding,offering insights into the genetic architecture of drought tolerance in wheat.These findings not only advance the development of drought-resistant cultivars but also contribute to sustainable agricultural strategies under water-limited conditions.These MQTL collectively provide a comprehensive genetic map of drought tolerance hotspots in the wheat genome. (2)Among the candidate genes mapped to these regions,the Sn RK2 gene family emerged as a key player in drought stress signaling and response.Specifically,TaSnRK2.1-2D,a member of this gene family,was found to be strongly associated with drought tolerance through transcriptional profiling,under drought stress and functional validation studies.Further expression analysis of TaSnRK2.1-2D in 30 wheat accessions drought-

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Molecular Cardiology of China ,Issue06, 2007



西北农林科技大学

# 博士学位论文

*TaSnRK2.1-2D* 通过调控活性氧 (ROS)  
的产生增强小麦的耐旱性

培养单位 生命科学学院  
学科专业 植物学  
论文作者 Nadeem Bhanbhro  
指导教师 陈坤明 教授

2025 年 5 月

ABSTRACT

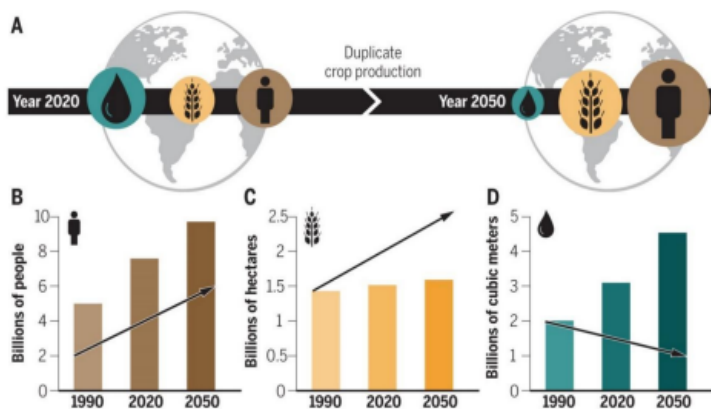
## ABSTRACT

Common wheat (*Triticum aestivum* L.) is one of the most widely consumed cereal crops globally, serving as a fundamental component of the daily diet for billions of people. As a staple food, wheat plays a pivotal role in global food security, providing a significant portion of the world's caloric intake and serving as a primary source of protein, vitamins, and minerals. Beyond its nutritional value, wheat is a cornerstone of agricultural economies, contributing substantially to both domestic consumption and international trade. However, the productivity and sustainability of wheat cultivation are increasingly threatened by abiotic stresses, with drought being one of the most detrimental. Drought stress severely impacts wheat growth and development, leading to reductions in grain yield, plant height, and biomass production. These losses not only affect food supply but also have cascading effects on livestock feed production and agricultural economies. As global climate change exacerbates the frequency, intensity, and duration of drought conditions, understanding the molecular and genetic mechanisms underlying drought tolerance in wheat has become a critical priority for ensuring food security and agricultural resilience.

(1) To address the challenges of drought stress in wheat, this study conducted a systematic review and meta-analysis of research published between 2000 and 2020, identifying 759 quantitative trait loci (QTL) from 68 studies. These QTL were statistically integrated into 75 meta-QTL (MQTL), revealing genomic regions with consistent effects on drought tolerance. A consensus genetic and physical map was constructed to pinpoint markers associated with these MQTL, providing a valuable resource for marker-assisted breeding. Additionally, 113 previously characterized drought-responsive genes were mapped, elucidating their allelic variations and potential roles in drought resilience. By consolidating fragmented genetic data, this study establishes a robust framework for molecular breeding, offering insights into the genetic architecture of drought tolerance in wheat. These findings not only advance the development of drought-resistant cultivars but also contribute to sustainable agricultural strategies under water-limited conditions. These MQTL collectively provide a comprehensive genetic map of drought tolerance hotspots in the wheat genome.

(2) Among the candidate genes mapped to these regions, the SnRK2 gene family emerged as a key player in drought stress signaling and response. Specifically, *TaSnRK2.1-2D*, a member of this gene family, was found to be strongly associated with drought tolerance through transcriptional profiling, under drought stress and functional validation studies. Further expression analysis of *TaSnRK2.1-2D* in 30 wheat accessions drought-tolerant and drought-sensitive varieties, *TaSnRK2.1-2D* demonstrated significantly improve drought

signaling, reactive oxygen species (ROS), nitric oxide (NO)-mediated regulation, and microRNA-related mechanisms. The insights presented herein offer valuable resources for improving global wheat production and agricultural sustainability through molecular breeding strategies. Provide references.

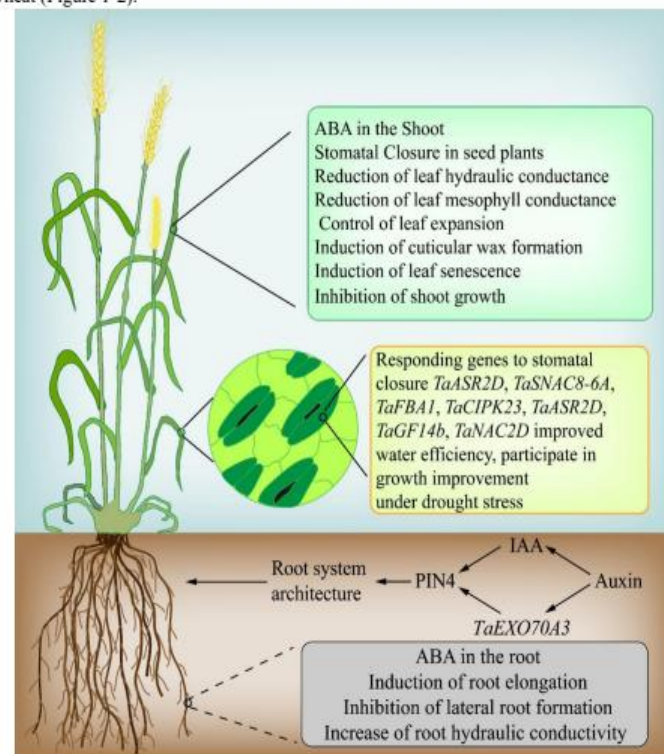


**Figure 1-1.** The past, present, and future of global climate, agriculture, and food security are of paramount concern. (A) Most projections indicate an increase in water scarcity in the forthcoming years. As the global population continues to expand, it is imperative that crop production also rises to meet the fundamental needs of society. To achieve this, plants must be optimized for greater water efficiency. (B) The estimated global population for the period 1990–2050 is depicted, with an arrow indicating the projected number of individuals residing in regions experiencing water scarcity. (C) The availability of global arable land for agriculture during the 1990–2050 period is illustrated, with an arrow denoting the anticipated demand for arable land necessary to ensure food security, given the current crop production rates per hectare. (D) The global demand for freshwater in agriculture for the 1990–2050 period is presented, with an arrow indicating the predicted reduction in freshwater availability for agricultural purposes, considering the prevailing trends in climate change and precipitation (Gupta et al., 2020).

### 1.1 Effect of drought stress on common wheat (*Triticum aestivum* L.)

Drought stress is detrimental to wheat plant growth and development, with major effects including reduced plant size, leaf area, grain number, tiller number, and plant biomass, as well as early maturity, limited leaf extension, reduced photosynthesis, deactivation of photosynthetic enzymes, and diminished quality of protein, vitamins (notably B vitamins),

lateral root formation, improving root water absorption capacity and drought resistance in wheat (Figure 1-2).



**Figure 1-2.** Schematic overview of the current understanding of how ABA content in wheat leaves and roots regulates stomatal movement, influencing plant form and function during drought. Root architecture, including structure and depth, can be modulated by *TaEXO70A3* and PIN4 independently of canonical auxin signaling, enhancing soil water uptake and drought tolerance (Bhanbhro et al., 2023).

### 1.2.2 Physiological response for drought stress

Developing drought-resistant wheat varieties is a critical objective in modern agriculture, particularly in the face of increasing water scarcity due to climate change. A key step in achieving this goal is the identification of orthologs of plant drought-resistant genes, which can serve as genetic resources for improving drought tolerance (Cheuk et al., 2020). Advances

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Electromechanics, etc Agriculture Plant Protection Crop Horticulture Animal Husbandry and Veterinary*Conference paper* [Full text access](#)1. THE MORPHOGENESIS OF *Pieties brassicae* GRANULOSIS VIRUS (PbGv) IN VIVO AND THE OBSERVATION OF ITS GENOME

Recent Development of Electron Microscopy 1985--Proceedings of the Third Chinese-Japanese Electron Microscopy Seminar, 1985

LI Weiqi Wurnisha YANG Xiangming The Xinjiang Institute of Chemistry,Academia Sinica,Urumqi China

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CH. DUQUE and M. INSTALLE Laboratoire d'Automatique, de Dynamique et d'Analyse des Systemes. Universite Catholique de Louvain Batiment Maxwell, Place du L

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Systems Science and Engineering--Proceedings of International Conference on Systems Science and Engineering(ICSSSE'88), 1988

Yin Xinyou Xie Huaai Qi Changhan Institute of Agricultural Systems Engineering Jiangxi Agricultural University Nanchang, China

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## 4. CONTROL OF A PROCESS PLANT FOR PRODUCTION OF LIGHT EXPANDED CLAY AGGREGATE

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Tot Steinar Schei~\* Berit Floor Lurid~\* Helge Mordt~(\*\*) \*SINTEF,Division of Automatic Control,N-7034 TRONDHEIM,Norway \*\*A/S Norsk Leca,P.O Box 66,Risløkkå,N

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## 5. THE FUNDAMENTAL STUDY OF GROUND WATER PROSPECTING BY INDUCED POLARIZATION METHOD

# Adaptive Large Neighborhood Search Algorithm for Smart Farm Picking and Distribution Integration Problem

Yiran Pan;Zhonghua Miao;Nan Li;Shanghai University;

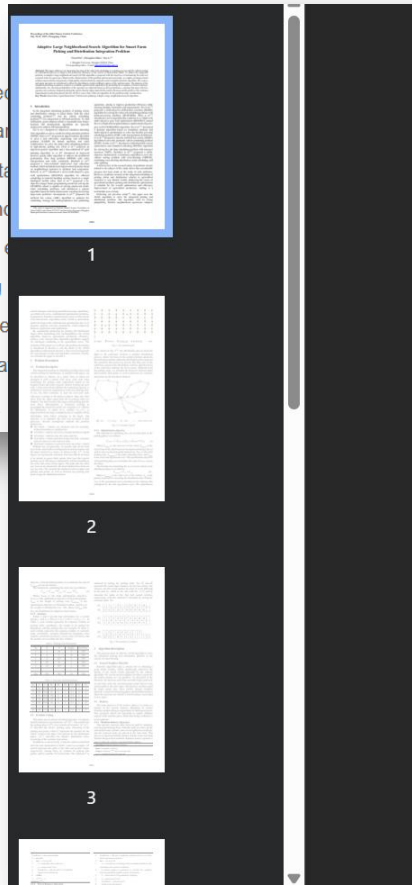
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## Keywords

Smart farm;;Agricultural robot;;Vehicle route planning;;Adaptive large neighborhood search algorithm

## Abstract

This paper addresses an integration decision problem of robot task scheduling in a picking process and the vehicle routing in a distribution process to improve the production efficiency in the context of farm-to-door mode. To address the integrated problem, an adaptive large neighborhood search (ALNS) algorithm is proposed with the objectives of minimizing the total cost occurred in the two processes. Based on the characteristics of the problem and our previous study, we employ an integer-based solution representation and generate a high-quality initial solution by using the nearest neighbor heuristic algorithm. The remove and repair operators are introduced to allow the algorithm to explore different regions of the solution space. The purpose of the simulated annealing acceptance criterion is to enhance global search capabilities by permitting the acceptance of worse solutions. Additionally, the selection probabilities of the operators are adjusted based on their performance, ensuring that more effective operators are used more frequently during the search, thereby improving both the search efficiency and the quality of the solutions. Experimental results demonstrate that the ALNS is a new state-of-the-art algorithm for the problem under consideration.



Proceedings of the 44th Chinese Control Conference  
July 28-30, 2025, Chongqing, China

# Adaptive Large Neighborhood Search Algorithm for Smart Farm Picking and Distribution Integration Problem

Yiran Pan<sup>1</sup>, Zhonghua Miao<sup>1</sup>, Nan Li<sup>1\*</sup>

<sup>1</sup>. Shanghai University, Shanghai 200444, China

\*Corresponding author . E-mail: [linan2019@shu.edu.cn](mailto:linan2019@shu.edu.cn)

**Abstract:** This paper addresses an integration decision of the robot task scheduling in a picking process and the vehicle routing in a distribution process to improve the production efficiency in the context of farm-to-door mode. To address the integrated problem, an adaptive large neighborhood search (ALNS) algorithm is proposed with the objectives of minimizing the total cost occurred in the two processes. Based on the characteristics of the problem and our previous study, we employ an integer-based solution representation and generate a high-quality initial solution by using the nearest neighbor heuristic algorithm. The remove and repair operators are introduced to allow the algorithm to explore different regions of the solution space. The purpose of the simulated annealing acceptance criterion is to enhance global search capabilities by permitting the acceptance of worse solutions. Additionally, the selection probabilities of the operators are adjusted based on their performance, ensuring that more effective operators are used more frequently during the search, thereby improving both the search efficiency and the quality of the solutions. Experimental results demonstrate that the ALNS is a new state-of-the-art algorithm for the problem under consideration.

**Key Words:** Smart farm; Agricultural robot; Vehicle route planning; Adaptive large neighborhood search algorithm

## 1 Introduction

In the integrated scheduling problem of picking robots and distribution vehicles in smart farms, both the robot scheduling problem<sup>[1][2]</sup> and the vehicle scheduling problem<sup>[3][4]</sup> are categorized as NP-hard problems. To find sufficiently good solutions within a reasonable time frame, heuristic and metaheuristic algorithms are typically employed to address NP-hard problems.

Liu et al.<sup>[5]</sup> designed an improved simulated annealing (SA) algorithm to solve a multi-traveling salesman problem (MTSP). Hari et al.<sup>[6]</sup> proposed an approximation algorithm to solve a task allocation, sequencing, and scheduling problem (TASSP) for human operators and robot collaboration. To solve the multi-robot scheduling problem

operations, aiming to improve production efficiency while meeting multiple constraints and requirements. Wu et al.<sup>[13]</sup> proposed a multi-objective differential evolution (MODE) algorithm for solving the robot cell scheduling problem with batch-processing machines (RCSP-BMs). Zhou et al.<sup>[14]</sup> introduced a novel algorithm that combines Levy flight with multi-objective grey wolf optimization (MOGWO), named the Levy flight and weighted distance update multi-objective grey wolf (LWMOGWO) algorithm. Xu et al.<sup>[15]</sup> developed a dynamic algorithm based on simulation methods and multi-objective optimization to solve the flexible job shop scheduling problem (FJSP) with transportation distribution. Li et al.<sup>[16]</sup> proposed a discrete artificial bee colony (DABC) algorithm to solve the stochastic vehicle scheduling problem (SVSP). Fontes et al.<sup>[17]</sup> developed a hybrid particle swarm

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排泥设备	soil discharging facility	China National Committee for Terms in Sciences and Technologies
吸头	soil receiver suction end	China National Committee for Terms in Sciences and Technologies
喷嘴	soil discharging nozzle	China National Committee for Terms in Sciences and Technologies
分泥板	soil valve, tumbling door	China National Committee for Terms in Sciences and Technologies
裸地	bare soil	China National Committee for Terms in Sciences and Technologies
冻土器	frozen soil apparatus	China National Committee for Terms in Sciences and Technologies
土壤水分平衡	soil water balance	China National Committee for Terms in Sciences and Technologies
土壤含水量	soil water content	China National Committee for Terms in Sciences and Technologies

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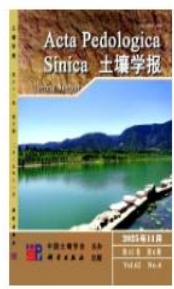
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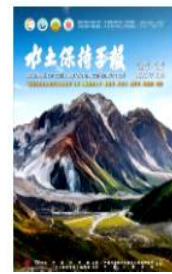
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Series Name: 农业科技

Subject Name: 农业基础科学

Articles: 6881

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# Chinese Journal of Eco-Agriculture

Chinese Journal of Eco-Agriculture

## Basic Information

Former Title: 中国生态农业学报;生态农业研究

Sponsor: 中国科学院遗传与发育生物学研究所;中国生态经济学会

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Soil secondary metabolites: An ecological link bridging microbial residues and soil organic carbon pools [Chinese Full Text](#) [English Full Text \(MT\)](#) LIU Zhanfeng;Guangdong Provincial Ke... 6-11

Significance and application limitation of the space-time Integration of Soil improvement and Energy production by using Straw (ISES) [Chinese Full Text](#) [English Full Text \(MT\)](#) CAI Zucong;HUANG Xinqi;WEN Teng;S... 12-20

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## 农业生态系统及其调控

Effects of different nitrogen application rates on photosynthetic characteristics and grain [Chinese Full Text](#) [English Full Text \(MT\)](#) SONG Xiao;GUAN Hanwen;GUO Tengf... 58-69

# How can modern intensive agriculture utilize species diversity? Insights from the important agricultural heritage rice-fish system

English Full Text (MT)

Chinese Full Text

CHEN Xin YE Junlong TANG Jianjun College of Life Sciences, Zhejiang University

浙江大学生命科学学院

**Abstract:** Species coexistence is a fundamental paradigm for the survival of organisms in nature. Throughout the long development of agriculture, humans have utilized the wisdom of species coexistence to establish agricultural systems that leverage biodiversity, such as intercropping, rice-fish coculture, and agroforestry systems. The rice-fish coculture system, which involves cultivating cyprinid fish in the shallow-water environments of paddy fields, has a long history and is widely distributed in souther... More

**Keywords:** species coexistence; rice-fish system; facilitative effect between coexisting species; functional trait compatibility; artificial intelligence;

**Series:** (D) Agriculture;(B) Chemistry/ Metallurgy/ Environment/ Mine Industry

**Subject:** Environment Science and Resources Utilization;Fundamental Science of Agriculture

**Classification Code:** S181

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# Research on the key points of recruitment and selection of human resource management in public institutions

梁宏

灵石县能源事务服务中心

Machine-translated for reference only

**Abstract:** 新时期，事业单位需要重视人力资源管理。在招聘甄选人才的过程中，文章建议采取完善试用期管理制度及时高效地做好人岗匹配、制定好分析工作和甄选要求、甄选培训人员、优化招聘人才途径、创新多元开发招聘渠道等措施，以期选拔高水平的人才进入单位开展工作，不断提高事业单位的竞争力。

**Keywords:** 事业单位; 人力资源;

**Series:** (J) Economics & Management;(G) Politics/ Military Affairs/ Law

**Subject:** Administration Science and National Administration

**Classification Code:** D630.3

**Online Release Time:** 2025-09-01 17:44 (The online publication date of CNKI does not represent the print publication date of the article.)

# Application Effect of Different Fertilizers and Fertilizer Ratio in Head Cabbage

[English Full Text \(MT\)](#)

[Chinese Full Text](#)

HAN Yu-ping   HU Miao   SHANG Miao   Yichang Agricultural Science Research Institute

Yichang Agricultural Technology Extension Center

宜昌市农业科学研究院   宜昌市农业技术推广中心   西藏山南市农业技术推广中心

**Abstract:** [Objective]To study application effect of new type of fertilizer in head cabbage.[Method] The plant traits,yield and economic benefit were compared after application of different fertilizer and fertilizer ratio( N-P-K),and the effects of fertilizer reducing and efficiency increasing in head cabbage cultivation was studied. [Result]Fertilization of 300 kg/hm<sup>2</sup> Shengmingyuan fulvic acid chelate( 10-10-10) +150 kg/hm<sup>2</sup> Xiashilande soil conditioner + 375 kg/hm<sup>2</sup> Shikefeng stable fertilizer( 16-8-18) ha... More

**Keywords:** Head cabbage; Fertilizer ratio; Fertilizer reducing and efficiency increasing; Application effect;


**DOI:** 10.13989/j.cnki.0517-6611.2018.36.031

**Series:** (D) Agriculture


**Subject:** Horticulture

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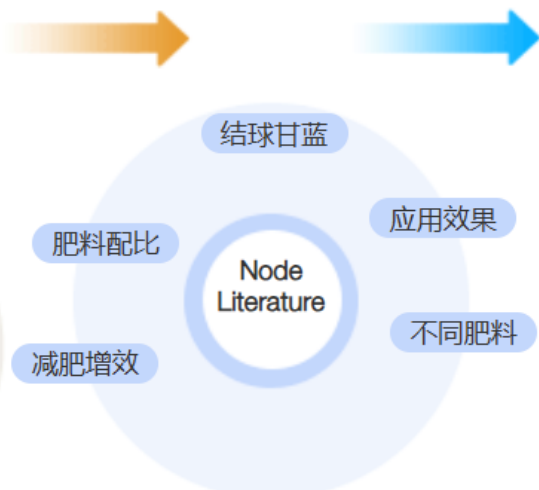
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- 产量和品质
- 硝酸盐含量
- 黄瓜产量
- 日光温室
- 番茄产量
- 施肥量
- 有机肥
- 含氨基酸水...
- 保护地
- 日光温室蔬菜

### TRUNK

- 硝化反应
- 有机肥
- 有机肥用量
- 不同施肥处理
- 养分含量
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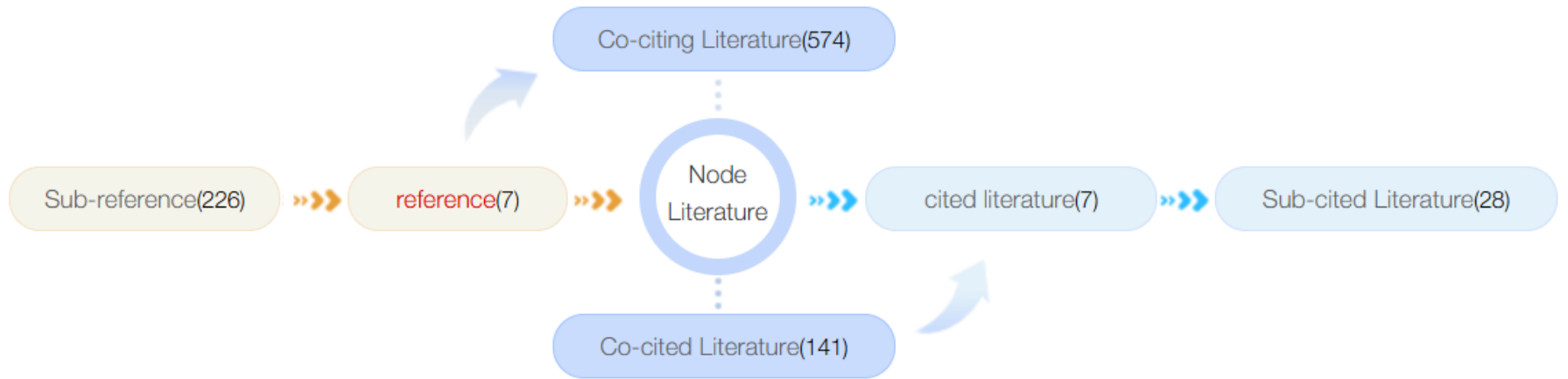
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- 氮磷钾
- 农艺性状
- 肥料利用率
- 营养品质
- 肥料贡献率
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- 收获期
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### LEAVES

- 土壤养分
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- 氮磷钾
- 植物根际促...
- 黄瓜产量
- 功能微生物
- 发酵液
- 微生物肥料
- 小白菜

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[1] Effects of Soluble Fertilizer Containing Amino Acids on Yield and Economic Benefit of Vegetables[J]. LIU Cui-ling;LIANG Zhi-jie;TENG Fang-chao;Yantai Agricultural Sci & Tech Institute;Sinochem Yantai Crop Nutrition Co.,Ltd;Shandong Zhaoyuan Agricultural Technology Extension Center.Journal of Anhui Agricultural Sciences,2015(30)

[2] 稳定性长效复合肥恩泰克在西兰花上的应用效果[J]. 曾祥明;肖焱波;段惠明.Journal of Changjiang Vegetables,2015(13)

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- 3 结论与讨论

中国农学通报 . 2023 ,39 (25)



# 云南茼蒿高产养分临界值施肥模型研究

陈检锋 尹梅 陈华 王志远 王伟 王应学 杨艳鲜 付利波

云南省农业科学院农业环境资源研究所

**摘要:** 为明确云南茼蒿科学施肥量,在嵩明、祥云、通海布置田间试验,研究耕层土壤养分、当季施肥量与茼蒿产量、净产值的关

Китайский бюллетень сельскохозяйственной науки. 2023,...



## Исследование модели внесения удобрений с учетом критической питательной ценности для высокоурожайного салата в провинции Юньнань.

Чэнь Цзяньфэн Инь Мэй Чэнь Хуа Ван Чжиюань Ван Вэй Ван Инсюэ Ян Яньсянь Фу Либо

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**краткое содержание:** Для уточнения научно обоснованной нормы внесения удобрений для салата в провинции Юньнань были проведены полевые эксперименты в уездах Сунмин, Сяньюнь и Тунхай с целью изучения взаимосвязи между содержанием питательных веществ в верхнем слое почвы, сезонным количеством удобрений и урожайностью салата, а также его чистой стоимостью. Результаты показали, что обработка N2P2K2 обеспечила самую высокую урожайность и чистую стоимость на каждом экспериментальном участке. Урожайность





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1 [频振诱控技术研究与应用论文选编 \(重大农业害虫频振诱控技术国际研讨会论文集\) \(1992-2007\)](#) International

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Sponsor: 农业部全国农业技术推广服务中心、国际水稻研究所、广西壮族自治区农业厅

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2 [International Conference on Agricultural and Biosystem Engineering\(ABE 2014\)](#) International

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3 [Preceedings of 2012 CSAM International Academic Annual Meeting](#) International

Conference Name: 2012中国农业机械学会国际学术年会 Conference Date: 2012-10-27 Sponsor: 中国农业机械学会

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#### 1 Картофельная промышленность и возрождение сельских районов 2025 (Китай)

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Количество цитирований: 4    Загрузки: 6244

#### 2 Материалы 4-го Симпозиума по развитию высококачественного и высокотехнологичного сельского хозяйства (отечественного) 2025 года

Название конференции: Симпозиум 2025 года (4-й) по развитию высококачественного и стандартного сельского хозяйства.

Дата встречи: 20.12.2025

Организатор: Научно-исследовательский центр современного сельского хозяйства, Шаньсийская академия сельскохозяйственных наук.

Загрузки: 570

#### 3 Труды 28-го академического симпозиума отделения ветеринарной патологии Китайской ассоциации животноводства и ветеринарной медицины, 27-го академического симпозиума Комитета по патофизиологии животных Китайского общества патофизиологии, 7-го академического симпозиума Комитета по экспериментальной патологии Китайской ассоциации лабораторных животных и 6-го академического симпозиума отделения ветеринарных патологов Китайской ассоциации ветеринарной медицины (



## Картофельная промышленность и возрождение сельских районов 2025

### Основная информация

Название конференции :26-я Китайская картофельная конференция

Время встречи :2025-05-19

Место проведения встречи :Чунцин, Китай

Организатор :Профессиональный комитет по картофелю Китайского общества растениеводства

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Цзинь Липин;

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Анализ ситуации с производством и сбытом картофеля в Китае в 2024 году.

Гао Минцзе; У Хань; Ван Аосюэ; Ло Цюю; Лю Цзысюань;

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# 序 言

习近平总书记 2024 年 4 月 23 日在新时代推动西部大开发座谈会讲话中强调“深入实施乡村振兴战略”“打造具有地域特色的乡村建设模式”。实施乡村振兴战略是党的十九大作出的重大决策部署，党的二十大对全面推进乡村振兴作出了重要部署，党的二十届三中全会《决定》强调“必须统筹新型工业化、新型城镇化和乡村全面振兴”。推进乡村全面振兴是新时代新征程“三农”工作的总抓手。2025 年的中央一号文件中明确要求“持续增强粮食等重要农产品供给保障能力”，深入推进粮油作物大面积单产提升行动。通过优良品种和农业技术的应用来提高作物生产效率，同时持续提升农产品品质，是未来一段时期内作物生产的重心。

马铃薯是全球大约三分之二人口的主食，也是我国重要的粮菜和加工原



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Journal  
 **HS1 Enhances Rice Heat Tolerance Through Maintenance of Chloroplast Function and Reactive Oxygen Species Homeostasis**  
An Wang;Zhengji Shao;Ying Liu;Guangheng Zhang;Li Zhu;Jiang Hu;Qian Qian;Deyong Ren  
**Rice Science** Volume 32, Issue 6, 2025, PP 751-755

Journal  
 **OsLAC12, a Laccase-Encoding Gene, Contributes to Rice Heat Tolerance Through Regulation of Antioxidant Defense and Secondary Metabolism.**  
Shuangcheng Ding;Zihui Gao;Yuhang Chen;Jiaxin Liu;Yuxin Xue;Yulu Teng;Simin Qin;Xiaohai Tian;Hongwei Wang  
**Plants (Basel, Switzerland)** Volume 14, Issue 18, 2025, PP 2846-2846

摘要: Heat stress (HT) exerts significant negative impacts on plant growth, development, and productivity. In this study, we identified OsLAC12, a heat-induced laccase-encoding gene, as a key regulator of heat tolerance in rice. Functional validation confirmed that OsLAC12 encodes an active laccase, with supporting evidence showing that roots of OsLAC12 overexpression lines exhibited ~1.5-fold higher laccase activity and nearly three times the lignin content compared to the wild type (WT). Under HT, o...

关键词: ROS;heat stress;laccase activity;lignin biosynthesis;thermotolerance

Journal  
 **Rice NADP-dependent malate dehydrogenase gene OsMDH8.2 is involved in heat tolerance**  
Min Jiang;Zhang Chen;Ebenezer Ottopah Ansah;Wangmenghan Peng;Lifeng Huang;Fei Xiong;Peng Li;Gynheung An;Wenfei Wang;Y...

摘要: Convergent and divergent evolution lead to plants with stronger adaptability to higher temperatures, thus averting crop biomass yield reductions. NADP-dependent malate dehydrogenase (NADP-MDH) is a redox-regulated enzyme that catalyzes the reversible reduction of oxaloacetate to malate. The



*'This Handbook promotes the critical and reflective capacities which economists can acquire from philosophy.'*  
- Sheila Dow, University of Stirling, UK

Издательство Edward Elgar представляет «Руководство по преподаванию философии экономистам» экономическому сообществу. Эта работа уникальна в своей области, поскольку в ней впервые обосновывается важность философии в экономическом образовании. Экономика как дисциплина, возникшая на основе философии, не может без неё обойтись. Поэтому Edward Elgar взяли за этот увлекательный проект, объединив усилия с многочисленными учёными со всего мира, которые являются



65% of companies report climate change drives demand



65 % компаний признают влияние изменения климата на спрос

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*Липенский А. В.  
Эксперт по электронным ресурсам  
ООО «Датаграмм»*

 [lipenskiya@dtgrm.com](mailto:lipenskiya@dtgrm.com)

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