

A Bibliometric Analysis on Global Research of *Idesia polycarpa* (1994 – 2024)

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Abstract This study presents a comprehensive bibliometric analysis of *Idesia polycarpa* research, mapping the global scientific landscape from 1994 to 2024 using the WoSCC and CNKI databases. Analysis of 496 publications reveals a field dominated by China, which contributes 90.2% of the international (WoSCC) literature, with Henan Agricultural University being the most productive institution. Co-citation analysis identifies "seed" biology and lipid metabolism as the intellectual foundation, whereas keyword evolution highlights "fruit" and associated gene regulation as the current research frontier. While fatty acids remain a central theme, a distinct divergence is observed: international research delves into molecular mechanisms, while domestic studies in China National Knowledge Infrastructure (CNKI) are strongly application-driven, focusing on oil content and germination rate. This study synthesizes these trends to provide a strategic framework for prioritizing future research and optimizing resource allocation, thereby supporting the sustainable development of *I. polycarpa* as a multifunctional species.

Key words *Idesia polycarpa* oil, Chemical component, Bioactivity, Ecological applications

0 Introduction

Idesia polycarpa Maxim, a deciduous tree belonging to the family Salicaceae, is native to East Asia, including China, Japan, and the Korean Peninsula. This species is characterized by an umbrella-shaped crown, heart-shaped leaves with red petioles, and vibrant red-orange berries, typically reaching up to 20 m in height^[1]. As a dioecious species, it thrives on slopes, in valleys, and along forest edges at altitudes of 500 – 1 500 m, demonstrating strong cold and drought tolerance with minimal soil requirements. Its robust root system contributes significantly to soil retention and ecological restoration, rendering it highly suitable for afforestation of degraded lands.

Beyond its ecological roles, *I. polycarpa* possesses considerable ornamental, industrial, and pharmacological value. The fruits are rich in oil, which can be used in biofuel and lubricant production. In addition, extracts from the bark, leaves, and fruits have been reported to exhibit antioxidant, anti-inflammatory, and hemostatic properties. Owing to its resilience and aesthetic appeal, it is increasingly employed in urban greening and landscape design. Ongoing research exploring its applications in biodiesel production, stress-resistant breeding, and medicinal development further underscores its combined ecological and economic significance^[2].

Despite growing academic interest, a comprehensive synthesis of research trends for *I. polycarpa* is currently lacking. This study addresses this gap by conducting a bibliometric analysis of the literature published between 1994 and 2024. Using analytical tools such as CiteSpace, we mapped publication trends, citation patterns, international collaborations, and the evolution of keywords. Bibliometric analysis provides quantitative insights into scientific output and helps identify emerging research hotspots, gaps, and future trajectories^[3-4]. The specific objectives of this study are to: (i) characterize the bibliometric landscape of *I. polycarpa* research; (ii) assess international collaboration networks and identify highly cited works; (iii) trace the thematic evolution and current research foci; and (iv) pinpoint emerging frontiers to guide future investigations.

1 Methods

1.1 Literature search and screening We conducted a comprehensive literature search in the Web of Science Core Collection (WoSCC) and the China National Knowledge Infrastructure (CNKI) for records published up to 2024. The WoSCC search, covering the period from 2015 to 2024 to reflect its more recent and comprehensive coverage of international literature on the topic, used the query "Topic = *Idesia polycarpa*" and identified 59 records. The CNKI search, spanning from 1994 to 2024 to capture the longer history of Chinese-language research, used the subject term "SU = *Idesia polycarpa*" and retrieved 470 records, comprising 413 journal articles and 57 dissertations. We included all peer-reviewed articles and reviews. Non-scholarly sources, such as duplicates, advertisements, popular science articles, interviews, and textbooks, were excluded. When multiple versions of a publication were found, only the most recent version was retained.

1.2 Data processing We exported the search results in plain text format. After deduplication and standardization of data

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(*e.g.*, unifying institutional author names), the data were processed using CiteSpace (version 6.3.R1). To ensure consistency and reliability in citation network analysis, which relies on standardized reference formats, this aspect of the study was confined to the WoSCC dataset.

1.3 Bibliometric analysis and visualization We utilized CiteSpace, a Java-based application designed for visualizing knowledge structures and detecting emerging trends, to perform several analyses; co-authorship, institutional collaboration, keyword co-occurrence, and reference co-citation networks^[5–6]. Key metrics employed to interpret the resulting networks included centrality (to identify pivotal nodes), burst detection (to pinpoint terms or references with sharp increases in frequency), and the sigma (Σ) measure (which combines structural centrality and burst strength to identify novel and influential concepts).

The parameters for CiteSpace were configured as follows. For the WoSCC dataset, the time slicing was set from 2015 to 2024 with one-year intervals. The top 50 most cited or occurring items per slice were selected, with a link retention factor (LRF) of 2.5 and a lookback period of 5 years. These are standard settings that help produce a coherent and salient network visualization. For the CNKI dataset, the time range was set from 1994 to 2024 with an LRF of 3.0, while all other parameters were kept consistent with the WoSCC analysis.

2 Results and analysis

2.1 Annual publications number and publication trends Following the literature search and screening process, 392 articles from the CNKI database and 50 articles from the WoSCC database were ultimately included for bibliometric analysis, from initial retrievals of 470 and 59 articles, respectively. The annual publication output for *I. polycarpa* from 1994 to 2024, as shown in Fig. 1, revealed three distinct developmental phases based on the CNKI data: (i) a low-and-stable phase (1994–2007), with annual publications consistently in the single digits; (ii) a moderate-growth phase (2008–2015), during which annual output steadily increased to approximately 20 articles; and (iii) a rapid-growth phase (2016–2024), characterized by a sharp rise to a peak of 49 publications in 2021.

Although a slight decline was observed in 2023, publication numbers remained high, indicating sustained research activity. Throughout the entire period, the number of publications indexed in CNKI significantly surpassed that in WoSCC, underscoring the predominance of Chinese-language research on this species within the available literature. The international literature represented in WoSCC showed a notably lower but gradually increasing output.

2.2 Country and institution-level collaboration The country collaboration network based on WoSCC data is presented in Fig. 2A (Network parameters: $N = 4$, $E = 1$, density = 0.1667). Of the 59 records retrieved from the WoSCC database, 50 publications were ultimately included in the international research analysis after screening. Analysis of the country distribution of these publica-

tions (note: due to the presence of multinational collaborations, the total frequency count is 51) revealed that China was the overwhelmingly dominant contributor, accounting for 90.2% (46/51) of the publication frequency. This was followed by South Korea and Germany (each with 3.9%, 2/51), and the United States (2.0%, 1/51). In particular, all countries exhibited a centrality of zero, indicating the absence of strong international collaborative hubs and reflecting limited cooperation within this research field.

At the institutional level, the collaboration network was broader yet still nationally concentrated (Fig. 2B; $N = 47$, $E = 71$, density = 0.0657). Ranked by publication volume, the leading institutions were Henan Agricultural University (15 publications, 16.13%), Sichuan University (9, 9.68%), and the Chinese Academy of Sciences (6, 6.45%). However, when assessed by centrality—a metric of a node's bridging role in the network—the Chinese Academy of Sciences held the highest influence (centrality = 0.16). While a few international institutions, such as Yale University and the Max Planck Society, are present in the network, their connections are sparse, reinforcing the predominantly domestic nature of the collaborative landscape.

Analysis of the CNKI dataset further highlights the concentration of research within specific Chinese institutions. The College of Forestry at Henan Agricultural University was the most prolific (22 publications, 6.3%), followed by the Sichuan Academy of Forestry (17 publications, 4.87%) and Henan Agricultural University (13 publications, 3.72%). All leading institutions are based in China, and the domestic collaboration network, while active, shows minimal international connectivity.

2.3 Co-citation analysis of references A total of 258 co-cited references formed a network with 710 co-citation links, resulting in a density of 0.0214 (Fig. 3A). In this network, node size corresponds to citation frequency. The most frequently co-cited references were Rana and Liu^[7] and Xiang *et al.*^[8], each cited nine times. They were followed by Li *et al.*^[9] and Rana and Liu, each with seven citations, Wang *et al.*^[10] with six citations, and three studies (Lee *et al.*^[11], Feistel *et al.*^[12], and Fan *et al.*^[13]), each cited five times. Among these, Fan *et al.* presented the highest centrality (0.12) and the highest sigma value ($\Sigma = 1.25$), indicating its pivotal role and novelty within the network. Using the log-likelihood ratio (LLR) algorithm, 33 valid clusters were identified. The high modularity ($Q = 0.8859$) and silhouette scores ($S = 0.9751$) confirm that the clustering is well-structured and meaningful (Fig. 3B, C). Below is a summary of the selected key clusters:

Cluster #0: Seed (33 members, silhouette = 1.000). This cluster centers on lipid synthesis in *I. polycarpa* fruit. A key study by Li *et al.* combined transcriptomic and biochemical analyses to characterize differences in lipid accumulation between the pericarp and seed, identifying crucial genes and reconstructing the associated biosynthetic pathways^[14].

Cluster #1: Sex conversion (24 members, silhouette = 1.000). Research here explores the sexual system of *I. polycarpa*. Wang *et al.*

reported that the species exhibits trisexuality (female, male, and bisexual flowers), providing a foundation for floral regulation and breeding. Complementing this, Feng *et al.* investigated sex-linked differences in leaf nutrients, microbiota, and metabolites, highlighting distinct physiological profiles between male and female plants^[15].

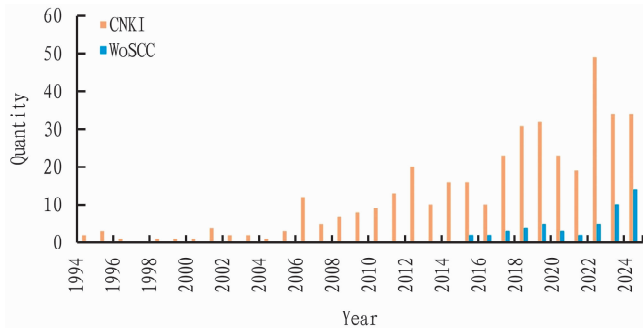
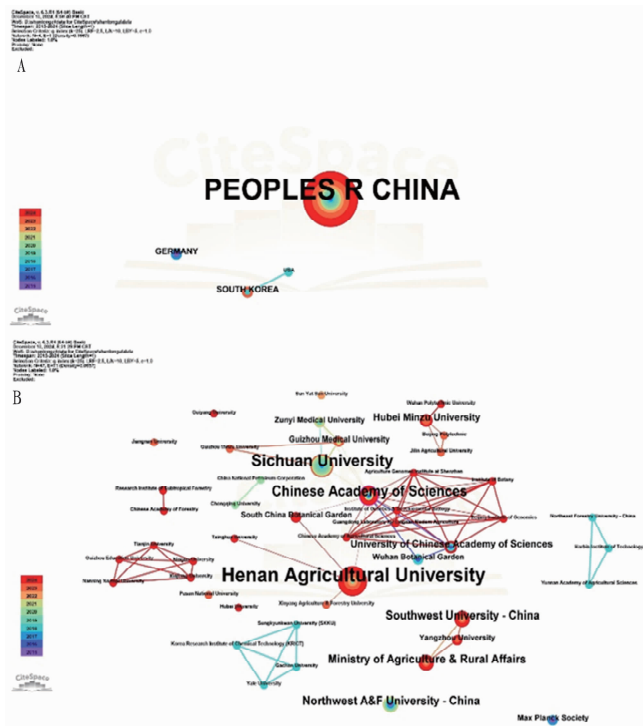


Fig. 1 Annual publication volume of *Idesia polycarpa* from 1994 – 2024 based on the CNKI (blue) and WoSCC (orange) databases



NOTE A: Country-level collaboration; B: Institutional collaboration network; Node size reflects publication volume; red rings indicate high centrality.

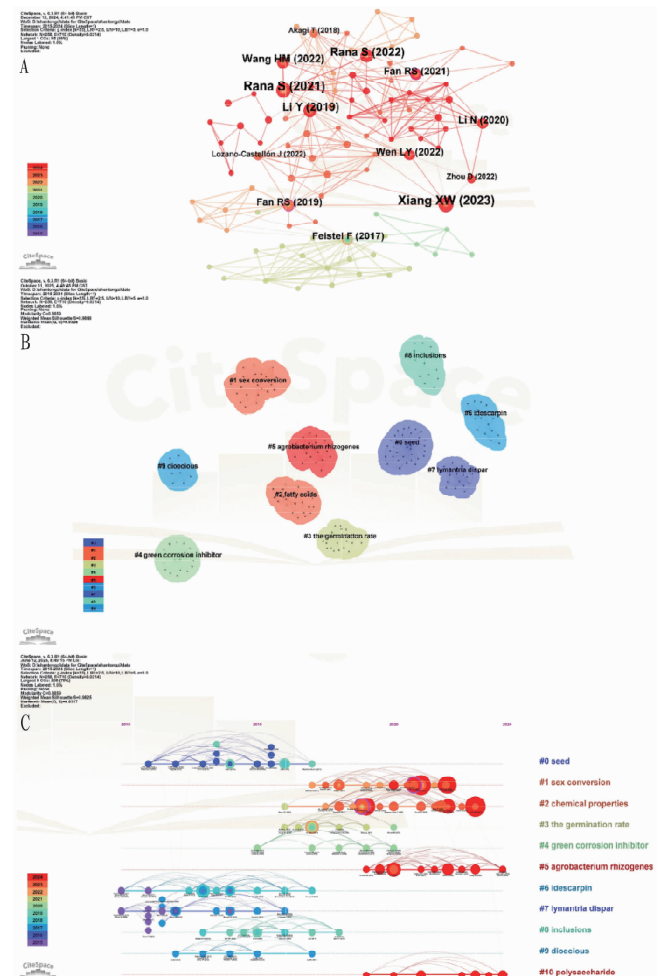
Fig. 2 Co-occurrence network maps generated by CiteSpace on the basis of WoSCC data

Cluster #2: Fatty acids (23 members, silhouette = 0.983). This cluster focuses on the composition and applications of *I. polycarpa* oil. Xiang *et al.* demonstrated that the oil is rich in bioactive components (*e. g.*, β -sitosterol, α -tocopherol) and unsaturated fatty acids, suggesting its suitability as a functional edible oil. Zhang *et al.* further analyzed geographical variations in pulp

oil composition, reporting high contents of linoleic and palmitoleic acid^[16].

Cluster #3: Germination rate (22 members, silhouette = 0.986). While the cluster title suggests a focus on germination, the research themes within it extend to bioactivity. Huang *et al.* reported that drying enhanced the lipid-lowering bioactivity of compounds from *I. polycarpa* leaves^[17]. In a pharmacological direction, Li *et al.* demonstrated that ethyl acetate extracts from fruit residues improved antioxidant capacity and modulated lipid metabolism in HepG2 cells (a human hepatocellular carcinoma cell line)^[18]. This work suggests a potential therapeutic effect for non-alcoholic fatty liver disease (NAFLD), potentially mediated through the activation of PPAR α and Nrf2 pathways.

Cluster #4: Green corrosion inhibitor (18 members, silhouette = 0.916). This cluster assesses industrial applications. Zhang *et al.* evaluated fruit extract as a corrosion inhibitor for copper under acidic conditions^[19]. Electrochemical and surface analyses confirmed effective adsorption and inhibition, which was supported



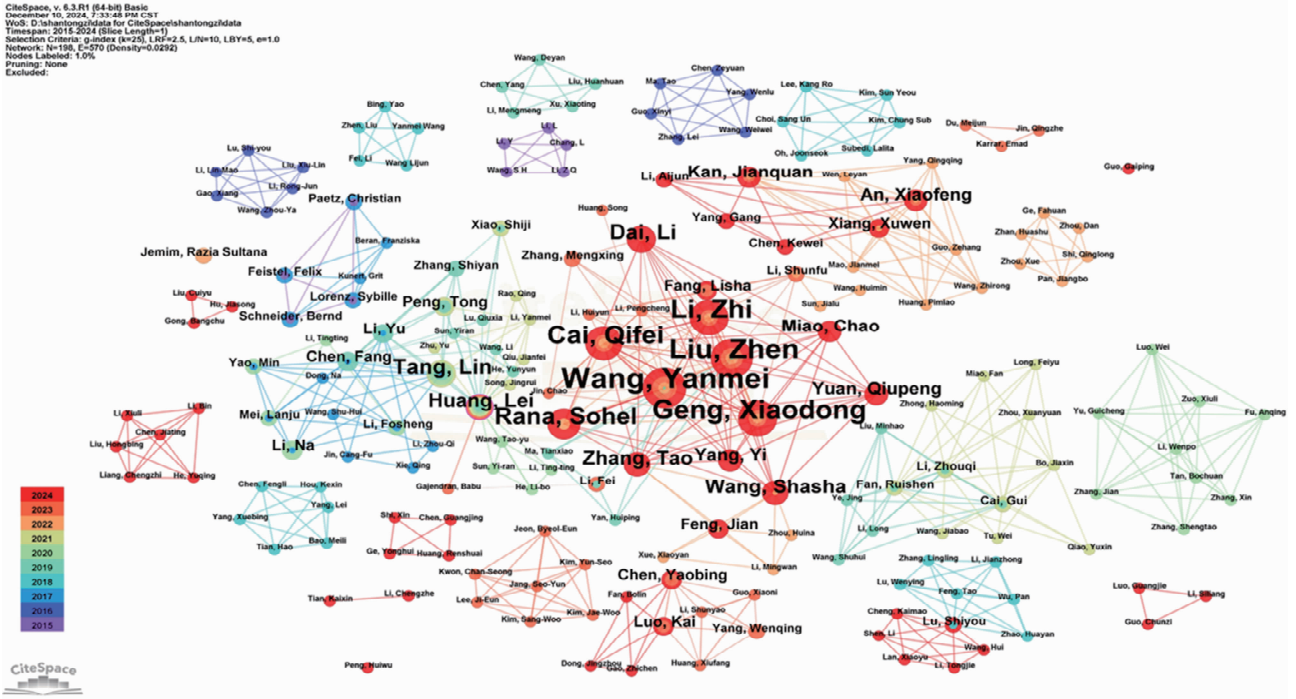
NOTE A: Cocitation network of references in *Idesia polycarpa* research; B: LLR-based cluster view. C: Timeline view of research clusters from WoSCC data. Node color indicates publication year; cluster labels are based on key terms.

Fig. 3 Co-citation analysis of references

by molecular simulations that identified polycartine A as a key inhibitory compound.

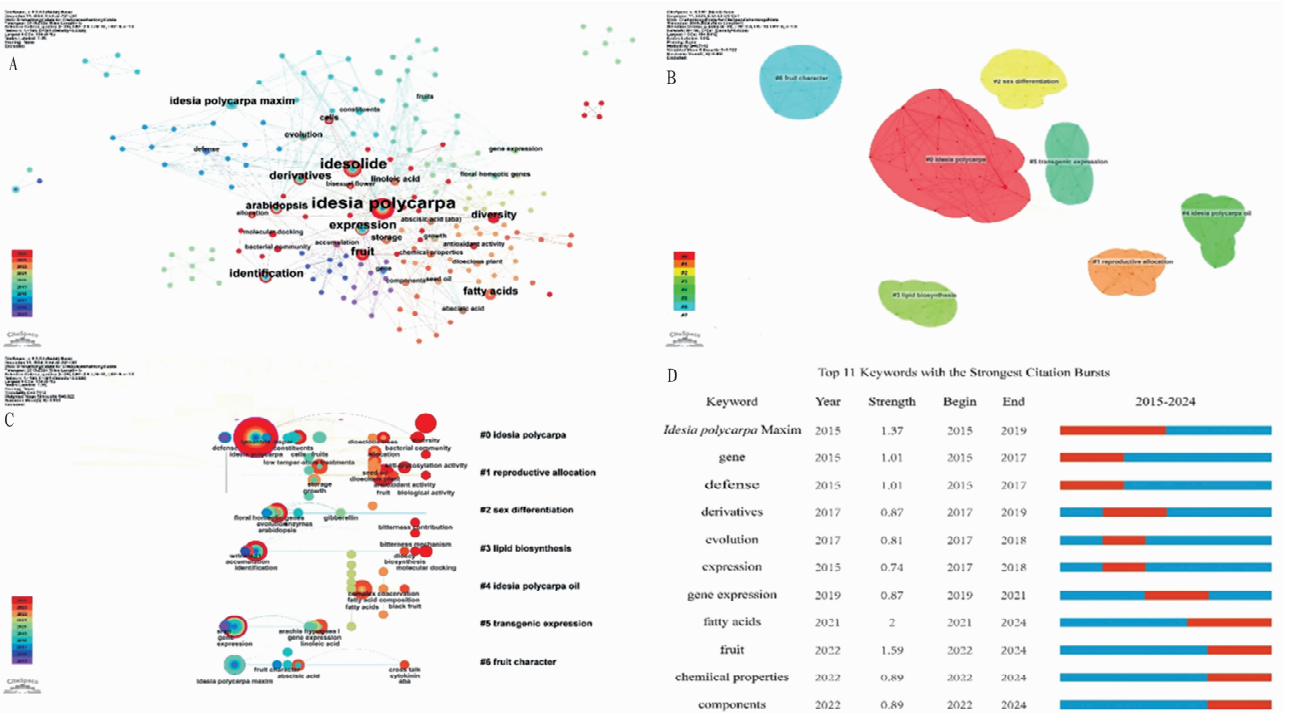
2.4 Co-authorship network analysis The co-authorship network of *I. polycarpa* researchers, derived from the WoSCC data-

base, is visualized in Fig. 4. In this network, each node represents an author, with its size proportional to their publication output and its color indicating distinct collaborative communities.



NOTE Node size indicates publication volume or centrality; color denotes distinct collaboration clusters.

Fig. 4 Coauthorship network of researchers on *Idesia polycarpa* based on WoSCC data



NOTE A: Keyword co-occurrence network; B: Cluster map of research themes; C: Timeline view of keyword evolution (2015 – 2024); D: Top 11 keywords with the strongest citation bursts.

Fig. 5 Keyword analysis based on WoSCC

Several key researchers emerged as central hubs within the network, including Cai Qifei, Liu Zhen, Wang Yanmei, and Li Zhi. These individuals not only maintained high publication volumes but also exhibited strong centrality, signifying their pivotal role in facilitating collaborations and connecting different research groups. The network structure reveals several clearly defined, color-coded clusters, each representing a cohesive and internally collaborative research team focused on specific aspects of *I. polycarpa* research.

2.5 Keyword co-occurrence and thematic evolution Co-occurrence analysis of keywords from the WoSCC database generated a network of 190 nodes and 591 links, with a density of 0.0329 (Fig. 5A). The most frequent and central (centrality ≥ 0.1) terms were *I. polycarpa* (frequency: 21) and idesolide (frequency: 12), underscoring their foundational role in the knowledge structure. In terms of novelty, fruit achieved the highest sigma value ($\Sigma = 1.25$), followed by fatty acids and expression. Cluster analysis identified seven major thematic groups (Fig. 5B).

The timeline view of these clusters (Fig. 5C) illustrates the thematic evolution from 2015 to 2024, where larger, redder nodes indicate more recent and intense research focus. Notably, recent years have seen a surge in keywords such as fatty acids, fruit, and chemical components, signaling a growing emphasis on biochemical and applied research. This shift is corroborated by the analysis of citation bursts (Fig. 5D). The term fruit exhibited the strongest burst intensity, followed by *I. polycarpa*, genes, and defense. While *I. polycarpa* itself had the longest burst duration (2015–2019), indicating sustained foundational interest, recent bursts for fatty acids and related terms (2021–2024) highlight a clear movement towards biochemical characterization. In contrast, analysis of the CNKI dataset revealed a distinct focus. The most frequent keywords were *I. polycarpa* (194), *I. polycarpa* oil (31), and fatty acids (15), alongside application-oriented terms like oil content and germination rate. Notably, response surface methodology and *I. polycarpa* oil showed the highest centrality and novelty (Sigma values of 1.10 and 2.82, respectively), underscoring a strong emphasis on process optimization and product development in the Chinese-language literature. A comparative overview highlights this divergence: international research (WoSCC) prioritizes fundamental biological mechanisms, such as gene regulation, lipid biosynthesis, and sexual differentiation, while the CNKI corpus reflects a stronger focus on practical traits and industrial applications.

3 Discussion

3.1 Research leadership and collaborative landscape The research landscape of *Idesia polycarpa* is predominantly shaped by Chinese institutions, with Henan Agricultural University, Sichuan University, and the Chinese Academy of Sciences forming the core of a dense domestic collaboration network. While sporadic connections with global entities like Yale University and the Max Planck Society exist, robust international partnerships remain underdevel-

oped. This institutional dominance can be attributed to a confluence of factors: (i) Geographic and Resource Advantage: As a species endemic to East Asia, Chinese researchers have primary access to its natural germplasm and ecological contexts^[14]; (ii) Strategic Alignment: The species' potential in bioenergy, ecological restoration, and rural development aligns closely with national sustainability and green development policies; and (iii) Established Research Infrastructure: Strong, pre-existing domestic networks facilitate efficient interdisciplinary collaboration, accelerating output^[21]. The limited global engagement likely reflects the species' regional distribution and its nascent status on the world's research agenda.

3.2 The evolution of research focus Analysis of publication trends from 1994 to 2024 reveals a clear maturation of the field. An initial period of limited output (1994–2007) was followed by stable growth (2008–2015), coinciding with the recognition of *I. polycarpa* as a promising energy crop. The subsequent phase of rapid expansion (2016–2024), peaking at 49 CNKI publications in 2021, was likely driven by supportive national policies for renewable resources and technological advances in applied research. The consistent dominance of CNKI over WoSCC in publication volume underscores the stronger domestic research impetus, while the lower international output highlights a significant opportunity for global scientific engagement.

3.3 Intellectual foundations and knowledge structure The intellectual foundation of *I. polycarpa* research is built upon key publications that have shaped its thematic clusters. Seminal work by Rana and Liu on sex-based differences in growth and resource allocation provides a critical baseline for understanding reproductive biology (Cluster #1: Sex Conversion)^[7]. Besides, pioneering functional genomics studies by Fan *et al.* on lipid metabolism genes (*IpDGT2*, *IpFAD2*) have laid the groundwork for genetic engineering strategies to improve oil quality, forming the core of Cluster #2 (Fatty Acids) and #3 (Lipid Biosynthesis)^[20]. These foundational studies exemplify the field's progression from descriptive biology to mechanistic understanding. However, the concentration of citations on a few pivotal works, with other rigorous studies receiving less attention, may reflect a "Matthew effect" in scientific influence, a common phenomenon in emerging research domains.

3.4 Diverging research hotspots and emerging frontiers Keyword analysis reveals a compelling divergence in research focus. International literature (WoSCC) emphasizes fundamental biological processes, with high-innovation terms like *fruit*, *expression*, and *idesolide* pointing to interests in biochemistry and molecular regulation^[11–14]. In contrast, domestic research (CNKI) is distinctly application-oriented, with high novelty indices for *I. polycarpa* oil and response surface methodology (RSM), highlighting a focus on oil extraction, process optimization, and industrial development^[1,8–9,16].

The evolution of research fronts charts a clear trajectory from agronomy and cultivation (~2004)^[7] to fatty acid profiling and functional genomics (post-2009)^[9,14], and more recently (2022–

2024), to fruit composition, bioactive chemicals, and industrial applications^[8,17,19,21]. This signals a field transitioning from basic inquiry to targeted development. Future frontiers will likely be defined by: (i) deepening the functional genomics of lipid pathways; (ii) comprehensive biochemical characterization of fruit compounds; and (iii) scaling applied uses through optimized oil extraction and value-chain integration.

4 Conclusions

This first bibliometric study of *I. polycarpa* research (1994–2024) delineates a rapidly evolving field characterized by significant growth since 2016, yet one that remains geographically concentrated within China with limited international collaboration. The intellectual structure, founded on studies of sexual differentiation and lipid metabolism, reveals a clear trajectory from basic science toward applied research. A notable divergence exists: international efforts prioritize fundamental biological mechanisms, while Chinese research is strongly application-oriented, focusing on oil extraction and utilization. Three major research fronts have emerged—lipid biosynthesis and functional genomics, fruit composition and bioactivity, and industrial applications.

References

[1] WEN L, XIANG X, WANG Z, *et al.* Evaluation of cultivars diversity and lipid composition properties of *Idesia polycarpa* var. *vestita* Diels[J]. *Journal of Food Science*, 2022, 87: 3841–3855.

[2] HUANG S, ZHENG W, WANG Y, *et al.* Dynamic changes of endogenous hormones in different seasons of *Idesia polycarpa* Maxim. [J]. *Life*, 2023, 13: 788–788.

[3] REIS A C, RAMOS B, PEREIRA A C, *et al.* Global trends of epidemiological research in livestock tuberculosis for the last four decades[J]. *Transboundary and Emerging Diseases*, 2021, 68: 333–346.

[4] DU Y, DUAN C, YANG Y, *et al.* Heart transplantation: A bibliometric review from 1990–2021[J]. *Current Problems in Cardiology*, 2022, 47: 101176.

[5] CHEN C. The centrality of pivotal points in the evolution of scientific networks[C]. *Proceedings of the 10th International Conference on Intelligent User Interfaces*, 2005: 98–105.

[6] CHEN C. CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature[J]. *Journal of the American Society for Information Science and Technology*, 2006, 57: 359–377.

[7] RANA S, LIU Z. Study on the pattern of vegetative growth in young dioecious trees of *Idesia polycarpa* Maxim. [J]. *Trees: Structure and Function*, 2021, 35: 69–80.

[8] XIANG X, WEN L, WANG Z, *et al.* A comprehensive study on physico-chemical properties, bioactive compounds, and emulsified lipid digestion characteristics of *Idesia polycarpa* var. *vestita* Diels fruits oil[J]. *Food Chemistry*, 2023, 404: 134634.

[9] LI Y, PENG T, HUANG L, *et al.* The evaluation of lipids raw material resources with the fatty acid profile and morphological characteristics of *Idesia polycarpa* Maxim. var. *vestita* Diels fruit in harvesting[J]. *Industrial Crops and Products*, 2019, 129: 114–122.

[10] WANG H, RANA S, LI Z, *et al.* Morphological and anatomical changes during floral bud development of the trioecious *Idesia polycarpa* Maxim. [J]. *Revista Brasileira de Botanica*, 2022, 45: 679–688.

[11] LEE M, LEE H, LEE J, *et al.* Anti-adipogenic activity of compounds isolated from *Idesia polycarpa* on 3T3-L1 cells[J]. *Bioorganic & Medicinal Chemistry Letters*, 2013, 23: 3170–3174.

[12] FEISTEL F, PAETZ C, LORENZ S, *et al.* *Idesia polycarpa* (Salicaceae) leaf constituents and their toxic effect on *Cerura vinula* and *Lymantaria dispar* (Lepidoptera) larvae[J]. *Phytochemistry*, 2017, 143: 170–179.

[13] FAN R, LI L, CAI G, *et al.* Molecular cloning and function analysis of FAD2 gene in *Idesia polycarpa* [J]. *Phytochemistry*, 2019, 168: 112114.

[14] LI R, GAO X, LI L, *et al.* De novo assembly and characterization of the fruit transcriptome of *Idesia polycarpa* reveals candidate genes for lipid biosynthesis[J]. *Frontiers in Plant Science*, 2016, 7: 801.

[15] FENG J, RANA S, LIU Z, *et al.* Diversity analysis of leaf nutrient endophytes and metabolites in dioecious *Idesia polycarpa* Maxim. leaves during reproductive stages[J]. *Life*, 2022, 12: 2041.

[16] ZHANG W, ZHAO C, KARRAR E, *et al.* Analysis of Chemical component and antioxidant activity of *Idesia polycarpa* pulp oil from five regions in China[J]. *Foods*, 2023, 12: 1251.

[17] HUANG L, ZHU Y, PENG T, *et al.* Drying methods and structure-activity relationships of hydroxycinnamic acid derivatives in *Idesia polycarpa* Maxim. leaves[J]. *Food & Function*, 2021, 12: 1651–1661.

[18] LI N, SUN Y R, HE L B, *et al.* Amelioration by *Idesia polycarpa* Maxim. var. *vestita* Diels of oleic acid-induced nonalcoholic fatty liver in HepG2 cells through antioxidant and modulation of lipid metabolism[J]. *Oxidative Medicine and Cellular Longevity*, 2020, 2020: 1208726.

[19] ZHANG X, LI W, YU G, *et al.* Evaluation of *Idesia polycarpa* Maxim. fruits extract as a natural green corrosion inhibitor for copper in 0.5 M sulfuric acid solution[J]. *Journal of Molecular Liquids*, 2020, 318: 114080.

[20] FAN R, CAI G, ZHOU X, *et al.* Characterization of diacylglycerol acyltransferase 2 from *Idesia polycarpa* and function analysis[J]. *Chemistry and Physics of Lipids*, 2021, 234: 105023.

[21] ZUO Y, LIU H, LI B, *et al.* The *Idesia polycarpa* genome provides insights into its evolution and oil biosynthesis[J]. *Cell Reports*, 2024, 43 (3): 113909.

(From page 21)

[2] XU JW, LUO SX. Determination of baicalin in different parts of *Scutellaria baicalensis* by HPLC[J]. *Journal of China Pharmaceutical University*, 2001, 32(3): 235–236. (in Chinese).

[3] GUO XW, ZHANG FC, LIN SY. Effect of ultrasonic extraction on the

yield of baicalin[J]. *China Journal of Chinese Materia Medica*, 1994, 19(6): 348–349. (in Chinese).

[4] Pharmacopoeia Commission of the Ministry of Health, People's Republic of China. *Pharmacopoeia of the People's Republic of China*[S]. Beijing: Chemical Industry Press; 2005, 211. (in Chinese).