

Information Security Issues and Countermeasures in Agricultural Science and Technology Journal Papers

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Abstract

Objective To analyze information security issues in agricultural science and technology papers, identify critical control points for information security, and provide a reference for preventing the leakage of national and corporate secrets through academic dissemination that may compromise information security.

Methods Based on relevant laws and regulations of China, as well as editorial practices, this study analyzes the critical control points for information security that should be addressed in agricultural science and technology journal papers.

Results Nine key points for information security in agricultural science and technology papers were summarized. The following strategies are proposed to address information security issues: enhancing editors' information security awareness and their ability to identify confidential data; establishing a robust information security review mechanism in the editorial office with designated personnel responsible for manuscript desensitization; and actively exploring technical solutions to partially resolve confidentiality issues.

Conclusion Editorial offices should prioritize national security and interests, and ensure the information security of published papers in accordance with national laws and regulations as well as the relevant provisions of the Ministry of Agriculture and Rural Affairs.

Full Text

Information Security Issues and Response Strategies in Agricultural Science and Technology Journal Articles

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Abstract

[Purpose] This study analyzes information security issues in agricultural science and technology papers, identifies critical control points for information security, and provides references for preventing the leakage of state and enterprise secrets through academic dissemination that could endanger information security. **[Methods]** Based on relevant Chinese laws and regulations and editorial work practices, this paper analyzes the key points requiring information security control in agricultural science and technology journal articles. **[Findings]** Nine key information security points in agricultural science and technology papers were summarized. Response strategies for information security issues are proposed as follows: enhancing editors' information security awareness and ability to identify confidential data; establishing a comprehensive information security review mechanism in editorial offices with designated personnel responsible for manuscript desensitization; and actively exploring technical solutions to partially address confidentiality issues. **[Conclusions]** Editorial offices should prioritize national security and interests, and ensure information security in published papers according to national laws and regulations and relevant provisions of the Ministry of Agriculture and Rural Affairs.

Keywords: Agricultural science and technology articles; Information security; Laws and regulations; National security; National interests; Response strategies

The public publication of academic papers serves as a crucial means of scientific and technological exchange, actively contributing to the shared development and progress of human society. However, the open dissemination of scientific and technological information is a double-edged sword, inherently carrying certain information security risks. While sharing innovative achievements, it may also leak secrets and pose risks to national security and enterprises through such disclosures.

China is a major agricultural nation, with agriculture forming the foundation of its national economy. In recent years, increased research funding across various sectors has generated a substantial volume of academic papers. According to Web of Science database statistics, as of May 2021, China ranked first globally in the number of SCI papers published [1]. In terms of citation frequency, Chinese papers in agricultural science ranked second worldwide [2]. With the development of modern technologies such as the internet, big data, and artificial intelligence, agricultural technology has advanced significantly [3]. As

both publication volume and influence continue to grow, information security concerns have become increasingly prominent. Much inadvertently disclosed data in papers may relate to national security and major interests. Agricultural journal editors must enhance their information security awareness during manuscript processing, understand relevant control points, and eliminate potential information security risks at their inception. This study focuses on the key information security points that agricultural journal editors should attend to in the current intelligent era, summarizing and exploring the primary information security issues in agricultural science and technology papers along with preventive measures and response strategies. The aim is to raise information security awareness among authors, reviewers, and editors, prevent the leakage of state secrets through academic exchanges, and jointly safeguard national information security and interests.

1. Information Security Key Points in Agricultural Science and Technology Papers

Information security in scientific papers encompasses core research results in science, technology, and socio-economics that are vital to national security, as well as inventions, patented technologies, industrial designs, experimental equipment, and trade secrets that are unsuitable for public disclosure. Information security issues in the agricultural field primarily involve the following aspects.

1.1 Data Unsuitable for Public or Premature Disclosure

As the primary industry, agriculture generates nationwide statistical data that must be carefully handled. Macroeconomic indicators such as national crop production, planting area, and yield per unit for grains and oilseeds involved in international trade or subject to volatile market conditions, as well as fertilizer production and application rates, pesticide usage, and farmer income growth, must be verified as originating from publicly released government data when appearing in papers. Such data is not prohibited from publication, but the timing must follow official government release schedules.

For crops with special purposes, such as poppies and cannabis used for medical treatment, or those related to national defense like natural rubber, editors must maintain heightened review awareness to ensure secure reporting of planting areas and production volumes.

1.2 Confidential Research Projects

Major national projects receive substantial state funding to support key basic research and high-tech studies, exerting profound influence on national development. When papers involve confidential projects, they must undergo careful review to ensure that relevant information and data align with officially published state information, with the paper's confidentiality classification not lower than the project's required level.

1.3 Important Germplasm Resources and Biotechnology Breeding

With support from national science and technology programs, China's transgenic breeding technology has initially established an innovation framework featuring independent genes, independent technologies, and independent varieties, achieving significant progress in breeding research and development [4]. For instance, corn resistant to fall armyworm became a highlight of the "13th Five-Year Plan" science and technology innovation exhibition. Transgenic insect-resistant corn that has obtained production application safety certificates demonstrates over 95% control effectiveness against major pests such as fall armyworm and yields more than 10% higher than current mainstream varieties [5]. To date, four insect-resistant and herbicide-tolerant corn varieties and three herbicide-tolerant soybean varieties have received production application safety certificates. China currently cultivates transgenic cotton on a large scale, with domestic transgenic insect-resistant cotton accounting for over 99% of market share [6].

Animal and plant germplasm resources and transgenic biotechnology breeding are closely related to national biosecurity. As global biosecurity situations become increasingly severe, biosecurity involves state secrets in biotechnology R&D, laboratory safety management, and biological data collection. The Biosafety Law of the People's Republic of China, implemented in 2021, explicitly stipulates that biosafety information classified as state secrets shall be managed according to the Law of the People's Republic of China on Guarding State Secrets and other relevant confidentiality regulations. Research papers involving industrialization of transgenic varieties and key loci and technologies for animal and plant transgenic breeding must comply with relevant national laws and regulations and detailed rules issued by the Ministry of Agriculture and Rural Affairs. Editorial review must be stringent to prevent leakage of research secrets in published papers.

1.4.1 Animal Epidemic Diseases

The health status of domesticated poultry, livestock, and aquatic fish not only concerns human life and health but also relates to social stability and economic security. When scientific papers use mathematical models for early prediction or provide historical reviews of previously undisclosed epidemics, special caution is required to prevent social panic and distrust manufactured through historical narratives. For such topics, we recommend filing with relevant authorities following the procedures for reporting major events.

According to the Animal Epidemic Prevention Law of the People's Republic of China, animal diseases are classified into three categories based on their harm to aquaculture production and human health: (1) Category I diseases, such as foot-and-mouth disease, African swine fever, and highly pathogenic avian influenza; (2) Category II diseases, such as rabies, brucellosis, and grass carp hemorrhagic disease; (3) Category III diseases, such as *E. coli* disease, avian tuberculosis, and soft-shelled turtle parotitis disease.

When scientific papers involve animal epidemic diseases, the following points require attention: (1) Article 20 of the Emergency Regulations for Major Animal Epidemics stipulates that major animal epidemics shall be promptly and accurately announced by the State Council's veterinary authority according to state-prescribed procedures; no other units or individuals may announce major animal epidemics. (2) The Monitoring Standards for Terrestrial Wildlife Epidemic Sources and Diseases (Trial) specifies that terrestrial wildlife epidemic information shall be reported by the State Forestry Administration to relevant state departments and legally released; no other units or individuals may release such information in any manner. (3) New animal pathogens may only be reported after registration in international standard laboratories.

1.4.2 Plant Pests and Diseases

Prevention and control of invasive alien species concerns national food security, biosecurity, and ecological security. The Ministry of Agriculture and Rural Affairs, Ministry of Natural Resources, Ministry of Ecology and Environment, and General Administration of Customs jointly issued the Measures for the Management of Invasive Alien Species. Article 19 establishes a joint information release system for invasive alien species, with the Ministry of Agriculture and Rural Affairs and relevant departments uniformly releasing nationwide situations.

For example, the hottest topic in Chinese agriculture in 2019 was the fall armyworm. As a migratory pest warned by the FAO, fall armyworm was first detected in Yunnan Province at the end of 2018 and rapidly spread to 27 provinces, severely threatening corn production. When papers introduce such pests and diseases, data regarding geographic area, damage extent, or yield reduction must be based on official data released by the Ministry of Agriculture and Rural Affairs and relevant departments.

1.5 Food Safety

Food safety is fundamental to people's livelihood, representing a "heartwarming project" that directly relates to public health and life safety, economic development, and social stability. It is also a hot-button issue prone to social concern. Such articles on food public safety frequently appear in technical and popular science journals. When reporting, verification of facts must be accompanied by careful consideration of social impact.

1.6 Data on National Soil Pollution Surveys

Soil issues extend beyond the soil itself, affecting citizens' health, living environment safety, and China's agricultural product exports. Soil pollution is a critical environmental protection focus, representing a severe and sensitive problem. When papers address "pollution sources and contaminated area," editors must carefully review whether sensitive information exists and whether it is suitable for public release.

1.7 Geographic Information

National territory and geographic information concern national security and interests; map security is as important as territorial security. The Regulations on Map Management (effective January 1, 2016) stipulate in Article 8 that map compilation must follow national standards and content representation regulations. Maps must not contain: (1) content endangering national unity, sovereignty, and territorial integrity; (2) content endangering national security or harming national honor and interests; (3) state secrets; (4) content affecting ethnic unity or violating ethnic customs; (5) other content prohibited by laws and regulations. Article 12 requires that important geographic information data in maps must use legally published data. Article 13 mandates that maps compiled using state secret surveying results must use surveying results processed by confidentiality technology from the State Council's surveying and mapping geographic information authority or provincial-level equivalents.

Papers involving the following issues require review according to regulations before publication. According to the Ministry of Land and Resources Order No. 77, the Provisions on Map Review Management (effective January 1, 2018), Article 5 requires applications for map review to the surveying and mapping geographic information authority for: (1) publishing, displaying, loading, producing, importing, or exporting maps or products with map graphics; (2) republishing, redisplaying, reloading, reproducing, reimporting, or reexporting previously approved maps or products with changed content; (3) maps or products with map graphics intended for overseas publication, display, or loading. Article 7 specifies that the State Council's surveying and mapping geographic information authority reviews: (1) national maps; (2) maps covering two or more provincial-level administrative regions; (3) maps of Hong Kong, Macao, and Taiwan; (4) world maps and maps primarily showing foreign territories; (5) historical maps.

Administrative maps frequently appear in papers, such as maps of China where authors often omit the ten-dash line in the South China Sea. This issue concerns national territorial integrity, so editors must pay careful attention during manuscript review.

1.8 Meteorological Information

Meteorological information concerns national military security, agricultural production, and social stability. Liu Yuejin, a professor at the University of International Relations and founder of national security studies, stated: "Meteorology is information and also a resource; meteorological data constitutes an element of information security and resource security" [7].

Manuscript review for scientific papers must be conducted according to laws and regulations including the Meteorology Law of the People's Republic of China, Data Security Law of the People's Republic of China, Measures for Meteorological Data Sharing, and Measures for the Management of Meteorological Data (Trial), with the principle of safeguarding national security and data security.

Special attention should be paid to meteorological elements in key areas and sensitive regions.

1.9 Military-to-Civilian Technology Achievements

During participation in military-to-civilian technology transformation, agricultural scientists may gain some understanding of the technology' s military usage or background. When introducing research backgrounds in papers, authors may extend into military domains. Journal editors reviewing such articles must ensure coverage is limited to agricultural applications and does not expand arbitrarily.

2. Response Strategies for Information Security Issues

- (1) Enhance information security awareness and ability to identify confidential data. Weak information security awareness and insufficient recognition of its importance lead to passive or negligent leakage, as well as false or misleading information. For journal practitioners, regular information security training in the agricultural field is necessary to improve awareness and identification capabilities for confidential data.
- (2) Currently, the processing of scientific journal articles lacks a complete information security review mechanism, with inadequate rules and regulations. Therefore, establishing an information security review mechanism and assigning dedicated personnel responsible for manuscript desensitization is crucial.
- (3) Editorial offices currently lack technical means for access control and data desensitization in manuscripts. They should actively cooperate with relevant technical departments to explore technical solutions that partially address confidentiality issues.

Throughout the processing of agricultural science and technology journal articles, editorial offices must uphold bottom-line thinking and correct value orientation, placing national security and interests first. Review of paper information should be based on laws including the Law of the People' s Republic of China on Guarding State Secrets, Regulations for the Implementation of the Law of the People' s Republic of China on Guarding State Secrets, National Intelligence Law of the People' s Republic of China, Personal Information Protection Law of the People' s Republic of China, Data Security Law of the People' s Republic of China, Measures for Security Assessment of Data Cross-border Transfer, and Biosafety Law of the People' s Republic of China, as well as relevant regulations from the Ministry of Agriculture and Rural Affairs. This ensures information security and reliability in published papers, safeguarding national interests and social stability.

References:

[1] Major News! China' s Published Papers Exceeded the US in 2021 [EB/OL]. <https://www.cn-healthcare.com/articlewm/20210607/content-1229073.html>.

[2] 2021 China Science and Technology Papers Statistics Report Released: China Ranks First in the World in Citation Frequency in Four Fields [EB/OL]. [2021-12-28]. https://3g.163.com/dy/article/GSAJSTBB0550CBNY.html?spss=adap_{pc}.

[3] Peng Chengyi. Thoughts on “Internet Plus Modern Agriculture” Development [J]. *Guangdong Sericulture*, 2019(6):58-60.

[4] Global Times New Media. China' s Transgenic Soybean and Corn Industrialization Pilots: Relevant Persons Say Production Application Safety Certificates Have Been Obtained with Significant Yield, Efficiency, and Ecological Effects [EB/OL]. [2021-12-31]. <https://view.inews.qq.com/a/20211231A0A1K000>.

[5] Science and Technology Daily. 11 Highlights Not to Be Missed at the “13th Five-Year Plan” Science and Technology Innovation Achievement Exhibition [EB/OL]. [2021-10-28]. https://www.cas.cn/cm/202110/t20211028_{4811474}.shtml?from=timeline.

[6] 72-Year-Old Cotton Biotechnology Breeding Expert Guo Sandui—Cotton Is the Most Beautiful Flower [EB/OL]. <https://baijiahao.baidu.com/s?id=1744727821886001979&wfr=spider&for>

[7] Why Does Meteorological Data Concern National Security? [EB/OL]. [2021-11-25]. <https://baijiahao.baidu.com/s?id=1717391365364302762&wfr=spider&for=pc>.

Note: Figure translations are in progress. See original paper for figures.

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