第1卷 2025年1月 总第72期
Vol.1 January. 2025 Total issues 72
ISSN 2749-9065

BioGreen

——生物多样性保护与绿色发展
Biodiversity Conservation and Green Development

绿皮火车，四川省凉山彝族自治州

Local train, Liangshan Yi Autonomous Prefecture, Sichuan Province

摄影：熊昱彤　　Photo by XIONG Yutong

出版 Publisher：德国绿色包豪斯基金会旗下机构 dbv

编辑 Editor：《生物多样性保护与绿色发展》编辑部

总编辑：周晋峰

国际标准刊号：ISSN 2749-9065

官网网址：z.cbcgdf.org/

BioGreen – Biodiversity Conservation and Green Development

Short description of content:

BioGreen - Biodiversity Conservation and Green Development is an Open Access international journal publishing the latest peer-reviewed research covering biodiversity, sustainability, environmental science and ecological civilization. It also provides rapid and arresting news and trends on frontier issues of environmental policies and governance.

Imprint:

Publisher:

dbv Deutscher Buchverlag GmbH

Wilhelm-Herbst-Str. 7

28359 Bremen

Germany

Tel. +49 (421) 3345 7070

Website: www.dbv-media.com

Editor:

BioGreen - Biodiversity Conservation and Green Development

Unit B16E, Chengming Building, Xizhimen,

100038 Beijing

P.R. China

Tel. +010-88431370

Website: www.cbcgdf.org

Responsible for the content according to § 5 TMG: Dr. Zhou Jinfeng

Field(s): Biology, Environment, Ecology, Economy and Law

Keyword(s): General ecology | Biodiversity | Development policy | International | China

ZDB number: 3096891-4

Homepages: http://z.cbcgdf.org/

Frequency of publication: Full text, online

Note: In English, Chinese, German

Frequency: Monthly/irregular

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In order to build a sound sphere for biodiversity conservation and green development research, the journal welcomes all thoughtful and visionary articles. The views and opinions expressed in the articles do not necessarily represent those of the journal.

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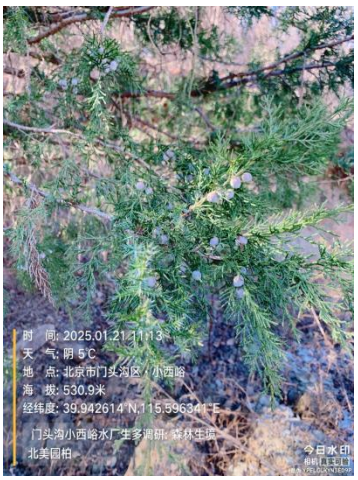
根据“深圳晚报”的消息，1 月 3 日，深圳市第七届人民代表大会常务委员会发布公告，《深圳经济特区公园条例》（以下简称《条例》）已获通过，将从 2025 年 5 月 1 日起施行。

《条例》对禁止投喂野生动物给出了明确规定。《条例》规定，对公园内野生动物重要栖息地、野生植物原生地等区域，公园管理单位可实行访客预约和限额管理等措施，限制开展破坏自然生态的活动。任何单位和个人不得破坏野生动植物资源，不得违法捕捉、惊扰和擅自投喂野生动物。

《条例》的出台将有助于进一步提升公园的管理和服务水平。禁止投喂野生动物等措施的实施，也将有助于进一步规范市民行为，保护野生动物资源，维护生态平衡，促进人与自然和谐共生。

放置红外相机兼鸟调，对门头沟清水镇开展第二次生物多样性调查

2025 年 1 月，为深入了解北京门头沟区清水镇上清水村、下清水村、达摩庄村等地区的生物多样性现状，中国生物多样性保护与绿色发展基金会（简称：中国绿发会）研究室及相关项目团队前往该地区进行了一次全面的生物多样性调查。此次调查旨在通过科学的方法，掌握清水镇相关区域的野生动植物资源分布情况，为后续该区域的生物多样性保护现状进行评价。



2025 年全国两会议/提案建议会定档 2 月 20 日

2025 年全国两会的召开时间已经确定。依托于全国两会的召开，为更好地服务代表委员参政议政，将人民群众强烈所盼、普遍关注的热难点问题带上两会，中国绿发会两会建议工作组将于 2025 年 2 月 20 日上午 9 点召开第十届“全国两会议/提案建议会”。

本届两会建议会将由中国绿发会党支部指导、《生物多样性保护与绿色发展》科学期刊提供学术支持。

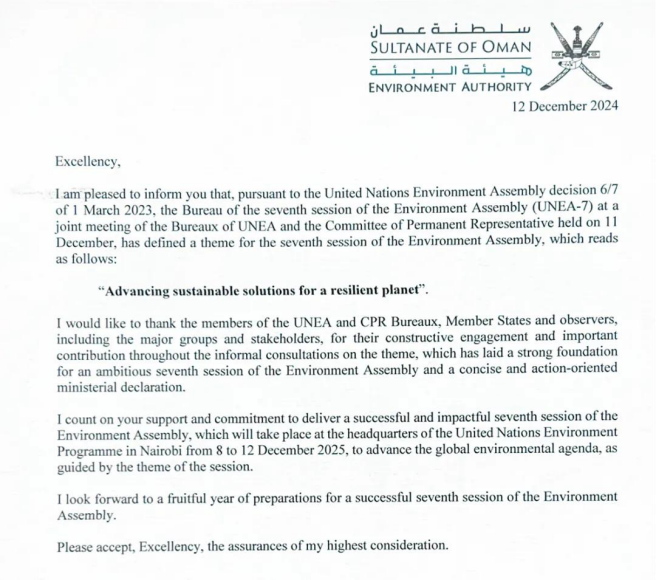
据新华社报道，全国人大常委会会议 2024 年 12 月 25 日表决通过了关于召开十四届全国人大三次会议的决定。根据决定，十四届全国人大三次会议于 2025 年 3 月 5 日在北京召开。政协第十四届全国委员会日前召开主席会议，建议全国政协十四届三次会议于 2025 年 3 月 4 日在北京召开。

【国际视野】

第七届联合国环境大会主题正式确定

第七届联合国环境大会(UNEA-7)将于 2025 年 12 月 8 日至 12 日在肯尼亚内罗毕联合国环境规划署(UNEP)总部举行。一如往届联合国环境大会，作为特别认证机构，中国绿发会国际部将认真研究会议材料，并将组建代表团实地深度参与到会议中去。

2024 年 12 月 12 日，在与联合国环境大会主席领导下的会员国和观察员，包括主要团体和利益攸关方进行广泛磋商后，第七届联合国环境大会的主题宣布：“推进可持续解决方案，建设有复原力的地球”（Advancing sustainable solutions for a resilient planet）。



سلطنة عمان
SULTANATE OF OMAN
هيئة البيئة
ENVIRONMENT AUTHORITY

12 December 2024

Excellency,

I am pleased to inform you that, pursuant to the United Nations Environment Assembly decision 6/7 of 1 March 2023, the Bureau of the seventh session of the Environment Assembly (UNEA-7) at a joint meeting of the Bureaux of UNEA and the Committee of Permanent Representative held on 11 December, has defined a theme for the seventh session of the Environment Assembly, which reads as follows:

"**Advancing sustainable solutions for a resilient planet**".

I would like to thank the members of the UNEA and CPR Bureaux, Member States and observers, including the major groups and stakeholders, for their constructive engagement and important contribution throughout the informal consultations on the theme, which has laid a strong foundation for an ambitious seventh session of the Environment Assembly and a concise and action-oriented ministerial declaration.

I count on your support and commitment to deliver a successful and impactful seventh session of the Environment Assembly, which will take place at the headquarters of the United Nations Environment Programme in Nairobi from 8 to 12 December 2025, to advance the global environmental agenda, as guided by the theme of the session.

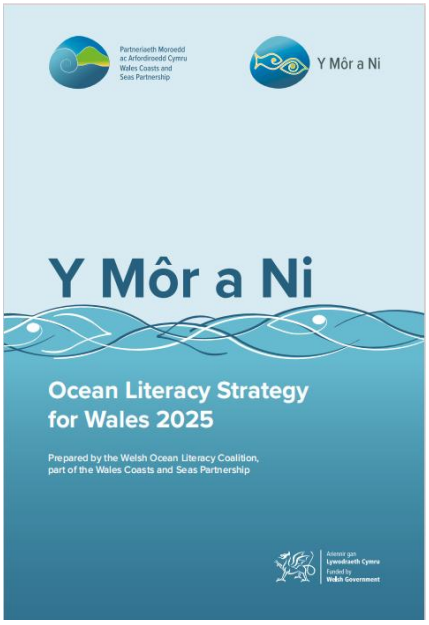
I look forward to a fruitful year of preparations for a successful seventh session of the Environment Assembly.

Please accept, Excellency, the assurances of my highest consideration.

图源：UNEA

英国首个海洋素养战略发布

1月8日，英国威尔士发布了首个海洋素养战略——“Y Môr a Ni”（威尔士语，意为“大海与我们”）。据报道，这一战略的推出标志着英国在海洋保护方面迈出了重要一步。



图源：该报告

“Y Môr a Ni”战略旨在通过教育、宣传等方式，让公众了解海洋的重要性，并激发人们保护海洋的热情。该战略的具体目标包括：

- 提升公众对海洋的认知。让公众了解海洋生态系统的复杂性，以及人类活动对海洋的影响。

• 加强人与海洋的联系。鼓励公众参与海洋保护活动，如海滩清洁、海洋生物监测等。

• 促进海洋可持续发展。推动建立更加健康、清洁、可持续的海洋生态系统。

全文可参见：

https://ymgynghori.cyfoethnaturiol.cymru/marine-morol/the-sea-and-us-y-m-r-a-ni/

第七届世界海洋生物多样性大会将于 2026 年 11 月 17 日举办

第七届世界海洋生物多样性大会（WCMB 2026）将于 2026 年 11 月 17 日至 20 日在比利时布鲁日（Bruges）举行。会议主题为：“我们需要的海洋生物多样性洞察力，为了我们想要的海洋”（The marine biodiversity insights we need, for the ocean we want）。

图源：WCMB

世界海洋生物多样性大会每三年举行一次，是一次高级别国际会议，重点关注海洋生物多样性的保护和可持续利用。会议为政策制定者、科学家、保护主义者、行业代表和其他利益相关者提供了一个平台，以讨论当前和新出现的海洋生物多样性问题，并确定保护和可持续管理海洋生态系统及其资源的方法。

本期聚焦：负责任旅游

全球旅游业的蓬勃发展推动了经济增长。2024年12月4日，世界旅游组织发布了最新的《世界旅游业晴雨表》。报告指出，2024年前九个月，全球约有11亿游客出国旅行。世界旅游组织秘书长波洛利卡什维利表示，旅游收入的强劲增长对全球经济而言无疑是一针强心剂。

近年来，旅游业的快速发展对当地的自然环境和生态系统产生负面影响，造成了生态负担。在一些沿海地区，旅游活动也对海洋和沿海环境、生物多样性资源产生了重大影响。由于认识到旅游活动对环境造成的负面影响，“负责任旅游”应运而生，对“负责任旅游”的探讨也在理论和实践层面不断深化。

负责任旅游（Responsible Tourism）是基于“为人们创造更好的居住环境，为人们创造更好的旅游环境（creates better places for people to live in, and better places to visit）”，于2002年在世界可持续发展峰会召开期间被定义。国外对“负责任旅游”的研究始于1965年，呈现出多学科相互融合的特点。国内对“负责任旅游”的研究起步较晚，主要集中在基础理论研究、实践研究、政策研究等方面。2020年3月，中国生物多样性保护与绿色发展基金会负责任旅游工作委员会成立，旨在将“负责任旅游”的理念深植人心，引领“负责任旅游”领域的实践和研究，推动中国旅游行业的绿色发展。被誉为“负责任旅游之父”的哈罗德·古德博士（Harold Goodwin），是该负责任旅游工作委员会主任。

本月期刊重点聚焦负责任旅游议题，希望与广大读者共同探讨负责任旅游的理论研究以及发展和实践。

负责任旅游与生态旅游概念的若干辨析

韦琦[1] 封紫[1]

（1.中国生物多样性保护与绿色发展基金会）

摘要：在经济全球化快速发展的当下，旅游业得到了前所未有的重视，正在成为许多国家或地区经济增长的重要引擎。然而，传统旅游活动往往忽视了环境保护的重要性，导致了一系列生态问题，如生物多样性丧失、环境污染和资源过度消耗等。面对这些挑战，“负责任旅游”应运而生。随着人们对生态旅游的热衷，围绕生态旅游的思考也更加普遍。本文通过对负责任旅游与生态旅游概念进行辨析，深入剖析负责任旅游的内涵与外延。同时，本文还将探讨负责任旅游和生态旅游在实践过程中面临的挑战，以期为推动旅游业的健康发展提供有益借鉴。

关键词：负责任旅游，生态旅游，辨析

韦琦，封紫.负责任旅游与生态旅游概念的若干辨析.生物多样性保护与绿色发展.第1卷，2025年1月，总第72期.ISSN2749-9065

一、旅游业的快速发展与负责任旅游的提出

根据世界旅游城市联合会、中国社会科学院旅游研究中心联合发布的《2024世界旅游经济趋势报告》显示，2023年全球旅游恢复至2019年的九成左右。2023年全球旅游总人次达126.73亿，同比增长41.6%，恢复至2019年的87.4%；全球旅游总收入达5.54万亿美元，同比增长21.5%，恢复至2019年的94.8%。2010年至2019年间，除疫情期间的波动外，全球旅游经济增长稳定，全球旅游总人次年均增长率保持在7.3%，全球旅游总收入年均增长率为4.6%。[1]随着人们出游意愿的增加，旅游目的地的游客量持续增多，除了对目的地经济的正面影响外，对目的地生态环境的负面影响也愈发凸显。

英国《自然气候变化》杂志发表的一篇论文显示，国际旅游业的碳足迹占全球温室气体排放的8%，是之前预计的近4倍。[2]《自然-可持续性》发表的一篇可持续研究论文认为，最受欢迎的夏威夷珊瑚礁或许受游客影响正在退化。与不太热门的景点相比，最受欢迎的地点处靠近海岸的珊瑚退化较多。[3]2024年，西班牙爆发的数万人抗议过度旅游的游行，同样把“过度旅游”推高物价、破坏环境等问题推上风口浪尖。西班牙《加那利即刻时报》举例称，当地水资源被优先分配给游客使用。有数据显示，游客的日均用水量是本地居民的6

倍。当地农民对此很不满，认为水本应用于农田灌溉，而非填充供游客享受的游泳池。[4]当然这些也只是旅游对生态环境负面影响的冰山一角，旅游对生态环境的影响远不止于此。

为应对旅游业的负面影响，负责任旅游的概念应运而生。南非早在1996年就将负责任旅游写入该国旅游开发与促进白皮书，继南非之后，英国、加拿大、印度、美国、冈比亚、斯里兰卡和新西兰也制定了本国负责任旅游的政策，推动了负责任旅游的实践。然而，关于“负责任旅游”的研究最早可以追溯到20世纪60年代，甚至更早。到了20世纪60年代至80年代，研究者将目光投向了旅游业与环境之间的冲突，旅游业发展过程中产生的环境影响成为旅游学界和环境科学界研究的主题之一。

二、负责任旅游与生态旅游

1965年，Hetzer用生态学的理论提出了旅游应该对自然生态环境和旅游目的地负责任的四个原则，用于指导旅游开发时如何做到对环境的负面影响最小，同时旅游者的需要满足程度最大化，并力求使旅游目的地社区利益最大化。关于“负责任旅游”（responsible tourism）的定义，不同学者有不同的解释。张帆认为，这些解释大致可以分为规模说、方法说、伦理说、开发说和行为说几种。[5]

2002年，在南非开普敦召开的旅游目的地负责任旅游第一次国际会议上签署了对于负责任旅游来说是具有里程碑意义的《开普敦宣言》。《开普敦宣言》提出负责任旅游具有以下特点：（1）减少负面的经济、环境和文化影响；（2）为当地人民产生较大的经济收益，加强东道社区的福利，改善工作条件并为其从事旅游业提供便利；（3）当地居民参与决定他们生活和生存机会的决策；（4）争取使旅游对自然和文化遗产保护起到积极的影响，维护世界多样性；（5）通过与当地居民进行有意义的接触，为游客提供愉快的经历，使其更多地了解当地的经济、文化和环境问题；（6）为残障群体提供介入旅游的方便；（7）对文化具有敏感性，可增进游客和东道地区居民之间的相互尊重，建立地方自豪感和自信心。[6]《开普敦宣言》对“负责任旅游”一词进行了定义，即负责任旅游是关于“为人们创造更好的居住环境，为人们创造更好的旅游环境”。

1993年，国际生态旅游协会把生态旅游定义为：具有保护自然环境和维护当地人民生活双重责任的旅游活动。从定义可知，生态旅游与负

责任旅游在概念上有一定的相似性，都强调了在旅游活动中充分考虑生态环境、经济和社会三个方面的影响，力求在满足游客需求的同时，最大限度地减少对自然环境的负面影响。虽然 Hetzer 也提出生态旅游（Eco-Tourism）的基本原则，这些原则也是负责任旅游的重要原则。但是，生态旅游和负责任旅游仍有差异。

首先，负责任旅游是对旅游行为的一种价值判断，强调的是行为的伦理要求。而生态旅游，是以旅游目的地为自然环境的一种旅游，强调的是一种旅游方式。具体来讲，负责任旅游不仅仅是对旅游活动的一种描述，更是强调旅游者和在开展旅游时对环境和社会的责任。具体来说，“负责任”包括：（1）对生态环境的负责任。这种负责任强调在活动中减少对自然环境的破坏，保护生态系统的平衡。这包括减少污染、节约资源、保护野生动植物等。（2）对社会福祉的负责任。这种负责任关注的是活动对当地社区的影响，强调尊重当地文化、传统和习俗，促进当地居民的福祉和发展。（3）对经济效益的负责任。这种负责任强调的是鼓励和支持采取可持续的经济行为，如购买当地产品、支持当地企业、促进公平贸易等。

生态旅游则强调在保护自然环境的前提下进行活动，旨在提高环保意识和参与度。生态旅游的主要特征包括：（1）生态旅游通常发生在自然保护区、国家公园、生态敏感区等自然环境中。这些地方通常具有丰富的生物多样性和独特的生态系统。（2）生态旅游强调旅游活动的可持续性，即在不破坏自然环境的前提下进行旅游活动。这包括减少污染、节约资源、保护野生动植物等。（3）生态旅游通常具有较强的教育性，旨在提高旅游者的环保意识和参与度。例如，旅游者可以通过参与植树、清理垃圾等活动，亲身体验环保的重要性。

其次，二者都有对生态环境的关注，从具体行为方面讲，生态旅游是负责任旅游的具体实践。负责任旅游要求在进行旅游规划、管理和运营过程中，始终将生态环境保护放在首位，采取一系列科学、合理和可行的措施，确保旅游资源的可持续利用。生态旅游则强调的是对自然环境的保护和教育意义，是一种依赖于目的地的生态环境作为旅游资源，通过对生态环境的了解体验，而产生的一种带有责任感和敬畏心的一种旅行方式，从这方面说，生态旅游是负责任旅游的一种具体实践。

最后，就产品内容方面来讲，负责任旅游是生态旅游的一类。生态旅游除了对目的地生态环境有所依赖外，在产品内容方面，生态旅游是包罗万象的，包括我们所熟知的教育旅游、负责任旅游、研学旅游、文化体验旅游、消费旅游等等。而负责任旅游只是生态旅游产品内容的一类。

众多学者认为，生态旅游是对自然区域负责任的旅游，它既保护环境又向当地居民提供福利。作为生态旅游者首先必须对生态旅游感兴趣，而且乐意把自己的闲暇和收入用于对生态的感受，并积极投入到保护生态的活动中。

三、负责任旅游面临的挑战

负责任旅游和生态旅游一样，在实践中都面临诸多挑战，这些挑战不仅影响到旅游活动的可持续性，也对自然环境和当地社区造成了深远的影响。主要挑战包括：

（一）资源的有限性与旅游需求增长的无限性之间的矛盾

随着全球旅游业的快速发展，越来越多的人选择旅游作为休闲娱乐的方式。然而，生态环境资源的有限性决定旅游增长不可能是无限的，超过了生态环境资源的承载范围，势必会出现“过度旅游”，进而会产生资源的浪费和环境退化。例如，前文我们所提到的西班牙当地居民抗议的“过度旅游”事件。“过度旅游”不仅会造成水资源的过度使用，可能因此导致干旱和水污染，还会导致环境退化，进而可能导致生物多样性丧失。除此之外，“过度旅游”会增加当地的碳排放量，进而加剧气候变化。因此，如何在满足旅游需求的同时，有效保护有限的生态环境资源，成为负责任旅游和生态旅游面临的重要挑战。

（二）生态保护与经济发展之间的矛盾

生态保护和经济发展之间常常存在矛盾。一方面，保护自然环境和生态系统是负责任旅游和生态旅游的核心目标；另一方面，旅游业的发展需要大量的基础设施建设和资源投入，这都可能会对自然环境造成破坏。例如，巴厘岛是著名的旅游胜地，每年吸引数百万游客前来观光。然而，由于过度开发酒店和其他旅游设施，巴厘岛的土地资源和生态环境受到了严重威胁。据统计，截至 2023 年，巴厘岛共有 541 家酒店，比 2019 年增加了 34 家。这些酒店的建设占用了大量土地，破坏了许多野生动物的栖息地，导致生物多样性下降。[7] 因此，如何在促进当地经济发展的同

时保护自然环境，成为负责任旅游和生态旅游需要解决的关键问题。

（三）旅游者的环保意识与行为之间的差距

尽管越来越多的旅游者意识到环境保护的重要性，但在实际旅游活动中，许多人仍然无法做到言行一致。例如，有些人虽然知道垃圾分类的重要性，但在旅游过程中却不愿意花时间和精力去分类垃圾；有些人虽然知道节约用水的重要性，但在酒店房间内却浪费大量水资源。因此，如何提高旅游者的环保意识，并促使他们将环保意识转化为实际行动，成为负责任旅游和生态旅游面临的重要挑战。

因此，在负责任旅游和生态旅游的活动中，需要社会各界共同努力来应对相关挑战。政府、当地居民、旅游从业者、旅游者等在推动旅游业健康发展中扮演什么角色、承担什么责任，厘清这些，都将有助于旅游业的健康发展，并尽可能减少旅游活动对生态环境造成的负面影响。

四、结语

最后，本文通过深入辨析负责任旅游和生态旅游两者的概念差异，并列举了负责任旅游和生态旅游在实践中共同面临的挑战，能够让我们更好地理解政府、当地居民、旅游从业者、旅游者等在应对相关挑战时需要承担的责任，从而更好地推动旅游业的健康可持续发展。

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负责任旅游如何创造生态与经济协同效应：海南东寨港红树林景区生态旅游模式探析

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摘要：旅游景区的过度开发与可持续模式的探索日益成为旅游实践的重点。本文以海南东寨港红树林景区为例，探讨负责任旅游作为可持续社区发展和生态保护模型的潜力。该项目通过开发有利于当地社区和自然生态系统的生态旅游，实现经济增长与环境保护之间的平衡。通过整合负责任旅游实践，如最小化负面环境影响、促进社区参与和提升当地经济机会，该模型展示了旅游如何有助于景区的可持续发展。文章还探讨了东寨港红树林生态旅游项目如何赋能当地居民，创造就业机会，并保持生态完整性。最终，本案例展示了生态旅游作为促进经济和生态协同效应的催化剂的潜力，为其他生态敏感地区提供了一个可推广的负责任旅游模型。

关键词：生态旅游，负责任旅游，可持续社区，东寨港红树林旅游区

周嘉祎，陈韵欢.负责任旅游如何创造生态与经济协同效应：海南东寨港红树林景区生态旅游模式探析.生物多样性保护与绿色发展.第1卷，2025年1月，总第72期.ISSN2749-9065

注：本文原文为英文，详见第71-85页。

浅析生态文明视阈下的负责任旅游

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摘要：当前，随着经济社会的高速发展，人民生活品质不断跃升，旅游业已成为满足人民美好生活新期待的新引擎。然而，旅游业“井喷式”增长的背后，可能对当地生态环境、社会文化、生物多样性、资源利用等方面带来负面影响。发展负责任旅游，也成为旅游业立足生态文明时代要求，推动高质量发展的重要着力点。本文通过对生态文明视阈下的负责任旅游行为的解析，并结合社会组织引领负责任旅游研究与实践，提出负责任旅游所提倡的良性的互利共赢的旅游关系，与生态文明理念高度契合。负责任旅游的主流化发展，将成为助推生态文明建设的重要引擎。

关键词：生态文明，负责任旅游，生物多样性，环境保护

王晓琼，高俊齐.浅析生态文明视阈下的负责任旅游.生物多样性保护与绿色发展.第 1 卷，2025 年 1 月，总第 72 期.ISSN2749-9065

当前，经济社会高速发展，为人民群众提供了更多的物质财富。随着生活品质的不断跃升，人民群众对美好生活的要求也越来越高。旅游业的高质量发展成为引领经济增长，满足人民美好生活新期待的新引擎。随着人们越来越多地参与旅游、享受旅游，全球旅游业的发展势头强劲，中国旅游业也在这一热潮的驱动下，迎来突破性发展，日益成为具有显著时代特征的民生产业。世界旅游及旅行业理事会（WTTC）预测，2024 年中国国内旅游收入将较 2019 年增长 11%，创下历史新高。

然而，旅游热潮汹涌之下，其面临的新机遇和新挑战也不断显现。旅游业“井喷式”增长背后，可能对当地生态环境、社会文化、生物多样性、资源利用等方面带来负面影响，也日益受到社会的广泛关注和重视。发展负责任旅游，倡导旅游过程中的负责任行为，激励更多游客选择成为一名负责任旅行者，也成为旅游业立足生态文明时代要求，推动高质量发展的重要着力点。

一、负责任旅游的起源与定义

负责任旅游（responsible tourism）是一种以可持续发展为基础的旅游方式。它强调旅游业的社会、经济和环境影响，并提倡游客采取措施减少其负面影响。负责任旅游可以帮助保护当地环境、文化和社会资源，同时促进当地经济和社区发展。通过采取负责任旅游方式，可以确保旅游活动不仅满足人们的需求，而且对人

们所访问的目的地产生积极正向影响。

负责任旅游的研究起源于20世纪60年代，当时人们开始意识到旅游对环境和当地社区的影响。1999年10月1日，联合国世界旅游组织（UNWTO）于智利圣地亚哥决议通过了《全球旅游伦理规范》，确定了十项基本原则。该规范综合了以往众多同类文件、规范和宣言的同类思想，为负责任旅游的提出奠定了基础。

2002年，在南非开普敦召开的世界可持续发展首脑会议上，各国代表签署了《在旅游目的地进行负责任的旅游的开普敦宣言》，该宣言被认为是负责任旅游的开端，同时标志着“负责任旅游”一词被正式提出，以及获得广泛的接受和采纳。

二、生态文明视阈下的负责任旅游

生态文明，让我们能够正确处理人与自然关系，实现人与自然、人与人、人与社会的良性循环、全面发展与持续繁荣。生态文明强调把人类活动限制在自然可承受的范围内，在“尊重自然、保护自然、顺应自然”的前提下，通过山、水、林、田、湖、草、沙的系统治理和保护，实现人与自然和谐共生的美好愿景。

“两山论”作为习近平生态文明思想的核心，深刻阐述了当前中国在发展进程中如何处理好发展与保护之间的关系。要树立正确的发展思路，绝不能再以牺牲环境为代价换取经济的发展，只有在确保人与自然协调发展的基础上，让绿水青山发挥最大的经济效益，我们的发展才是可持续的，我们的子孙后代才能够实现安居乐业。

全球文化旅游业的飞速发展，让资源开发、服务赋能、活动开展等前中后期出现的文旅产业活动对当地生态系统造成的负面影响显著增强。作为旅游活动的核心，包括旅游管理者、游客等相关人员的不负责任的意识和行为，会对人类赖以生存的生态环境造成极大的破坏，亦成为当地旅游业发展的重要瓶颈之一。

在旅游活动中，游客自身环保意识淡薄，尊重自然意识不强，只注重个人享受，忽视对环境造成的污染，使得不负责任的旅游行为屡见不鲜。这些行为方式，将不断加重自然资源的承载力，形成人与自然的对立关系。因此，我们必须直面不负责任的旅游行为所产生的“遍地狼藉”，这些行为所产生的影响与生态文明所倡导的“人与自然和谐共生”背道而驰。做好生态文明视阈下的旅游发展路径规划，推广负责任旅游至关重要。

三、负责任旅游旅游行为解析

负责任的旅游要求旅游管理方（政府）、经营方（企业）、消费方（游客）和目的地（居民），即四方面的旅游参与者都要以“尊重、自律、节约与回馈”四大核心价值为基础，开展负责任的旅游活动，以维护旅游目的地的生态、文化、社会与经济的可持续发展，尽可能地扩大正能量、降低负面影响。[1]负责任旅游行为主要体现在以下几方面：

（一）制定科学合理的旅游开发计划。旅游管理方和经营方，包括政府和企业等主体，应承担管理监督责任，做好充分的前期调研和评估，通过制定科学合理的旅游开发规划，既能够充分发挥旅游业对区域经济和社会发展的积极作用，又能避免过度开发和过度利用资源等问题，切实保护当地生态环境和文化遗产。

（二）对当地经济做出贡献。在外旅行，旅游者尽量选择当地经营的住宿场所；外出进餐，尽量选择当地应季食物，这种方式不仅可以最大限度地支持当地经济发展，有效降低碳排放，同时也为游客节约了出行成本。

（三）选择更为低碳的出行方式。据国际民用航空组织（ICAO）估计，全球 2%的二氧化碳排放来自航空运输，甚至比大多数国家的排放量还要多。负责任旅游，提倡低碳出行，在中长途旅行中，优先选择火车而不是飞机，对于短途国内旅行，开车比坐飞机更低碳。

（四）了解当地的习俗和法律。很多游客在不了解当地法律、习俗或语言的情况下前往旅游目的地，这样会给自身以及当地的管理造成很大的困扰。作为旅客，即使你不同意当地的习俗或法律，也有必要遵守它们。

（五）避免涉及剥削性的活动。作为一名负责任游客，有必要提前了解哪些旅游活动是剥削性的并且可能会破坏当地生物多样性。如动物表演活动往往涉及虐待动物和强迫动物劳动，无视动物福利，避免这类旅游活动也是对动物最大的保护。

（六）避免过度旅游。过度旅游是指一些热门旅行目的地或景点在同一时间有过多游客集中前往，严重超出了城市的承载能力。这一行为不仅对当地居民生计带来沉重负担，还会为了满足大量游客的住宿需求，大规模的进行土地开发和酒店建设，对生态环境构成严峻挑战。因此，在追求旅游发展的同时，我们必须认真思考生态保护与旅游发展二者之间的平衡关系，近年来逐渐在国内兴起的“逆向”旅游概念，为解决“过度旅游”问题提供了新的思路。

四、社会组织引领负责任旅游研究与实践

党的二十届三中全会提出，加快经济社会发展全面绿色转型，健全生态环境治理体系，推进生态优先、节约集约、绿色低碳发展，促进人与自然和谐共生。“负责任旅游”是对20世纪出现的大众旅游发展方式引起的环境、社会文化和经济负面影响进行反思后提出的一种旅游发展方式，其核心理念是扩大正面影响、减少负面影响。[2]作为一种实现旅游可持续发展的最佳方式，国内对负责任旅游的研究起步较晚，但近年来已逐渐进入公众视野。中国生物多样性保护与绿色发展基金会（简称中国绿发会）作为专业从事绿色发展与生物多样性保护领域研究与实践的社会组织，为推动中国文旅产业可持续发展，促进负责任旅游主流共识的形成，做出了诸多探索与尝试。

2020年3月，中国绿发会负责任旅游工作委员会正式成立，旨在将“负责任旅游”的理念深植人心，引领“负责任旅游”方面的实践和研究，推动中国旅游行业的绿色发展。2021年8月，中国绿发会负责任旅游工作委员会成功推动ICRT China邀请国内旅游业行业优秀代表参与“全球负责任旅游奖”评选，首次将这一项负责任旅游方面的国际权威奖项引入中国。2024年9月，中国绿发会负责任旅游工作委员会在北京召开了工作会议，探讨如何支持海南、香港和澳门成为全球气候旅游的引领者，以推动区域内的可持续旅游和环境保护。

多年来，中国绿发会负责任旅游工作委员会在引领负责任旅游主流化，推动旅游业绿色高质量发展等方面发挥了积极助推作用。生态文明是当下最契合时代发展需求，顺应社会发展的文明形态。负责任旅游倡导的方式和举措，既能够保证旅游目的地的生态、文化、社会与经济的可持续发展，又能够敦促旅游管理者、经营方、游客对自己的行为负责，通过约束自身行为，减少对目的地的自然生态环境、社会人文传统产生负面影响。这种良性的互利共赢的旅游关系与生态文明理念高度契合。这也说明，只有处理好发展与保护之间的关系，在确保人与自然协调发展的基础上，顺应自然规律，节约能源资源，保护和珍爱自然万物，负责任旅游方能成为助推生态文明建设的重要引擎。

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农田土壤微塑料污染研究进展

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摘要：近年来，农田土壤微塑料（MPs）污染逐步得到关注，其带来的环境风险逐渐得到重视，越来越多地围绕MPs对农田土壤环境影响的研究陆续开展。本文总结了截止到目前有关农田土壤MPs的研究成果和进展，特别是MPs对农田土壤养分、土壤中重金属迁移、土壤酶活性影响等研究进展。本文还阐明了农田土壤MPs污染研究现状与特点；论述了我国农田中MPs的主要来源；总结分析了MPs对农田土壤的养分及重金属迁移变化影响。本文认为，农田土壤中的MPs来源多样，其中农业地膜是农田中MPs的主要来源之一，其对农田土壤养分、重金属以及土壤酶活性均有一定的影响作用，并对目前农田土壤MPs污染研究现状存在的问题展开探讨，并提出对未来研究的展望。

关键词：微塑料，农田土壤，土壤养分

陈宇,李晓勇.农田土壤微塑料污染研究进展.生物多样性保护与绿色发展.第 1 卷,2025 年 1 月，总第 72 期.ISSN2749-9065

1 引言

微塑料（Microplastics,简称MPs）概念由 Thompson 等[1]在 2004 年提出,一般将直径小于 5mm 的塑料碎片、颗粒和纤维称为微塑料[2-3]，进一步划分还可分为微米塑料（1μm-5mm）、亚微米塑料（100nm-1μm）、纳米塑料（1-100nm）[4]。农田土壤中的 MPs 残留是由 Matthias C. Rillig[5]于 2012 年提出后逐渐受到人们关注，农业生产中常会产生 MPs 并残留在我们的生产环境当中，MPs 长时间残留会对农田土壤和作物生长造成影响[6]。农田中土壤 MPs 具有迁移性强、粒径小、疏水性强等特点[7]，易成为有机污染物和重金属的载体，其会降低土壤中微生物数量，改变土壤性质,表现在导致土壤毒性增加，土壤养分流失加快，使得土壤丧失耕作价值。以关键词“microplastic”和“soil microplastic”在 Web of Science 数据库中检索环境科学领域的发文量（图 1），土壤 MPs 研究发文量情况在 2018-2023 年逐步有较大上升，但从 2023 年的数据来看，其占整个环境科学领域 MPs 研究的发文量约为五分之一,农田土壤 MPs 污染还有待开展深入系统研究。

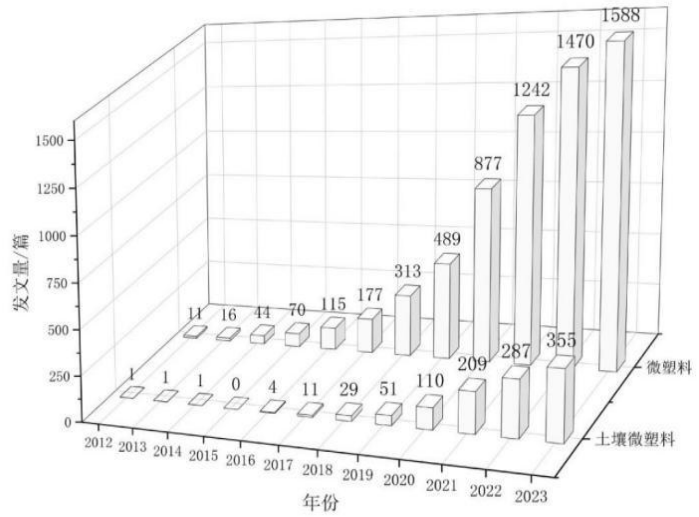

图 1 基于 Web of Science 数据库的土壤 MPs 污染研究情况统计

2 我国农田土壤中 MPs 种类和分布现状及主要来源

在土壤 MPs 的种类方面，目前国内外从农田土壤中提取到的 MPs 种类主要有聚乙烯（PE）、聚丙烯（PP）、聚苯乙烯（PS）、聚氯乙烯（PVC）及聚酰胺（PA）等多种，外貌形态主要为碎片、纤维、薄膜、颗粒和泡沫，粒径大小主要集中为 0-5mm 之间[8-10]。农田土壤中微塑料种类呈现具有多样性和复杂性，受不同地区和耕作方式的影响。

从 MPs 在土壤的分布范围来看，在国内研究中，我国 28 个省份的 MPs 丰度范围为 1.6-6.2×105items·kg^{-1}，均值为 4536.6items·kg^{-1}，中值 1640.0items·kg^{-1}[11]。对比国外研究表明我国农田土壤 MPs 污染略大于其他国家，具体数值参见表 1。在目前的文献报道中可见设施农田的 MPs 污染丰度最高，调查表明其峰值为 4.69×104items·kg^{-1}[11]，城郊农业次之为 1.26×104items·kg^{-1}[12]，大型农业峰值最低为 3.50×103items·kg^{-1}[13]。中国农田土壤微塑料的区域分布受到多种因素的影响，包括地理位置、气候条件、耕作方式和人类活动等。

表 1 各国家/地区农田土壤 MPs 丰度统计表

国家/地区	土壤 Mps 丰度均值（单位：items·kg^{-1}）	参考文献
中国南方	4817.9	[14]
中国北方	4156.1	[15]

中国西北部	3880~6300	[16]
青藏高原东北部	68～3668	[17]
墨西哥	2770	[18]
瑞士	593	[19]
欧洲	2500	[20]
德国	1.25	[21]
加拿大	298	[22]

在主要来源研究方面，目前我国农田土壤中MPs来源有农用塑料薄膜及包装使用、有机肥使用、污泥的使用、地表径流和农业灌溉、大气沉降五个主要来源。在有机肥的使用方面，其会向土壤中增加额外的MPs含量，我国每年因有机肥使用而进入土壤的MPs含量可达52.4～26400t，有研究表明长期使用有机肥的农田土壤中MPs丰度可达543.33items·kg^{-1}，其土壤的MPs丰度年增长率在10%左右[23-25]。在污泥使用的影响方面，我国农业使用的污泥量在300-400万吨左右，而我国大多数省份污泥的MPs平均含量在22700±12100items·kg^{-1}[26,27]。地表径流和农业灌溉也会带入大量的MPs，内陆湖泊水体中含有大量的MPs，长江口水体表面漂浮的Mps丰度可达137.3±2461.5个/m^3[28-30]。在大气沉降方面，我国滨海城市大气环境中MPs沉降通量可达1.46×105个/（m^2a），纤维类达1.38×105个/（m^2a），同样是土壤中MPs的一个重要来源[31]。在农用塑料薄膜及包装使用方面，农田土壤微塑料的来源主要为农用地膜的使用，2023年我国农用地膜使用量占农用塑料薄膜使用量约为60%。2019年国家统计局农村社会经济调查司关于农用地膜使用的数据显示，山东省农用地膜使用量最高，其地区土壤MPs丰度为310～5698items·kg^{-1}[32,33]。此外，有研究表明，农业地膜使用年数和农田土壤中MPs浓度成正相关[34]。而我国大部分农用塑料地膜是由PE制成的，由此可见，PE地膜是我国农田土壤MPs最重要的来源[35]。虽然有研究探索使用微生物、植物或化石材料衍生的生物可降解聚合物制备地膜，但这些材料在性能、成本和应用效果上尚未完全取代PE地膜。

3 农田土壤 MPs 污染研究现状与进展

近几年国内外有关农田土壤MPs污染研究处于初步阶段，目前对农田土壤的影响研究分类可分为 MPs 对农田土壤中重金属的变化影响、对农田养分变化影响、对土壤微生物群落变化影响、对土壤中酶活性变化影响等。

土壤中 MPs 会与重金属等污染物发生吸附等多种效应，并随着 MPs 老化程度的增加，其作为污染物载体的潜在风险呈上升态势[36]。在土壤介质中，MPs 与重金属的吸附作用会受 MPs 比表面积、老化程度、极性以及土壤中氢离子（H^+）和低分子酸的影响[37,38]，此外，MPs 受风化作用影响后其表面形态的改变也会增加其对重金属的吸附量[39]。在对重金属的迁移方面，土壤中不同种类 MPs 会对土壤中不同重金属的形态变化产生影响，并会改变镉、铅、铜等重金属在土壤中的富集深度以及可交换态含量[40]。MPs 会降低土壤对重金属的吸附能力，对重金属的解吸方面也会增加，这会导致重金属流动性的增加[41,42]。同时，MPs 本身作为一种微小物质，其本身的迁移也会使附着在其上的重金属发生迁移。不同重金属随 MPs 迁移的程度也不同，有研究表明在土壤中添加大量低密度聚乙烯（LDPE）种类的 MPs 后会使重金属镉（Cd）从中层富集迁移到表层富集，线性低密度聚乙烯（LLDPE）、聚苯乙烯（PS）种类 MPs 会使重金属铅（Pb）从表层富集迁移到中层富集，聚苯乙烯（PS）、线性低密度聚乙烯（LLDPE）种类 MPs 在整体上对重金属铜（Cu）在纵深方向迁移上起到了一定的截留作用。土壤中的重金属锌（Zn）受 MPs 作用下无明显迁移变化，仅在 LLDPE 影响下有较少变化[42]。

在土壤重金属生物有效性方面，大量实验表明 MPs 会加剧重金属在生物体中的积累。MPs 会和其装载的重金属一起被生物吸收，从生物体内分离出来的 MPs 上吸附的重金属含量和生物体内的金属含量存在正相关性[43]。MPs 和重金属共存时可产生比重金属单独存在时更高的毒性[44,45]。例如，MPs 和 Cd 的联合处理会明显提高蚯蚓体内的 Cd 累计含量，PE 和吡虫啉联合暴露相比单独暴露会明显提高蚯蚓氧化损伤率和死亡率[46,47]。微塑料对农田土壤中重金属的影响是多方面的，包括改变土壤物理化学性质、重金属的生物有效性，以及与重金属形成复合污染，对农田生态系统构成潜在威胁。

目前，国内外关于 MPs 污染对土

壤中微生物的影响主要集中在MPs富集对土壤微生物组成、群落多样性和生物活性影响[48]。目前的研究表明，MPs会降低土壤中细菌群落的多样性并抑制微生物群落的发展速度，并且土壤中微生物群落多样性随着土壤中MPs的相对丰度增加呈正相关[49]。由于环保理念对人们观点的影响，市面上出现了大量可降解的塑料，土壤中残留的可降解MPs对土壤微生物比传统MPs会产生更强的刺激作用，并会显著改变土壤微生物网络的复杂性和生态随机性[50]。MPs同时可以影响土壤中微生物的活性。例如，荧光素二乙酸酯酶（FDAse）活性可以很好地反映土壤中微生物活性、土壤质量的变化以及生态系统中有机质的转化，可作为评估土壤质量短期变化的有效指标，并可以代表微生物的整体代谢活性[51]。

土壤酶作为土壤的组成部分之一，在催化土壤中物质循环和能量流动等方面发挥着重要作用，其中蔗糖酶（S-SC）的酶促作用产物与土壤养分含量变化密切相关[52]。有研究表明，土壤中PEMPs会抑制蔗糖酶活性，相对比MPs质量分数来说，粒径对蔗糖酶活性影响较明显[53]。Huang等学者发现往土壤中添加MPs会显著提高土壤过氧化氢酶（S-CAT）活性，提高度在149%和139%左右，S-CAT作为可以表征需氧微生物指标的酶，其活性与需氧微生物的数量密切相关[54]，所以该酶活性变化可能来自MPs对土壤结构的影响。MPs能通过改变土壤理化性质，进而影响土壤酶活性[55]，也有研究表明MPs对S-UE和S-AKP/ALP等活性不存在明显影响[56]。结合相关研究表明，MPs对土壤中酶活性影响会有不同程度的增加、减少、或不变，这可能和土壤特性、MPs种类及颗粒大小以及存在时间不同有关，其对同一土壤酶活性的影响存在很大差异，更进一步的变化规律和机制仍有待探究[57,58]。这些影响会对农田生态系统的结构与功能产生长远的影响。

在养分影响方面，目前有关土壤在MPs污染影响下养分变化的研究并不多。MPs在土壤中造成的污染对土壤养分均会造成影响，影响程度会受MPs种类、MPs土壤丰度值、土壤种类以及污染时间等因素变化。从目前的研究进展来看：PE、PA、PS等为代表的土壤MPs残留对土壤养分均有一定程度的影响，一般来说会使土壤中有效氮、有效磷、速效钾等含量下降。对有效磷等养分的影响原理上主要认为是吸附作用为主要原因，有学者从吸附动力学和吸附等温线等方面进行过相关研究[59]，为MPs污染下的土壤养分迁移转换提供了

部分理论依据。此外发现MPs也会通过影响酸性磷酸酶、突然脲酶、蛋白酶、过氧化物酶和脱氢酶的三级结构而抑制相关土壤酶活性，从而使土壤养分含量降低[60]。随着土壤类型以及MPs类型的不同，也会出现以上养分含量先上升后下降或含量上升的情况发生。

在有机质含量的变化规律上一般呈上升变化，有研究表明MPs直接（吸附）效应和环境相关间接效应在调节土壤有机质含量变化过程和功能中可能起主要作用[61]，也有研究分析认为由于土壤农膜残留MPs主要为聚乙烯材质，而聚乙烯的含碳量较高，MPs会通过生物和非生物过程与土壤矿物质或有机化合物结合，将一些含碳化合物固定在土壤团聚体中，来增加土壤含碳量，因此土壤中MPs可以作为非植物来源碳的一部分来为土壤提供碳源[62,63]。

微塑料对农田土壤的影响是多维度的，它们不仅改变了土壤的物理结构和化学性质，降低了土壤肥力和养分有效性，还影响了土壤微生物群落的结构和功能，进而可能干扰土壤生态系统的稳定性和作物生长，同时微塑料还能吸附土壤中的重金属和其他有机污染物，增加了环境和食品安全的风险。因此，微塑料污染对农田土壤构成了一个不容忽视的环境问题，需要采取有效措施进行管理和控制。

4 农田土壤中MPs检测分析方法

农田土壤中MPs的检测分析步骤一般可分为土壤中MPs的采集、土壤中MPs的分离、土壤中MPs的鉴定三大部分。土壤MPs的采集方法一般有直接挑选法、大样本法、浓缩样本法、大气沉降采样法和生物取样法等[64]。土壤中MPs的分离方法有密度分离法、酶解净化法、电静态分离法等[65]，其中密度分离法应用较多。除此之外还有气浮法和加热法，但其在应用和研究上相对很少。农田土壤中MPs的鉴定方法有目测分类、光谱和质谱分析及热分析技术等。在实践中经常使用显微技术进行预筛选，再用扫描电子显微镜来进行表面形态鉴定[66,67]。根据最新的研究进展，农田土壤MPs最新分析技术总结如表2所示：

表2 农田土壤MPs最新分析技术总结

技术方法	方法特点
电静态分离法	基于微塑料电静态行为的分离方法，能够有效地从环境

	样本中分离微塑料
加热辅助密度分离法	从沉积物中提取微塑料的新方法，通过加热辅助来提高密度分离的效率
酶解净化法	一种用于环境样本中微塑料的酶解净化方法，能够有效去除有机杂质，提高微塑料的纯度
橄榄油基提取法	使用橄榄油作为提取剂的方法，用于土壤和堆肥样本中微塑料的提取、定量和鉴定
拉曼光谱成像技术	拉曼光谱成像技术因其高灵敏度和特异性，在微塑料的检测中显示出独特优势
高光谱成像技术	高光谱成像技术和化学计量学结合，可以快速监测土壤中的微塑料
近红外光谱技术	近红外光谱技术用于土壤中微塑料的高通量检测
基于量子级联激光的高光谱红外化学成像	一种快速识别和定量环境中微塑料的方法
可见近红外光谱（vis-NIR）	用于预测土壤微塑料浓度的一种技术
1H NMR 光谱法	作为识别和定量微塑料颗粒（如 PE、PET 和 PS）的一种简单快速方法
阻抗谱法	用于微塑料流动通过定量的一种方法
飞行时间二次离子质谱（ToF-SIMS）	一种具有高分子特异性和成像能力的表面分析技术，能够成功鉴定农田土壤中 PP、PVC、PET 和 PA6 微塑料的丰度和粒径分布信息
热重分析-质谱联用技术（TGA-MS）	联用技术可实现对有机改良剂中 PE 和 PS 微塑料的快速测量

随着对 MPs 研究的深入，检测分析技术不断创新和提升。有研究团队利用 AFM-IR 联用技术在微/纳塑料表征方面的应用，在获得高分辨形貌成像的同时，获得样品的化学成分分布、热学信息和力学性质等[68]，也有研究团队利用 8700LDIR 红外成像技术专门开发了 MPs 检测全自动解决方案[69]。在检测仪器方面，有研究团队研制了基于热裂解-质谱技术的微

/纳米塑料检测仪，具有不受尺寸限制、快速分析等优点，目前已实现了PP、PE、PS、PET等多种纳米塑料的分析检测[70]。在建立统一标准方法方面，有研究团队针对土壤等环境介质中的MPs，建立了傅里叶变换显微红外光谱的标准化方法。这规范了术语和定义、样品采集和保存、MPs的分离和净化、样品测定、结果分析以及质量控制的全部过程。检测的规范化有助于提高MPs数据的准确性和可靠性，使得不同实验室或研究机构之间的数据更具有可比性[71]。目前，农田土壤中MPs的检测分析方法正朝着更高效、更精确和更自动化的方向发展。MPs检测技术的未来发展将更加注重提高检测效率、降低成本、增强自动化能力，并结合人工智能等先进技术，以更好地应对微塑料污染的挑战。

5 存在问题及未来研究展望

农田土壤MPs污染作为一种新型环境问题逐渐引起人们重视，目前对MPs种类、MPs来源、地区分布特征以及MPs污染带来的环境危害等都有一定研究，但各类相关研究还处于不充足的状态，仍有很多方面可以探索积累，未来可以从以下四个方面开展深入研究：

（1）农田土壤MPs迁移和转化：农田土壤中MPs在人为耕作、动物活动、降雨和土壤淋溶等一些影响下进行迁移，目前对于这些状况的迁移变化和动力学过程研究还比较缺乏，未来可以在土壤MPs的迁移路径上加大研究，以及进一步探讨微塑料对土壤生物地球化学过程的影响及其机制。

（2）农田土壤养分变化研究：农田土壤MPs对养分的影响原理还有待进一步分析，MPs对湿地农田生态系统土壤养分等的影响尚未得到充分阐明。在未来的研究中可以进一步明确各种因素影响下土壤MPs污染对农田养分影响的变化规律，以便未来能充分把握其变化规律来促进农业生产。

（3）土壤MPs生物降解：目前研究表明聚乙烯地膜等可被微生物菌株降解[72]，这所代表的微生物降解法是一种很有前景的解决方案，但是目前研究缺乏高效菌株，在实际应用上的效果不佳，未来还需不断扩充土壤MPs降解菌的菌株库，不断揭示其降解机制。

（4）农田土壤中MPs对大气污染影响：有研究表明农田土壤中MPs可能通过自身降解及促进土壤有机质分解两种机制促进土壤中的CO2

排放[73]，以及 MPs 和秸秆混施时对土壤 N2O 排放有显著影响，低量 MPs 与秸秆添加促进土壤 N2O 排放，而高量 MPs 添加抑制土壤 N2O 排放[74]。这些案例都表明了 MPs 会影响农田土壤相关气体排放，其和大气污染息息相关，但关于这方面的研究目前还比较少，其对大气污染的相关研究还有待扩展。

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教育中的动物与儿童同理心发展

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摘要：本文为作者根据参加北京师范大学2024自然教育学术研讨会时发言内容整理而成。文章包括“基本信息：动物内容与同理心发展的关联”、“现象观察：自然教育中动物被如何对待”以及“实践指南：生命关怀心智模式整合发展框架在自然教育中的应用”等三个方面，并结合其担任执行主编编撰出版的《生命意义与同一健康》一书的内容，进一步阐述了关于同理心发展的思考。

关键词：同理心，动物，自然教育，生命关怀，同一健康

张媛媛.教育中的动物与儿童同理心发展.生物多样性保护与绿色发展.第 1 卷，2025 年 1 月，总第 72 期.ISSN2749-9065

引言

同理心（Empathy）是指在人际交往、人与自然互动过程中，能够体会他方（包括人和动物）的情绪和感受，理解他方的立场和想法，并站在他方的角度思考和处理问题的能力。在中文翻译中，有人把“Empathy”译为“移情”或者“共情”，笔者认为两者皆不足以表达“Empathy”的含义，“移情”也容易和精神分析中的“移情”概念相混淆，“共情”减弱了对反思的重视。儒家“忠恕之道”与同理心概念高度相关。

同理心概念有近 200 年的发展历程，贯穿美学、心理学、精神分析、神经科学等领域，被认为是人际关系、心智成长、创造力的重要因素。作为社会化的人，理解自己和他者的想法和感受的重要性不言自明，否则会带来误解、冲突乃至其他后果。2006 年，美国芝加哥大学神经科学家简·德赛迪（Jean Decety）使用脑成像的方法证实了同理心的神经机制包括情感同理心和认知同理心两条路径。

通过同理心，人们既理解了他人，又通过他人的经验意识反诸自身，理解了自己。社会化的“动物”就是这样透过与他者的互动达成心智的成长。同理心不仅包括情感和认知成分，还包括过程和结果（反应）。

同理心起步于“关注”，既有情感过程也有认知过程的参与，首先对处于不幸中的他者产生情绪模仿，继而识别情绪。个体被所感受到的情绪感染，对他者产生“共鸣”，这是一种“自我取向”的情感反应过程。共鸣会激发个体产生一种换位的“想

象”，构建一个虚拟的人物，以自我——他者取向和视角去理解当时境况可能拥有的想法和行为，对这个虚构人物产生感同身受的反应。这个过程的高潮是面向他人的同构情绪反应，这是一种培养成熟亲社会行为的状态。在这样的情感体验中，重回认知过程，进入新的同理心循环。

同理心是一个复杂的、动态的心理机制，绝非一个静态的结论。这个过程中，同理心需要个体在情感和认知层面都积极参与，不断深化对他人的理解和感受。所有体验的感受和情绪及认知的不同取向和视角都参与到自身行为决策中，也就是说，同理心就存在于想法-感受-行为所形成的行动链中。

Rijnders 等人（2021）提出了同理心拉链模型。他们将成熟的同理心描述为一种平衡状态，只有通过共同运作认知和情感过程以及情境和个人因素，才能实现。这些情境/个人因素充当“拉链力”，将认知和情感过程压缩在一起以实现成熟的同理心。这种压缩过程的有效性受内部心理状态（例如动机和注意力）和外部情境因素的影响。当一系列认知和情感过程既平衡又足够有效时，同理心就被认为是完全发展起来的。

发展成熟的同理心是终身的功课，对于儿童来说，更是重中之重。同理心发展具有阶段性、具身性、环境依赖性，认知同理心和情感同理心也存在发展不同步现象。

缺乏同理心的表现：

首先，情绪识别和情绪感染出现障碍，会有情感连接的困难，包括：无法通过面部表情、语调或肢体语言等非语言线索来判断他人的情感；难以“感受”到他人的情绪，他人的情感体验可能显得遥远或难以理解，很难在某种程度上与之产生共鸣；无法准确地描述自己的情感状态，或者在适当的场合表达恰当的情感，常常表现得不自然或不合时宜。

其次，心理理论建构迟缓，会缺乏换位思考的能力，包括：难以理解他人行为背后的原因，倾向于以自我为中心，无法跳出自己的思维框架来考虑他人的立场、动机、意图；对社交情境的理解不足，对他人的隐私和界限缺乏敏感性，无法理解某些社交行为在特定情境下的适当性；忽视他人的情感需求，难以对他人的情感状态做出适当的反馈。会表现得冷漠、疏离或漠不关心，即使他们内心并非如此。

一、基本信息：动物内容与同理心发展的关联

动物在儿童同理心发展中起到了什么角色？

我知道你的痛，因为我也一样会感到痛——对于拥有相似结构的个体，这是常识。忽视虐待动物的行为，将之简化为儿童探索行为的延伸，是儿童同理心发展的现实障碍。预防虐待动物行为的发生，及早干预和引导具有重大的社会意义，因为虐待动物可能导致暴力行为的延续和扩大，虐待行为背后可能存在着心理问题或受伤害现实，这已有大量的实证研究。

动物不但以环境要素参与了同理心的发展，更以复杂的身份参与了人类生活，人们也在如何对待它们的过程中发展自己。作为他者的人和非人动物，尤其是哺乳动物，具有非常多的相似之处，包括认知、情感、行动模式。儿童喜欢动物，更通过与动物的观察互动，了解其行为特征、基本健康和功能、动物的情感状态、动物的天性，并培养对生命的敬畏之心。在这个过程中，确保健康、快乐并过着合理的天性生活是动物福利的核心宗旨。值得注意的是，人类也是灵长类动物中能直立行走的一个类群。

在教育过程中，最糟糕的事情莫过于一个孩子伤害动物而逃脱责任，这不仅损害了动物，也阻碍了儿童同理心的健康发展。在2024年出版的《生命意义与同一健康》书中，介绍了华盛顿大学和荷兰开放大学一项临床研究的一个案例。十四岁虐待动物的年轻人成年后再涉家暴，他被当年的警察认了出来。从虐待动物到人际暴力，这并非个案。

如何对待动物不仅关乎伦理道德，更与社会、政治、经济等多个层面密切相关。动物的健康与人类的健康、环境的健康交织在一起，是一体的健康，即同一健康，这是一个重要的概念，不仅仅关乎人畜共染病，也同样关乎心理健康和社会健康。想要理解人和动物之间的复杂关系，对动物分类是基础，笔者非常喜欢《动物社群》提出的分类，动物如何生活是这个分类主要的观察角度。

家养动物：通过驯化与人类建立共生关系，服务于食品供给、医疗研究、劳动生产、技术协作及情感陪伴等多重功能。

野生动物：在自然栖息地中独立生存，尽可能与人类保持距离的物种。

边缘动物：由于栖息地被侵占或主动选择，进入人类生活圈的非驯化动物，与人类形成了一种若即若离的共处关系。

二、现象观察：自然教育中的动物

透过教育，儿童会如何理解“动物”？

语文、思政、品德与生活、美术等几乎所有科目都涉及到。

这里以一个自然教育的例子来展开。在一个“寒假特辑昆虫营”的广告上，写着“揭开大自然的面纱，从认识一只昆虫开始”，活动提供包含昆虫饲养套装+标本制作工具的昆虫学习材料包，并鼓励孩子们通过蝴蝶标本的制作朝向真正的昆虫专家迈进！

那么，这样的活动能有效帮助学生理解动物、感知生命，并提高生态文明意识和同一健康意识吗？显然答案不尽如人意。

在笔者看来，自然教育首先也是科学教育，学生透过探究，向动物学习生活与发展的自然范式，从而自己也能以自然范式去创造和生活。

相当多的自然教育活动涉及动物，包括：野生动物保护区实地考察、湿地公园观鸟活动、城市公园生态观察、自然教育营地研学活动、在地乡土野外观察、生态农场体验、去野生动物保护站或流浪动物救助中心参访/志愿服务、社区宠物互动活动、自然博物馆参观、动物科普讲座等等。这些项目都非常好，但其中存在的一些问题也不容忽视，包括：打扰动物；破坏栖息地；投喂；不当接触，甚至导致自己受伤，忽视人畜共染病；采集标本的研学活动规模急剧增大，对生物多样性造成一定影响；物种歧视（鄙视链）；野生动物异宠化倾向。在一个新闻报道中，笔者甚至看到绿鬣蜥、象龟等保护动物被宠物乐园机构带进学校做科普讲座。

在校园开展小动物饲养活动越来越常见。教师们希望能帮助学生：培养责任心；学习动物日常护理；观察动物生长发育；建立情感联系。兔子是最常被饲养的动物。兔子很敏感，有打洞、社交，但又挑剔同伴的特性。这样的饲养活动也存在：将动物教具化，不当对待致受苦；饲养环境不适，轻视动物福利；缺乏专业指导，未正确示范养护；随意处理动物死亡事件等都可能是校园饲养活动需要避免的。

海洋馆/动物园究竟能否很好的承载自然教育的功能，始终值得讨论。学校安排学生去海洋馆学习，本着帮助学生了解海洋生物多样性、认识海洋生态系统、学习海洋保护知识以及培养环境保护意识的初心。实际上，海洋馆存在过度娱乐化展示的问题，以及海洋动物的栖息地与人造空间

之间的差异，无法回避圈养环境的影响，也难以回避可能误导学生对海洋动物习性的理解。

此外，动物园必须要正视动物表演问题，努力基于动物自然行为进行丰容，避免将动物过度拟人化。使用DOK理论来分析，过度人格化或娱乐化反映了浅层认知，这种简化处理导致对动物行为的误解，阻碍学生理解动物在生态系统中的真实角色，也无法让学生透过观察将动物被对待的方式与动物的生命状态相联系，难以构建关于动物福利、动物伦理以及同一健康的心理理论，不但动物自身固有价值在学生的头脑中是虚无的，他们对自己的生命固有价值也难以确认，与他者连接的情感反应也是虚弱的，这一切都成为学生发展同理心的障碍。

三、实践指南：生命关怀心智模式整合发展框架在自然教育中的应用

在探究学习的过程中，教育者既要警惕缺乏知识深度（Depth of Knowledge），也要警惕缺少感受连接，更要警惕带来伤害。缺乏更深层次的战略性思考和延展性思维时，学生对生命的认识就会流于表面；缺少情感体验和关怀时，学生就难以构建生命的意义感并反映到生活中，以创造真切的幸福。

反思教育设计及实践是否可以帮助学生实现有意义的探究学习：将认知层次提升到更高水平，使学生能够系统思考、建立联系，理解生命价值，理解同一健康，透过生命感知建立连接，体验尊重与关怀，活出价值。

例如，虐猫狗的话题不仅仅涉及儿童对猫狗的态度，还与儿童发展基于同一健康策略的人和动物相处模式紧密相关，同理心发展与同一健康发展同步相伴。人类与野生动物以及边缘动物的接触面也正在扩大，对野生动物的猎奇，对边缘动物走进自己生活区域的恐惧，都成为同一健康策略落实的障碍。

喜爱是快乐和接受两种情绪的交融。轻蔑则是生气和厌恶两种情绪的交融。快乐和生气反映的是情绪状态，与情感同理心相关，而接受和厌恶则反映的是对动物生命价值的认知，与认知同理心相关。

教育对此，该如何应对？

想要回答这个问题，需要回到“体验三角”，去理解这个过程的神经机制，或许更能帮助我们理解涉及动物的认知同理心和情感同理心协同发展的重要性。

无论是儿童还是成年人，人们总是不断透过知、情、意、行这个体验

循环来“强化”或“修正”自己对价值的判断，对生命价值的判断的重要性毋庸置疑。在这个过程中，大脑的突显网络（SN）不断从默认网络的自我概念中调取信念和价值观，“落实”对好事或坏事的评判，让激励突显或让厌恶突显，“我觉得”“我应该”这样的意识通达率越高，中央执行网络（CEN）就越活跃，以行为回应信念和价值观，以达成自己主观上的利好。究竟什么是主观上的利好呢？身体的感受和情感反应给出了答案，既有本体感受、基本情绪也有次级情绪，突显网络（SN）仰赖的就是这些。简单来说就是，人在与世界的互动过程中形成了自身独特的认知框架和行为决策模式，感受以及情绪在其中生发，没有对错只是作为信号。

笔者在《基于心智模式改善的生命关怀教育》书中提出生命关怀心智模式整合发展，以作为教育反思。笔者认为，作为理性和感性合一的“全人”——一个生理、心理、社会整全的人，其发展的整体任务应该包括“将道德的、审美的、情感的直觉与科学的最普遍力量结合起来以形成一种首尾一致的世界观”，并在此基础上构建“心系万物诗性繁荣，做恰好的选择的人生观”，以智慧和同理心理解生命间的相互依存关系，培养审美意识，在对他人、动物和环境的关怀中作出明智抉择，实现人与自然的和谐共生。生命关怀心智模式整合发展是一个包括智商、情商、德商、系统商在内的终身学习过程。

图源：根据《基于心智模式改善的生命关怀教育》整理

教育不仅仅要回应如何减少动物虐待，还要回应儿童如何构建对生命价值、生命意义的心理理论，理解

生活，拥有生命力，活得好，活得有意义。

什么是活得好、活得有意义？

伟大的数学家、过程哲学创立者怀特海（Whitehead）说：所有真实的或现实的关系都是审美关系。美不是由形式上的和谐构成的，而是一种内在和谐的体现，是生命力和创造潜力得到最大发挥的体现，是个体与其环境共生共荣的一种最佳状态。基于此，笔者认为：活得好就是活出共生共荣的状态，这种状态体现出内在和谐的自然而然的美；活得有意义则是心系万物诗性繁荣，发展“一切关系都是审美关系”的觉悟能力，做恰好的选择，以关怀、正直和智慧的愿望生活。

在《教育的目的》一书中，怀特海强调“在教育中，应该培育出一种最为本真的思想素养，即风格意识。所谓风格意识是一种审美意识，是对所遇事物的精彩之处的不由自主的、发自内心的欣赏。”

2024 年 6 月，中国人民大学出版社出版了《生命意义与同一健康》这本书。书中透过生活世界的多个案例来解析：理解生命拥有自身固有价值、为它的价值及为整体的价值，理解并体验与他者互动，理解一切关系都是审美关系，理解意义编织了生命之网，理解生生不息，对于作为自然之子的人类是最重要的事情。

这是一个有益的探索，将宏大的生命意义话题落实到人的健康、动物的健康和环境的健康的具体之中，将教育与学习扎根于生活本身。《生命意义与同一健康》这本书的第一章是邱仁宗以自己六十年的养猫经历来解析“什么是生命”，紧接着从“生命之网”、“生命的感知”、“关怀与尊重”、“友善相处”和“情感智力”五大主题，不断练习从人的视角转换到动物的视角，从动物个体视角转回自身个体视角，理解生命的自身固有价值、为它的价值及为整体的价值，并以《奇迹》《野》等五首过程诗歌为读者敞开同理心认知成分和情感成分融合的过程诗教视野。

小结

在地球上，非人类动物不仅仅是作为与人类生活高度相关的类别存在，更是与人类一样属于自然的一部分而存在。对于儿童来说，动物更是发展同理心和生命关怀心智的重要媒介，作为教育工作者，我们的责任不仅是传授知识，还要帮助学生透过生命感知建立连接，体验并实践尊重与关怀，活出价值，拥有意义感。这不仅关系到个体的成长，更关系到整

个社会的可持续发展和地球所有生命形态的同一健康。

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凝聚社会各方力量 共促黄河流域湿地保护——基于黄河流域湿地保护公众调查报告的分析

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摘要：本文基于2023年10月至11月“黄河流域重要湿地保护成效评估”一期项目在青海和山东省开展的湿地保护主题公众调查结果，从湿地保护意识、公众参与意愿、保护成效认知、保护成效满意度等方面了解黄河流域湿地保护的公众认知、公众参与和公众满意度，识别湿地保护现存问题、矛盾与冲突，以期在湿地保护公众参与机制形成与完善方面为黄河流域湿地保护提供借鉴。

关键词：湿地保护，湿地保护成效，公众参与，公众满意度

赵玉萍，敖翔，王帅.凝聚社会各方力量 共促黄河流域湿地保护——基于黄河流域湿地保护公众调查报告的分析.生物多样性保护与绿色发展.第 1 卷，2025 年 1 月，总第 72 期.ISSN2749-9065

1 引言

湿地是介于陆地和水域之间重要的生态系统类型，发挥着涵养水源、调节气候、改善环境、维持生物多样性等生态功能，与人类生存发展息息相关。黄河发源于青藏高原巴颜喀拉山北麓的约古宗列盆地，自西向东分别流经青海、四川、甘肃、宁夏、内蒙古、山西、陕西、河南及山东 9 个省（自治区），最后流入渤海，全长约 5464 公里，流域面积 79.5 万平方公里，是我国第二大长河。黄河流域构成我国重要的生态屏障，是连接青藏高原、黄土高原、华北平原的生态廊道，拥有三江源、祁连山等多个国家公园和国家重点生态功能区。黄河流经黄土高原水土流失区、五大沙漠沙地，沿河两岸分布有东平湖和乌梁素海等湖泊、湿地，河口三角洲湿地生物多样。黄河流域湿地保护关乎国家生态安全，在我国生态文明建设中具有重要意义。

2023 年开始，兴安盟生态文明研究院持续推进黄河流域重要湿地保护成效评估项目工作。该项目结合 2022 年 6 月实施的《中华人民共和国湿地保护法》，计划在持续四年时间内，对包括黄河源区湿地、若尔盖草原区湿地、宁夏平原区湿地、内蒙古河套平原区湿地、毛乌素沙地区湿地、三门峡库区湿地、下游河道湿地、河口三角洲湿地等黄河流域八个湿地分布区，进行湿地保护成效评估，总结湿地保护成功经验，分析存在的

问题，并提出黄河流域湿地保护管理相关建议。该项目注重湿地保护中的公众参与，本着促进人与自然和谐共生为根本目标，力求通过湿地保护主题公众调查，了解湿地保护的公众认知、公众参与和公众满意度，识别湿地保护现存问题、矛盾与冲突，以期在湿地保护公众参与机制形成与完善方面为黄河流域湿地保护提供借鉴。

2 公众调查方法与开展情况简介

2023 年 10 月至 11 月，“黄河流域重要湿地保护成效评估”一期项目面向青海和山东省定向开展了黄河流域湿地保护主题公众网络问卷调查，问卷涉及被访者基本信息、湿地保护宣传、湿地保护公众认知、公众参与和公众满意度等方面的 16 个问题，共收集到来自青海省和山东省的 149 份有效问卷。本文基于本次公众调查结果，分析黄河流域青海段和山东段湿地保护的公众认知、公众参与和公众满意度，以期促进黄河源头区和黄河三角洲地区湿地保护公众参与机制形成与完善。

3 结果与分析

3.1 被访者基本信息

参与本次调查的人群具有如下特点：女性占多数（57.72%）；18~45 岁年龄段占 90%以上；超过 83%的被访者受过高等教育。具体见图 1：

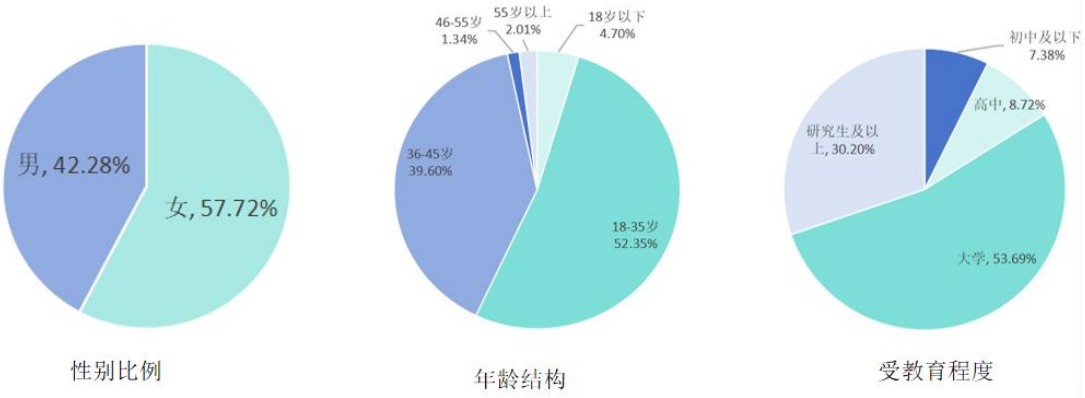

图 1 参与问卷调查人员基本信息

参与问卷调查人员中 68.46%的人对于特定湿地属于偶尔到访，包括旅游、研学、考察等；5.37%的被访者属于湿地管理人员；22.15%的被访人属于湿地附近生活、工作或求学的居民；湿地保护志愿者占 12.08%。

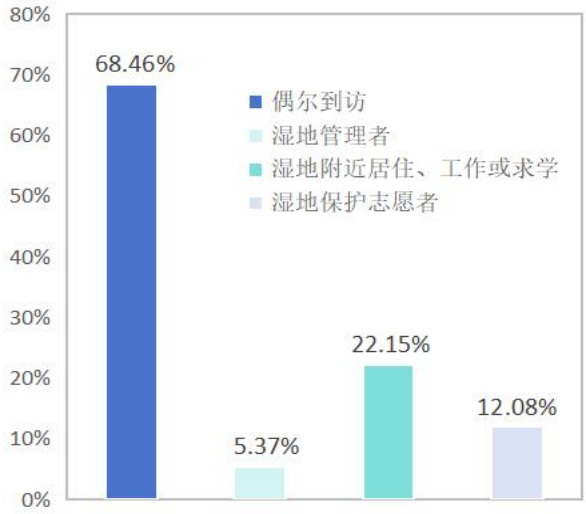

图 2 被访者与特定湿地之间的关系

3.2 湿地保护宣传与政府部门推动公众参与及监督工作情况

被访者了解湿地保护相关政策、规划、工程及相关知识等信息渠道相对多元。除了有 6.71%的被访人表示不了解之外，网络是 68.46%的被访者了解湿地保护相关政策、规划、工程及相关知识等信息的主要渠道，电视广播排第二，报刊图书和社会组织宣传及公益活动并列第三。学校教育、政府宣传活动和家庭教育属于倒数前三名（见图 3）。

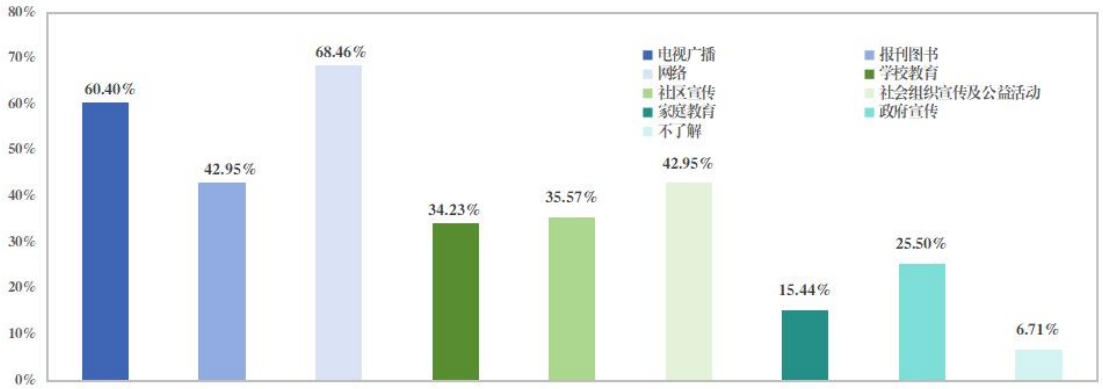

图 3 被访者了解湿地保护相关信息的渠道

为了了解政府部门在推动湿地保护相关信息公开、公众参与及监督方面的成效及公众满意度，本次调查发现：被访者对相关部门在推进湿地保护相关信息公开、公众参与和监督方面，表示非常满意的占 22.82%；表示比较满意的占 47.65%；表示一般的占 21.48%；表示不满意的占 2.01%；表示不了解的占 6.04%。整体来看，持满意态度的被访者占七成以上，近三成的被访者态度一般、不满意或不了解，具体见图 4。由此看

出，当前政府部门在推动湿地保护相关信息公开、公众参与和监督等方面还存在不足，需要进一步提升和加强。

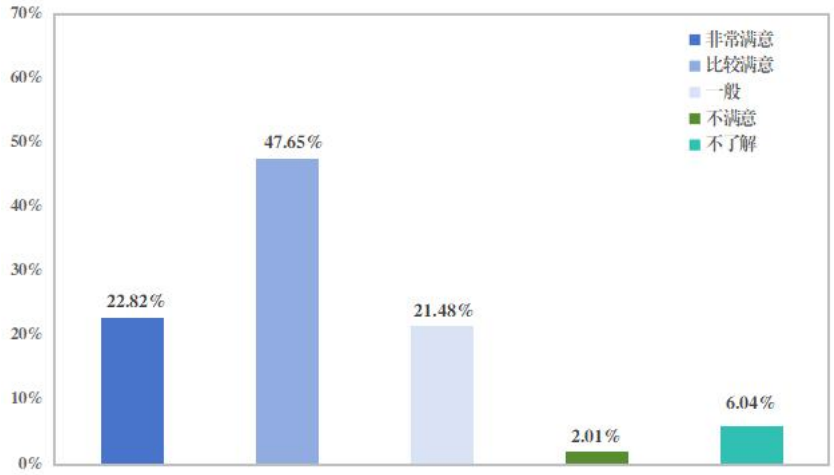

图 4 被访者对政府部门在湿地保护信息公开、公众参与及监督等方面工作的满意度

3.3 湿地保护公众认知与参与度

《中华人民共和国湿地保护法》规定，国家鼓励单位和个人依法通过捐赠、资助、志愿服务等方式参与湿地保护活动；任何单位和个人都有保护湿地的义务。我们对公众对湿地保护的关注度、认知程度和参与度进行了调查。

被访者对于湿地保护的关注度可在一定程度上反映其湿地保护意识，本次调查发现：46.98%的被访者对湿地保护比较关心，29.53%的被访者对湿地保护非常关心，也就是超过四分之三的被访者对湿地保护持积极态度；表示不关心的被访者占5.37%，对湿地保护关注程度一般的占18.12%，对湿地保护态度相对漠然的被访者占近四分之一，具体见图5。

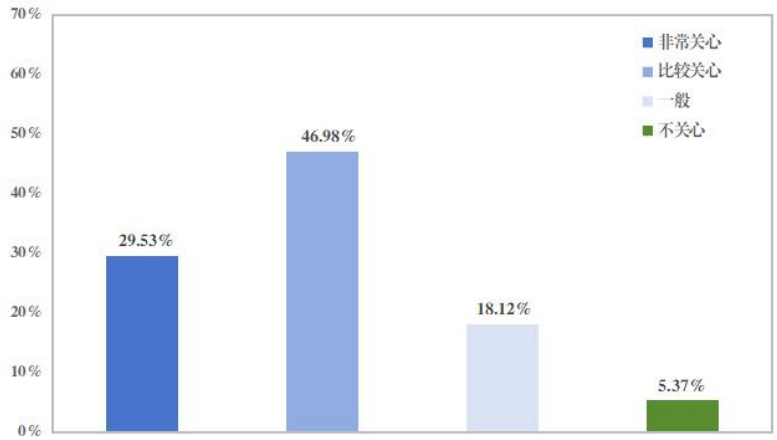

图 5 被访者是否关心湿地保护

我们对湿地面临的威胁（即湿地保护工作重点方向）的公众认知进行了调查，调查结果显示，湿地面临的威胁排前五的依次为：气候变化、垃圾等固废污染、水污染、围垦、外来物种入侵；公众对于线性工程建设（电网、公路、铁路等）、水利工程对湿地连通性的破坏、人工景观过多对湿地自然性的破坏、过度放牧、过度强调湿地美观（缺乏对本土物种的保护）等六方面对湿地的威胁还没有足够的认知，或者是在被访者看来特定的被调查湿地目前不存在这些方面的问题，或者问题不严重，具体见图 6。

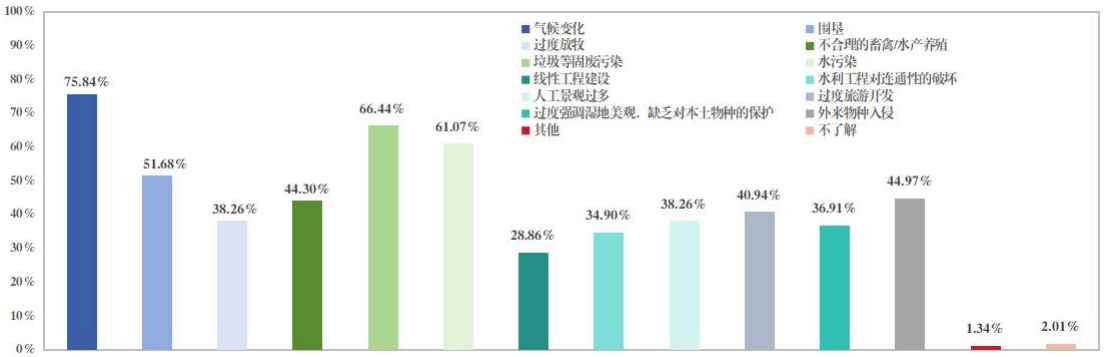

图 6 公众对湿地保护工作重点方向的认识

同时，我们对被访者参与湿地保护活动情况进行了调查，结果显示只有 16.78%的被访者经常参与湿地保护活动，49.66%的被访者偶尔参与，三分之一的被访者表示没有参与过湿地保护活动，详见图 7。因此，当前我国在湿地保护公众参与方面还需要进一步加强。

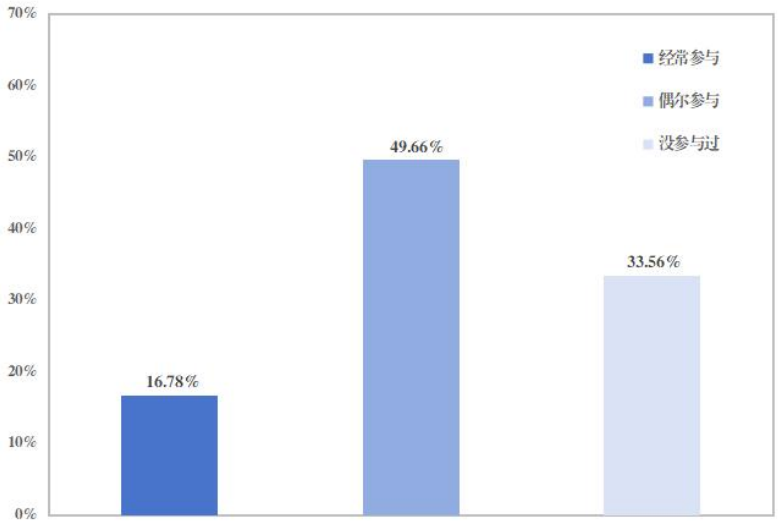

图 7 公众参与湿地保护活动情况

3.4 湿地保护公众满意度

公众满意度是反映公众对湿地保护成效满意程度最直接的指示性指标。随着我国对生态保护中公众力量的不断重视，公众满意度作为重要的必选指标被纳入河湖健康评估[1]、生态保护修复成效评估[2]等标准规范，以及生态保护修复成效评估体系中[3]。在本次调查中，我们以四分法统计了公众对山东东营黄河口湿地、山东东营龙栖湖湿地公园、山东滨州黄河湿地以及青海省兴海县黄河湿地等四个湿地的保护成效满意度得分。结果显示，山东东营黄河口湿地公众满意度得分最高（75.96 分），其次是山东东营龙栖湖湿地公园（71.55 分），山东滨州黄河湿地排第三（69.59 分），青海省兴海县黄河湿地公众满意度得分（65.96 分）。尽管四个湿地在黄河流域的区位不同，从湿地管理等级类型或者说湿地管理重要性上也有差异，但是该结果在一定程度上反映了公众对被评估湿地保护成效的整体满意程度。同时，结合湿地保护管理等级，该结果反映出公众对自然保护区、重要湿地公园等重要湿地的满意度相对较高，对一般湿地保护成效的满意度相对较差。

《中华人民共和国湿地保护法》第十四条规定：“国家对湿地实行分级管理，按照生态区位、面积以及维护生态功能、生物多样性的重要程度，将湿地分为重要湿地和一般湿地。重要湿地包括国家重要湿地和省级重要湿地，重要湿地以外的湿地为一般湿地。重要湿地依法划入生态保护红线。”

因此，我国对湿地实行分级管理。根据湿地的重要性和湿地保护管理类型，湿地保护管理的重点也存在差异：湿地类自然保护区更注重湿地自然生态系统、重要物种、重要栖息地的保护，强调对人为活动干扰的规范限制；而湿地公园在保护湿地完整性的前提下，更注重湿地生态系统持续提供休闲、游憩及景观美学功能；一般湿地在管理维护投入和方式上会有明显差异，来自政府部门的管理投入不及重要湿地，更需要社会各方力量的共同参与。

4 讨论与结论

通过本次调查发现，目前公众了解湿地保护相关信息的主要媒介是网络和电视广播，社会组织宣传及公益活动在黄河流域湿地保护宣传和推动公众参与方面发挥着重要作用。同时，在推动湿地保护相关信息公开、公众参与和监督方面，政府相关部门工作还有待进一步加强。另外，湿地

保护成效的公众满意度因湿地类型和管理等级不同而存在一定差异。

湿地保护需要全社会共同力量。根据《中华人民共和国湿地保护法》，各级人民政府要加强湿地保护宣传教育和科学知识普及工作；鼓励基层群众性自治组织、社会组织、志愿者开展湿地保护法律法规和湿地保护知识宣传活动；国家鼓励单位和个人依法通过捐赠、资助、志愿服务等方式参与湿地保护活动。同时，《中华人民共和国湿地保护法》第四十三条提出各级人民政府及其有关部门应当依法公开湿地保护相关信息，接受社会监督。

公众参与在我国湿地保护中发挥着重要作用，是构建人与自然和谐共生的必然要求。一切有意愿、有能力参与到湿地保护和管理中的社会力量都属于湿地保护公众参与的主体，包括一切与湿地保护工作有关的单位、部门、群众和个人[4]。湿地保护的公众参与能够弥补政府部门管理上的不足，加强对政府部门的监督。但当前公众在参与湿地保护过程中存在参与意识不强，参与制度不健全以及参与层次深度不够等问题[4-5]。本调查也显示黄河流域在湿地保护宣传和凝聚公众力量方面还有很大提升空间。建议政府部门引导社会各方力量做好湿地保护宣传，构建并完善湿地保护公众参与及监督机制，拓宽渠道以丰富公众参与湿地保护的途径和形式，以凝聚政府、企业、单位、社会组织和个人等多方力量共同关注并推动黄河流域湿地保护，促进流域高质量发展。

致谢：向参与本次调查的149位被访者致以诚挚的谢意！

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鳞翅目余甘子枝瘿网蛾已入侵中国

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摘要：2023年11月7日，作者在中国广东省深圳市坪山区的一条步道上发现，叶下珠科余甘子树枝上存在一些虫瘿，由余甘子枝瘿网蛾（Betousa stylophora）制造。之后在深圳南山区再次观察到。此虫瘿形状和大小类似于大麻科黑弹树上的北京枝瘿象（=赵氏瘿孔象）虫瘿。2024年12月10日，作者再次到深圳调研，在龙岗区和坪山区确认此类寄生现象、生物入侵现象在扩大。有关部门应当给予关注，以避免入侵的扩展。

关键词：入侵，余甘子枝瘿网蛾，余甘子，虫瘿，深圳

刘华杰.鳞翅目余甘子枝瘿网蛾已入侵中国.生物多样性保护与绿色发展.第 1 卷，2025 年 1 月，总第 72 期.ISSN2749-9065

注：本文原文为英文，详见第 94-101 页。

责任分散、集体不作为导致私营部门实施全球生物多样性框架目标困难的反思——写在 CBD COP16 后

何靖霄

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摘要：本文探讨了于2024年10月在哥伦比亚卡利举行的《生物多样性公约》第十六次缔约方大会（CBD COP16）之后私营部门在实现《昆明-蒙特利尔全球生物多样性框架》（KMGBF）目标方面面临的情况。通过责任分散和集体不作为的概念以及不作为三角和不作为螺旋理论，本文讨论揭示了各种行为者（政府、企业和个人）如何相互推卸责任。最终，本文认为，强有力的监管和彻底转向真正的全面行动以保护生物多样性对于私营部门将政策转化为切实可行的可持续成果至关重要。

关键词：CBD COP16，昆明-蒙特利尔全球生物多样性框架，私营部门，可持续，生物多样性保护

何靖霄.责任分散、集体不作为导致私营部门实施全球生物多样性框架目标困难的反思——写在 CBD COP16 后.生物多样性保护与绿色发展.第 1 卷，2025 年 1 月，总第 72 期.ISSN2749-9065

注：本文原文为英文，详见第 102-111 页。

作为外来物种的再力花对中国生物多样性的影响和分析

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摘要：再力花（*Thalia dealbata*，简称T. dealbata），又称粉状短梗蕉，是一种原产于美国东南部的水生植物，以其环境价值和观赏意义而闻名。然而，其引入中国后却带来了一系列的问题，因为它的优势地位、生存韧性和独特的授粉机制对当地生态系统构成了威胁。本文分析了T. dealbata在中国的现状，评估了其对生物多样性和生态系统动态的影响。通过对现有文献和实地观察的综合审查，我们评估了该物种的入侵威胁，并将其分类为在中国具有“高入侵风险”的物种。此外，我们提出了对其独特授粉机制生态影响的进一步研究的必要性，并制定了可行的方法来评估该机制对当地食物链和生物多样性可能产生的后果。

关键词：再力花，入侵物种，外来物种，水生植物，生物多样性，授粉机制

侯方欣.作为外来物种的再力花对中国生物多样性的影响和分析.生物多样性保护与绿色发展.第1卷，2025年1月，总第72期.ISSN2749-9065

注：本文原文为英文，详见第112-121页。

《中国战塑的绿色密码》：终结塑料污染，为美好未来而战

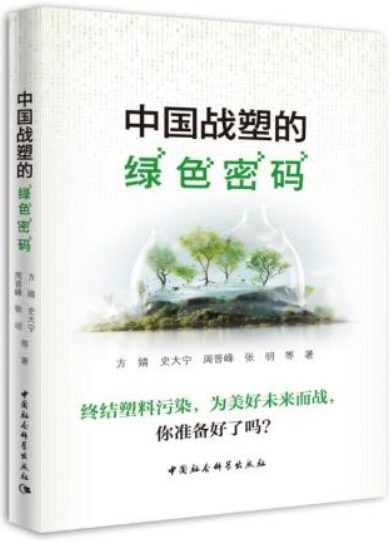
王晓琼[1] 王静[1]

（1.中国生物多样性保护与绿色发展基金会）

摘要：《中国战塑的绿色密码》一书由浙江科技大学、中国生物多样性保护与绿色发展基金会、浙江省生态环境宣传教育中心、杭州市化工研究院等单位共同参与撰写，并由中国社会科学出版社于2024年11月正式出版。恰逢塑料污染政府间谈判委员会第五次会议（INC-5）召开，仿佛是冥冥之中的邂逅，又是应对塑料污染的中国共识与行动的有力呼应。希望这本书能让读者们对塑料及其污染与治理有更多的了解，能有所行动，从身边小小的“减塑”“捡塑”开始，为终结塑料污染而蓄势聚能，走向更加美好的绿色未来。

关键词：塑料污染，微塑料，INC-5，人民战塑

王晓琼，王静.《中国战塑的绿色密码》：终结塑料污染，为美好未来而战.生物多样性保护与绿色发展.第 1 卷，2025 年 1 月，总第 72 期.ISSN2749-9065



塑料污染，关乎生态环境，关乎健康，关乎美好未来。

自 19 世纪末诞生以来，一百多年时间里，塑料及其制品产生的污染已经处于气候变化、生物多样性丧失和环境污染这三重危机的前沿，成为国际社会面临的重大环境挑战之一。

2024 年 11 月 25 日-12 月 2 日，塑料污染政府间谈判委员会第五次会议（INC-5）召开，来自全球 178 个成员国的 1400 余名谈判代表，以

及来自政府间组织、联合国机构、非政府组织以及媒体的2300余名代表齐聚韩国釜山，为完成一份具有法律约束力的“塑料条约”而进行磋商和谈判。尽管各国代表在谈判过程中就应对塑料污染危机而达成共识进行了激烈地讨论和博弈，然而令人遗憾的是，直到会议结束，各方仍在塑料制品的生产、管理以及资金机制等部分关键议题上存在显著分歧，最终会议决定推迟这一重要决策，并于2025年择期举行续会，继续就文书的达成进行谈判。可以说，INC-5的黯然收场，更加显现出全球环境治理的复杂性和挑战性，也让全球塑料污染治理的未来变得扑朔迷离。

塑料带来的“白色污染”遍布于我们周围，或飘荡在田间地头，或漂浮于河流湖泊，亦或弥漫于空气之中，无孔不入地侵入到我们的生活当中。联合国环境规划署的研究数据表明：在全球已经产生的70亿吨塑料垃圾中，只有不到10%的塑料垃圾被回收。数百万吨塑料垃圾被排放到环境中，或者运送到数千公里外的某地，大部分被焚烧或倾倒。

2004年，英国科研人员首次提出微塑料(Microplastic)这个概念，细小到用肉眼难以发现的微塑料颗粒存在于人类摄入的食物、饮用的水和呼吸的空气中，于无声无息中危害人类健康、生物多样性、土壤、水环境，等等。自此，塑料污染带来的危害已远远超出我们的想象……

面对如此严峻且危急的塑料污染形势，人类应该怎么做？

除了弥合分歧，努力为达成务实可行的塑料条约之外，“全球战塑”的人民力量亦不容小觑。就像《中国战塑的绿色密码》这本书中的那些“战塑伙伴”一样，“减塑”“捡塑”应该成为我们的习惯，每个人都是一个绿色密码。

《中国战塑的绿色密码》一书由浙江科技大学、中国生物多样性保护与绿色发展基金会、浙江省生态环境宣传教育中心、杭州市化工研究院等单位共同参与撰写，并由中国社会科学出版社于2024年11月正式出版，专业的编写团队为本书的出版发行工作提供了强有力的理论架构支撑。

循着本书的脉络，可以带您了解塑料的前世今生。塑料的产生源于我们人类对美好生活的诉求，源于寻找象牙的替代品，源于科学发明。塑料这种材料有诸多优点，但有一个致命的缺点——不可降解。在这个问题没有被解决之前，资本之手助推了“塑料热”，于是“潘多拉魔盒”被打开了。大地、高山、海洋……都有它的

身影，还有“隐形”的微塑料。生物不可避免地与它有“百般纠葛”。当然，我们也不例外。科学家发现，微塑料具有肠道毒性、肺毒性、免疫毒性、神经毒性等。

随着本书的起承转合，可以让您了解中国战塑政策的嬗递之路。20世纪90年代，中国就提出“白色污染”的概念，于2007年发布《关于限制生产销售使用塑料购物袋的通知》（“限塑令”），再到2020年发布的《关于进一步加强塑料污染治理的意见》（升级版“限塑令”）等，在塑料污染治理问题上一直展现出责任与担当。但由于塑料生产量、使用量巨大，回收利用率低等问题，塑料污染仍是我国生态文明建设要突破的顽疾之一。

沿着阅读的阶梯拾阶而上，可以让您探赜科技在解决塑料污染问题中的主导作用。科学家探索用生物的、化学的、经济社会的方法，或开发新型塑料材料，或寻求降解塑料的技术，或加强回收利用等，从而减少塑料对环境的危害。例如，天然纤维素、淀粉等都可能是替代塑料的材料，以及“吃”塑料的黄粉虫、大阪堺菌，等等。

借着书籍的火光继续前行，可以让您在许多的战塑故事的启发和引领下打开一扇新的大门，看到另一个彼岸的五彩斑斓。比如社会组织与外卖平台的“绿色消费权益”之争，“人民战塑”如何点燃星星之火，“美丽公约”关于“擦亮天路”的艰难与收获，“蓝色循环”项目将塑料垃圾变废为宝，等等。

在INC-5召开之际，《中国战塑的绿色密码》与读者见面，仿佛是冥冥之中的邂逅，又是应对塑料污染的中国共识与行动的有力呼应。希望这本书能让您对塑料及其污染与治理有更多的了解，能有所行动，从身边小小的“减塑”“捡塑”开始。唯有解开每个人的绿色密码，才能走出环境污染的“公地悲剧”和治理行动的“囚徒困境”，走向更加美好的绿色未来。

终结塑料污染，为美好未来而战，你准备好了么？

周晋峰，世界艺术与科学院院士、罗马俱乐部执委，创新提出了“人本解决方案”理论、污染治理三公理、生态恢复“四原则”、邻里生物多样性保护（BCON）、“碳平等”理论等。

鱼藤与红树林相克相生，保护并非“你死我活”

周晋峰

（世界艺术与科学院院士）

摘要：本文为笔者基于多年丰富的一线湿地调研经验和思考，就鱼藤是否会影响红树林保护分享的观点。本文认为，鱼藤是本地物种，它和红树林之间有相生相克之处。相生相克是自然界中的必然法则，是自然规律。本文强调，生态文明背景下保护的核心在于：尽可能减少、减小人类的干扰和破坏。

关键词：鱼藤，红树林，自然，生物多样性

周晋峰.鱼藤与红树林相克相生，保护并非“你死我活”.生物多样性保护与绿色发展.第 1 卷，2025 年 1 月，总第 72 期.ISSN2749-9065

大家普遍都关心红树林保护，但我们在工作之中发现，现在关于红树林的保护也存在一些误区，本文主要探讨“鱼藤与红树林保护”。有专家发现鱼藤对红树林有破坏作用，并且研究出了非常有效的办法，即用挖沟阻断的方法阻止鱼藤的蔓延和生长。

鱼藤是我国东南沿海的一种本土植物，不是外来入侵物种。这是笔者第一点要强调的。

第二点要强调的是，鱼藤是红树林伴生的一种植物，它是藤类植物，藤生长于红树林上，十分喜欢阳光，向阳而生，生命力顽强。特别是在近海岸，它们生长得很快，由于它们的迅速生长挡住了红树林的阳光，所以就会导致红树林死亡。在有鱼藤生长的地区，会看到近岸区域红树林间分布有一块一块的因红树林死亡形成的斑秃，这一小片就没有非常茂密的传统意义上好看的红树林了。

2023 年 11 月上旬，周晋峰、赵德润赴广西北海考察红树林保护

为了保护红树林免遭鱼藤侵扰，研究人员用专业的挖钩阻断的方法来阻止鱼藤的蔓延和生长，尽管办法十分有效，但这究竟是不是保护红树林？我们认为不是的，也不该这样做。因为我们的保护不是工业文明的保护。工业文明思想下的审美观，是青睐于一片绿，整整齐齐、郁郁葱葱，而生态文明时代的审美观则不是这样。生态文明时代的核心，是人与自然和谐共生。

鱼藤是本地物种，它和红树林之间有相生相克之处。什么叫相生呢？没有红树林它不能够爬藤，身为藤类植物，它需要有依附的主体，依附于红树林而生。但是它们之间又相克。鱼藤喜阳，生长十分茂密，遮挡了红树林的大量阳光，导致红树林死亡。但相生相克是自然界中的必然法则，是自然规律。

这是物种演替自然生境的很重要的现实，这一现实自有其生态价值和作用，它形成的这些小的斑秃，与水、水生生物、水上生物共同自然形成一个生态系统，我们人类不应该去干扰和改变它。那么，鱼藤会不会蔓延到将整片红树林全部杀死呢？不会，鱼藤基本是近岸生长，不会蔓延至深海处。据观察，离岸远一点的红树林上就没有鱼藤，鱼藤是不是攀附

于全部的红树林上？看起来也不是，因为随着红树林的演替，鱼藤也没有支撑，自然限制了其扩张，它不是无限的。这种情况下，我们人类要不要干预？要知道，工业文明追求的是传统的那些美、好和科学以及伦理，但是工业文明和今天的生态文明是不同的。

广西北海金海湾红树林中的红海榄。摄影：周晋峰。©绿会融媒·“海洋与湿地”（OceanWetlands）

生态文明背景下保护的几大基本原则是怎样的呢？保护的核心在于，尽可能减少、减小人类的干扰和破坏。

保护的第一条原则是“保护”（protection），防止人为蓄意的破坏或是干预。具体来说，就是我们不要随意向红树林生长区域倾倒垃圾和污染物，不在红树林保护区域滥砍滥伐、行船、过度开发利用如发展旅游业等。

保护第二大原则是“保育”（conservation），亦即生发，就是让它自然生长，不人为干扰，这是一个很重要的问题。从这个角度讲，鱼藤是我们应该极力保护的自然生态。生态文明思想的核心，是坚持人与自然和谐共生。这是生态文明思想的内在体现，坚持不要、尽量减少对自然的过度索取和干扰，而消灭鱼藤就意味着对自然的破坏，这种自然环节的破坏带来的连锁和系统的危害是非常深远的。

过程诗学的动机：地球公民的文学想象

白鸦

（过程诗学创立者）

摘要：地球公民面临的时代问题，已不仅仅是政治、经济、科技问题，更是伦理、哲学、诗学问题。过程诗学，狭义上是引领生态文明时代诗歌自觉的诗歌流派，广义上是承担地球公民责任和时代新使命的诗教实践。从过程诗学的动机和想象，到过程诗教的实践，深受时代背景影响，是时代新使命的需要。本文从生态、科技、心理等视角，简述时代力量对过程诗学动机的影响。

关键词：过程诗学，过程诗教，AI诗歌，生态文明

白鸦.过程诗学的动机:地球公民的文学想象.生物多样性保护与绿色发展.第 1 卷,2025 年 1 月，总第 72 期.ISSN2749-9065

地球公民面临的时代问题，已不仅仅是政治、经济、科技问题，更是伦理、哲学、诗学问题。过程诗学，狭义上是引领生态文明时代诗歌自觉的诗歌流派，广义上是承担地球公民责任和时代新使命的诗教实践。从过程诗学的动机和想象，到过程诗教的实践，深受时代背景影响，是时代新使命的需要。本文从生态、科技、心理等视角，简述时代力量对过程诗学动机的影响。

一、地球公民，文学想象，以及过程诗学的动机

地球公民，是基于世界情怀、全球意识、同理心，将公民责任置于全球化背景中，主动重塑自己公民身份的人。他们提倡万物一体的共生意识，主动关注气候、生态、资源等全球性问题，直面人类的共同危机并担当责任。他们尊重文化差异和民族传统，基于诗性共同体（全人类）和地域诗

性（国家民族）的双重维度，追求诗性的社会正义与公平的世界秩序。

对于地球公民的文学想象，首先在姿态上，要站在地球公民与地球生命的高度。生命不仅指人类和动物等众生，还包括山川草木等万物生成的生命系统。在此基础上，怀着生态之心、诗性正义、善的进化、心智再启蒙、诗性共同体、地域诗性等动机。这些动机需有利于两个方面，一是有利于推动有机的、开放的、生长的文学系统的演进；二是有利于诗性的社会正义和公共生活。

对于文学想象的意义，美国学者玛莎·努斯鲍姆在《诗性正义》一书中有过详细论述，书的副标题是“文学想象与公共生活”。她认为“文学想象是公共话语和民主社会不可或缺的有机组成部分”，“文学可以让人们体味和同情他者生活，扩展有助于公共生活决策的想象力……塑造柔软而不失权威的公共理性，影响社会正义。”

文学是有动机的。过程诗学强调的动机，可以从三个层面理解：一是具体层面，指生态之心的创作动机，体现于平等、和谐、互动、同心、真诚等关键词中，影响社会公共生活。二是根本层面，指本心，忽然的初心。从中国传统文化的意义上讲，是当下一念的动机，同时的直接的影响着过去、现在和未来，一切都潜伏在万物的动机中。从过程哲学的意义上讲，是有利于事件生成、万物历险、宇宙进程的动机。三是系统层面，指系统性的“整体的机”，包括动机、有机、对机。

文学动机受时代背景影响，又反过来影响人类的心智模式，生成深度生态心和地球公民立场。比如，从现代文学到后现代文学，其动机转变深受工业革命影响。从自然文学、环境文学到生态文学，其动机转变深受生态危机影响。从科幻文学到赛博朋克，再到过程诗学的AI诗歌，其动机转变深受一系列科技变革的影响。

过程诗学的动机和实践，体现于过程诗学的狭义和广义，以及系统性的过程诗教理念。此外，还有两个具体的内容可以作为补充：一是人们讨论中国当下诗歌时经常讲的解构与建构，二是从中产阶级立场写作到过程诗学，两种诗学理念之间的关系。

2010年发表的《过程诗学提纲》，归纳了15个关键词，分别体现过程诗学的价值观念、创作动机、美学原则。第一部分过程之眼（认识论），包括缘起、关联、价值、历险、享受五个关键词。第二部分生态之心（立场论），包括平等、和谐、互动、同

心、真诚五个关键词。第三部分自由之笔（形式论），包括感受、新颖、直接、可能、自由五个关键词。

关于过程诗学，有一段提要式的描述：过程诗学深度融合中国传统文化与过程哲学，以中西合璧、生态文明、地域诗性、过程诗教为核心理念，以过程之眼、生态之心、自由之笔所涵盖的 15 个关键词为创作原则。狭义上，过程诗学是引领生态文明时代诗歌自觉的诗歌流派；广义上，是中西合璧的承载时代新使命的诗教实践。

关于过程诗教，也有一段提要式的描述：过程诗教是重建地球诗性与人文精神的无所不在的生活教育实践。以中西合璧、知行合一为基本特征；以诗性沟通、观念冒险、亲自生活、善的进化为核心内容；基于人类从现代性困境走向生态文明的时代需要，承载复兴诗性共同体、激活诗性正义、关怀生命与自然、适应 AI 新环境、培养新公民意识、创新伦理、重构乡愁等时代新使命；鼓励人类真诚合作，觉悟生命的自由，积极参与有机世界的未知进程，树立对社会远景的信心。

可以通过几个关键词，来理解过程诗教：一是“新使命”，即承载时代新使命的诗教。二是“连接”，以诗性连接一切，包括万物、古今、虚实。三是“生活”，即无所不在的生活教育，寻常事物的本来惊奇。四是“动机”，即有益宇宙进程的心理动机教育。五是“直接”，过程诗学是本心认识本来的直接艺术，过程诗教以诗性建立万物之间的直接沟通。

二、工业革命、生态文明影响下的生态诗学与过程诗学

受启蒙运动、工业革命等时代大背景影响，18 世纪的文学有了深入关注人与自然关系的动机。从环保（境）文学、自然文学发展到生态文学；从关注自然生态发展到关注社会生态、精神（文化）生态；从人的文学发展到生命的文学。

有几部影响超越了文学领域的作品，它们的产生与时代背景关系密切。梭罗的《瓦尔登湖》1854 年出版，是在南北战争的前几年，第一次和第二次工业革命之间。利奥波德的《沙乡年鉴》1949 年出版，是在世界经济大危机（大萧条）之后的十几年，二战后不久，内容提到土地（生态）伦理。卡森的《寂静的春天》问世于 1962 年，是二战后的十几年，第三次工业革命以及全球化开始之际，写环境污染与人类的关系。

随后，20 世纪 80 年代出现了生态文学批评，用以地球为中心的思想

意识去研究文学。生态文学批评研究自然环境在文学中的表达，弘扬被忽视的自然文学类作品，而更重要的是，他们尝试创建一种生态诗学。在创建生态诗学的过程中，发展出了很多重要理念，比如：利奥波德的“生态中心论”、非人类中心说、环境伦理说（环境哲学），施韦策的“敬畏生命”，泰勒的“生命中心论”，奈斯等人的“深层生态学”。此外，还有日本学者的相关理论，与中国学者的思维很接近，主要有“交感论”、“场所意识”。

可以从以下几点，观察生态诗（学）与过程诗（学）的关系：

（一）时代使命。过程诗学（教）的使命包括伦理创新、AI 环境、虚拟乡愁等，体系深广。

（二）创作动机。过程诗学强调的“生态之心”，不仅仅是生态学概念，而是真诚的创作动机。这是基于中国传统文化的、主客未分的、合乎自然与天道的真诚，唤醒万物本具的价值。

（三）理念来源。过程诗学经中西融合，天然具有生态心，与生俱来深怀天人合一的冲动，创作过程接近天人合一的过程。

（四）表现范围。过程诗学作品基于工业文明的反思，不仅批评生态危机，更是重构导致生态危机的人类文化系统，“收拾”现代人的心灵残局。

（五）主体认知。过程诗学作品中的对话关系，不仅是主体与主体的对话，更是怀疑万物主体的审美觉醒、人性觉醒，把万物上升为道德主体。

生态诗（学）与过程诗（学）的研究和思考，都是基于地球公民立场，互相交织又有所不同。比较重要的不同，可以用一个概念来探讨——整体之机（动机、对机、有机）。过程诗学作品不仅表现有机，更体现整体之机。这里说的对机，是过程诗学作品直接表现世界奥秘的方式，而非逻辑知解。用一句话概括就是：深怀生态之心的创作动机，捕捉对机的根本环境，呈现无限可能的有机世界。这是《过程诗教提纲》的重要内容，是中国传统文化和建构后现代理念的融合。

正是因为整体之机，过程诗学作品可以在更高层次上体现万物生成、事件历险、宇宙进程等建构后现代理念，可以深度体现生命之网，因为生命之网蕴含整体之机，是充满生机、暗藏对机的有机之网。这些，是生态诗歌难以达到的高度。

三、科技革命影响下的科幻文学、赛博朋克、AI 诗歌

科幻文学主要表现未来世界，诸如世界末日、外星人入侵、机器人、环境灾难等。19 到 20 世纪的科幻文学发展过程中，出现了赛博朋客类的作品，以《仿生人会梦见电子羊吗？》、《神经漫游者》等为代表。

赛博朋克是科幻文学的新阶段，它的产生动机，最初受二战后的社会背景影响，先是一些英国青年通过音乐形式宣泄具有反叛精神的朋克文化，大约 60 到 70 年代，朋克文化与美国科幻新浪潮结合，形成了赛博朋克的雏形。80 年代以来，其迅速发展，渗透到动漫、电影、游戏等诸多领域。

与之前的科幻文学相比，赛博朋克有明显区别。以前是对科学的乐观想象，现在是探索科技黑暗面；以前是对人类未来的乌托邦幻想，现在是反乌托邦的悲观色彩；以前热衷于太空争霸、外星殖民的愿景，现在是融入现实的社会矛盾和人性思考。

赛博朋克作品的核心特点，是“高科技，低生活”的反差，是对机械文明的反思。作品主要表现信息网络和生化改造两大科技。作品中的经典角色是“边缘人”，就是性格疏远的独行者，生活在社会群体边缘，逃避集体意识以实现个体自由，有反乌托邦意识。

赛博朋克作品中的未来地球，是科技追求效率，社会僵化，制度崩坏，贫富悬殊巨大，人体改造盛行，仿生人有思想，人与机械分界消失，科技寡头控制财富和武力，信息技术控制社会群落，人性压抑，穷人靠电子产品麻痹自己。此外，赛博朋克作品中还有很多常见的鲜明的元素。

过程诗学的 AI 诗歌，与赛博朋克作品有何不同？首先要说明，过程诗学的 AI 诗歌，并不是 AI 写的诗，不是 ChatGPT 写的诗，而是诗人写的具有 AI 理念的诗。过程诗学对 AI 诗歌理念的建构，对后现代乡愁、AI 自由意志等问题的思考，是从 2011 年发表 AI 主题组诗《未来简史》开始的。《未来简史》一共 42 首，表现了对高科技可能带来的未来社会的反思，很多内容与赛博朋克表现的内容相通。

《未来简史》写到了未来高科技时代的种种现象和元素，例如游民、社群、角落、器官、芯片人、机器人等等；体现了人机一体、自由意志、后现代乡愁（虚拟乡愁）等理念；诗歌中具有后现代乡愁意义的诗句，体现在多次出现的“去往新故乡的途中”，“在哪里停下，哪里就是故乡”。

此外，还有“其实机器人更需要关怀”，这是对机器人道德主体进行反思的诗句。

2023年发表的《过程诗教提纲》，序言提到诗歌应该为人类提供适应AI新环境的教育：“科技新奇点让生命的自由意志和故乡的意义受到空前质疑，很多新事物作为人的延伸，正在反过来作用于人。人类亟需适应AI新环境、收拾心灵残局、重构乡愁的教育；亟需诗性来连接数字世界与有机世界，化解虚拟价值认同和多重身份的困境，保护人的感性生存、人格统一和个性完整。”

2024年3月，主题为“AI诗歌元年”的过程诗教沙龙，首次真正意义上探讨了AI诗歌。该沙龙邀请了中国AGI协会成员、哲学博士马翰林，南京大学法学博士韦邦龙，中国AGI协会成员NARS系统研发人员冯博杰，分别从哲学、诗学、法律、科技的角度深度探讨。在沙龙上，我发表了《人工智能（AI）诗歌的基本特点》，初步将发言内容归纳为三点：

（一）怀着生态之心的创作动机，在自我反思中打破他者边界，怀疑他者的道德主体和审美主体的觉醒。在此基础上推动伦理创新。

（二）有机连接万物，连接多维的虚实世界，在此基础上承载虚拟乡愁（后现代乡愁），收拾大众心灵残局。

（三）以先进的观念冒险，激活公共空间诗意和人类共同体的诗性正义，推动未来世界善的进化。

在沙龙的最后总结中，笔者补充说：“过程诗学所谓的AI诗歌，从人类命运出发，把AI作为人类的延伸，理念上中西合璧，与中国传统文化观念互相印证融通，这一点很关键，有别于西方科幻文学的理路，也有别于东方神秘主义。”

过程诗学的AI诗歌，是人类写的诗，是写一切生命和存在的诗。未来某一天，AI写的诗与人类写的诗，也许很难从“技术”层面比较高下，但AI不会通过写诗获得人类的快感，不会通过写诗发展生命的意义。套用“模型”一词来讲，人类写的诗如果有终极模型，那就是人的终极模型。人的终极模型从中国文化的高级层次上讲，是如来藏（释）、元神（道）、本心（儒）。这是写诗的AI不具备的模型。AI，机器人，仿生人，不是地球生命系统中天然的“我”，不是正误一体的阿赖耶识，只是人类投喂数据的、正确的“我”。AI作为人的延伸，其模型永远在人的终极模型之下。

过程诗学的AI诗歌与赛博朋克，可以从虚拟乡愁的角度做个比较。赛博乡愁，体现了对高科技的反思，对传统价值的怀念，以及多元身份的归属感，呈现了科技摧毁一切的悲观。过程诗学AI诗歌的虚拟乡愁，不是回到“消失的故乡”，而是在“去往新故乡的途中”，蕴含诗性化解一切的乐观。这不是乌托邦，不是被网络技术控制的虚假幸福，而是自由的个性实现。虚拟乡愁连接虚拟与现实，没有悲伤，不曾虚度，是对未来的社会远景的信心。

《过程诗教提纲》中的“后现代乡愁”词条说：“有机的乡愁系统中，回忆的我，当下的我，数字的我，共同构建了我。乡愁实质是一种生命的进程。在乡愁的进程中，人类创新了过去所以创造了未来，并统摄于当下……诗性的教育让人类交换回忆，深陷于互相回忆中……未来人的乡愁不喜不悲，不再有失落情绪，而是生活的历险和享受，是生活的一种方式或风格……”

AI组诗《未来简史》中，有一首《狂欢》，开头是这样描写虚拟乡愁的：“一切可以抵达的空间/都算故乡/花随便开，因为不再有人惦记一朵花的死/地球上没有异乡、祖坟/和户口制度/一只大雁无论从哪里飞到哪里/都不算移民……”

四、中西合璧的制高点

过程诗、生态诗，AI诗，以及其他相关写作，有共通之处，但只要站在中西合璧的制高点上，就可以看到明显区别。例如，生态文明影响的文学动机，过程诗歌的整体之机，就是站在中西合璧制高点上可见的明显区别。再例如，科技变革影响的文学动机，过程诗学AI诗歌的终极模型，就是站在中西合璧制高点上可见的明显区别。

过程诗学是中国传统文化和过程哲学的有机融合，并非仅是过程哲学影响下的写作，而是“中西合璧、生态文明、地域诗性”的写作，是地球公民的文学想象和“过程诗教”的实践。在生态危机时代、AI时代，文学的动机和想象，必然倾向于“诗性共同体-地域诗性”。

世界诗歌的中西合璧一直不理想，以两个影响特别大的诗歌流派为例，一是庞德为代表的现代主义诗歌的意象派，二是雷克斯罗斯、金斯伯格为代表的后现代主义诗歌的垮掉派。他们都热衷于深入的中西合璧实验，但都不够成功，流于东方神秘主义。

五、观念刷新、媒介变革影响下的时代意象重述

媒介变革对文学动机的影响往往被人们忽略。荣格说，心理原型是千百年来沉淀的，变异非常慢，几百年才变异一点。但如今时代不同了，心理原型或者时代意象，沉淀和变异都是加速度的。原始意象加速度内涵变异，时代意象加速度心理积淀，其背后的时代推动力至少有两种，一是前所未有的观念刷新，二是前所未有的媒介变革。

面对时代意象的加速度心理沉淀和变异，过程诗学强调：诗歌应重述心理原型，特别是重述时代大意象，使之连接未来，实现生态文明意义上的能量转化。

精神分析、神话原型批评、过程诗学，三者对心理原型有不同的诗性界定。精神分析认为，原型是集体无意识中先天积淀、代代相传、普遍一致的人类思维倾向。原型和本能，分别对人的思维和行为起作用。重要的原型有人格面具、阿尼玛和阿尼姆斯、阴影、自性。原型的心理积淀是因为遗传。

弗莱的神话原型批评认为，文艺作品的一切形式和主题根本上都源于神话，原始意象最早表现为神话，原型主要是神话原型。弗莱把原型的范围泛化了，凡是作品中反复出现、具有天然表达、能加深隐喻的意象，以及叙事结构，人物类型背后的基本形式等等，都是原型。原型的心理积淀是因为被文艺作品反复表现。

过程诗学认为的原型是泛化的，范围包括了精神分析和神话原型批评，但以时代大意象为核心。时代大意象，是受工业文明背景、现代性氛围、公共空间自由状态之影响，在现代人心灵深处加速度形成积淀的经验、观念、顽固意象、典型共识。原始意象加速度的内涵变异，时代意象加速度的心理积淀，是因为观念刷新与媒介变革。

观念刷新，例如刺激人心的AI信息、新的伦理问题，很容易在心理上加速度地形成意象积淀。那么，媒介变革的影响为什么那么大？媒介变革使得信息更加丰富多元，似乎更容易让人兼听则明，实则不然。信息渠道不是问题，信息选择是问题，人们按照自己的兴趣和价值观选择信息，就主动进入了信息茧房。媒介按照人们的兴趣和价值观推送信息，又使人们被动地处于过滤气泡中。这就是后真相时代。人们看到的真相经过了自己的喜好取舍和别人的舆论化处理，不仅没有兼听则明，反而因为回音壁效应而更容易形成极端认知

和顽固观念。这个时代，形成价值共识很难，但心理意象的积淀却是加速度的。

因此，在工业文明背景下，现代人受媒介变革影响而抱有的极端认知、顽固观念、心理共识，虽不是心理上深深积淀的原始意象，但也不是普通意象，它们是加速度形成心理积淀的时代大意象。所以，心理原型（主要是时代大意象）重述，是过程诗学的动机之一。

过程诗学心理原型重述的特点是：原型范围主要是时代大意象。重述原型不仅是“释放封装在原型中的希望”，更是时代大意象从工业文明到生态文明的语境转变、能量转化、内涵提升。重述原型不仅是再现原始意象，不仅是再现过去，而是连接未来，刷新角色，引领观念历险。过程诗学作品的心理原型重述，还具有平等对话、猛然想起、心理疗愈、基于地域诗性的人类共识、冲气以为和等等这些特点。

以上是笔者从生态、科技、心理等视角，观察了时代力量对过程诗学动机的影响。此外，还有意识形态、诗性共同体、地域诗性、伦理创新等等时代力量，影响了过程诗学的动机。

近年来，过程诗教有了积极的发展和实践，主要是在《过程诗学提纲》《过程诗教提纲》《AI 诗歌提纲》这三大提纲的理论建构基础上，依托教师参考用书《基于心智模式改善的生命关怀教育》、大学读本《生命意义与同一健康》等书籍的出版以及各种活动的开展，在生命关怀教育领域的落地实践。

征稿简讯（二十三）

《生绿》2025年3月刊聚焦“生物多样性教育”

生物多样性是人类赖以生存和发展的基础，包括基因多样性、物种多样性、生态系统多样性三个层次。目前，地球生物多样性仍以惊人的速度丧失。2025 年 1 月 8 日，一项发表在著名学术期刊《自然》上的有关全球淡水物种评估的研究揭示了一个令人震惊的事实：全球四分之一的淡水物种，包括甲壳纲动物、鱼类和蜻蜓等，正面临灭绝的威胁。该研究再次凸显了保护物种和遏制生物多样性丧失的紧迫性。

在全球范围内，对生物多样性及其重要性缺乏认识是普遍存在的现象。联合国教科文组织（UNESCO）强调，教育对于可持续地、公平地利用生物多样性并加以保护至关重要，也是让公众关注生物多样性的关键。《中国生物多样性保护战略与行动计划（2023—2030 年）》指出，将生物多样性教育纳入教育培训方案，结合自然教育、生态体验、野外探险等产业发展，引导各地依托当地生物多样性特色为学生和社区居民提供教育培训。

2025 年 3 月 3 日是第 12 个世界野生动植物日，旨在提高对世界野生动植物的认识。以此为契机，《生物多样性保护与绿色发展》（简称《生绿》）3 月刊将聚焦“生物多样性教育”，深入探讨生物多样性教育的发展以及实践，欢迎社会各界投稿。征稿截止日期为 3 月 15 日。投稿方式及征文规范详见：生物多样性保护与绿色发展。

此次征稿的分主题包括但不限于：

1. 生物多样性与教育的关系；
2. 生物多样性教育的重要性；
3. 生物多样性教育的实践；
4. 生物多样性教育与自然教育；
5. 生物多样性教育如何开展。

（注：鼓励投稿时附清晰图片）

In Focus: Responsible tourism

The booming global tourism industry has driven economic growth. On December 4, 2024, the UN World Tourism Organization released the latest World Tourism Barometer. The report pointed out that around 1.1 billion tourists travelled internationally in the first nine months of 2024. Zurab Pololikashvili, the Secretary-General of the World Tourism Organization, noted that "the strong growth seen in global tourism is excellent news for economies around the world".

In recent years, the rapid development of tourism has had a negative impact on the local natural environment and ecosystem, causing an ecological burden. In some coastal areas, tourism activities have also had a significant impact on the marine and coastal environment and biodiversity resources. As a result of recognizing the negative impact of tourism activities on the environment, "responsible tourism" came into being, and the discussion on "responsible tourism" has also been continuously deepened at the theoretical and practical levels.

Responsible Tourism is based on "creating better places for people to live in, and better places to visit", and was defined during the World Summit on Sustainable Development in 2002. Foreign research on "responsible tourism" began in 1965, showing the characteristics of multidisciplinary integration. Domestic research on "responsible tourism" started late, mainly focusing on basic theoretical research, practical research, and policy research. In March 2020, the Responsible Tourism Working Committee of the China Biodiversity Conservation and Green Development Foundation (CBCGDF) was established, aiming to deeply root the concept of "responsible tourism" in the hearts of the people, lead the practice and research in the field of "responsible tourism", and promote the green development of China's tourism industry. Dr. Harold Goodwin, known as the "Father of Responsible Tourism", is the director of the CBCGDF Responsible Tourism Working Committee.

This month's journal focuses on the series of topics related to responsible tourism, and hopes to discuss with readers the theoretical research, development and practice of responsible tourism.

Distinctions between the concepts of Responsible Tourism and Ecotourism

By WEI Qi[1], FENG Zi[1]

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Abstract: With the rapid development of economic globalization, the tourism industry has received unprecedented attention and is becoming an important engine for economic growth in many countries or regions. However, traditional tourism activities often ignore the importance of environmental protection, leading to a series of ecological problems, such as biodiversity loss, environmental pollution and excessive consumption of resources. In the face of these challenges, “responsible tourism” came into being. With people’s enthusiasm for ecotourism, the thinking about ecotourism has become more common. This article distinguishes the concepts of responsible tourism and ecotourism, and deeply analyzes the connotation and extension of responsible tourism. At the same time, this article will also explore the challenges faced by responsible tourism and ecotourism in practice, in order to provide useful reference for promoting the healthy development of the tourism industry.

Key words: Responsible tourism, ecotourism, distinctions

WEI Qi, FENG Zi. Distinctions between the concepts of Responsible Tourism and Ecotourism. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

How responsible tourism creates ecological and economic synergy: An ecotourism model from the Dongzhaigang Mangrove Scenic Area in Hainan

By ZHOU Jiayi[1], CHEN Yunhuan[1]

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Abstract: The over-development of tourist attractions and the exploration of sustainable models are becoming the focus of tourism practice. This study explores the potential of responsible ecotourism as a model for sustainable community development and ecological conservation, using the Dongzhaigang Mangrove Scenic Area in Hainan as a case study. The project aims to achieve a balance between economic growth and environmental protection by promoting ecotourism that benefits both local communities and the natural ecosystem. By integrating responsible tourism practices, such as minimizing negative environmental impacts, fostering community participation, and enhancing local economic opportunities, the model demonstrates how tourism can contribute to the sustainable development of scenic areas. The article examines how the Dongzhaigang mangrove ecotourism project empowers local residents, creates jobs, and supports conservation efforts, while maintaining ecological integrity. Ultimately, this case study showcases the potential for ecotourism to serve as a catalyst for creating economic and ecological synergies, offering a saleable model for responsible tourism that can be applied to other ecologically sensitive regions globally.

Key words: Ecotourism, responsible tourism, sustainable communities, Dongzhaigang mangrove tourism area

ZHOU Jiayi, CHEN Yunhuan. How responsible tourism creates ecological and economic synergy: An ecotourism model from the Dongzhaigang Mangrove Scenic Area in Hainan. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

Introduction

In recent years, global tourism has experienced unprecedented growth, with international tourist arrivals reaching nearly 1.3 billion by the end of 2023, recovering to 88% of pre-pandemic levels (World Tourism Organization, 2023). This growth not only demonstrates the strong resilience of the tourism industry but also highlights its

significant contribution to the global economy. However, this rapid expansion comes with notable challenges, particularly in ecologically sensitive areas. Large-scale tourism development often fails to adequately consider the environmental and cultural carrying capacities of destinations. Profit-driven mass tourism models frequently neglect the needs for environmental conservation and sustainable resource utilization, leading to ecosystem degradation, loss of cultural heritage, and unsustainable resource exploitation (Goodwin, 2023). These issues are particularly pronounced in ecologically sensitive regions, posing profound impacts on global ecological and social systems.

To address these challenges, the tourism industry is undergoing a profound transformation, with responsible tourism emerging as a new paradigm. The 2002 Cape Town Declaration explicitly stated that responsible tourism is not only about minimizing negative impacts but also about actively promoting the economic, social, and cultural prosperity of local communities, creating “better places for people to live in and better places for people to visit”. This concept fundamentally changes the traditional approach to tourism development, emphasizing that stakeholders in the tourism industry must balance economic growth and community well-being while maintaining ecological integrity. This approach not only provides theoretical guidance for the sustainable development of tourism but also serves as a valuable reference for destination communities worldwide.

Against this backdrop, mangrove ecosystems, as critical interfaces between terrestrial and marine environments, have become exemplary cases for implementing responsible tourism. These unique ecosystems possess remarkable carbon sequestration capacities, effectively mitigate coastal erosion, and support biodiversity, while also offering unique resources and opportunities for ecotourism development. For instance, the Dongzhaigang Mangrove Nature Reserve in Hainan, China, with its carbon sequestration capacity of 29.56×104 t and a carbon sequestration per unit area of 187.54 t/hm2 (Hu et al., 2015), represents an ideal site that balances ecological conservation with tourism development. It is not only a vital ecological asset but also a quintessential example of the potential of responsible tourism.

However, the Dongzhaigang region currently faces significant challenges. Environmental pollution caused by coastal aquaculture and fishing activities, the proliferation of illegal tourism activities, and conflicts within the local community between conservation and development have created complex ecological and social

issues (Huang, 2017). Local fishing communities, restricted by fishing limitations, have lost their primary source of income, with many lacking viable alternative livelihoods. This predicament threatens the well-being of local residents and poses a potential risk to the long-term ecological health of the reserve. Therefore, there is an urgent need for a new tourism model that can balance environmental conservation with community development.

This study focuses on the Dongzhaigang Mangrove Tourism Area, aiming to explore how the principles of responsible tourism can be implemented to simultaneously protect ecosystems and deliver sustainable economic and social benefits to local communities. The core objectives of the research are threefold: first, to mitigate the negative environmental impacts of tourism by promoting sustainable tourism practices and ensuring ecosystem health; second, to facilitate the economic transformation of local fishing communities, providing stable and promising employment opportunities for residents affected by fishing restrictions; and third, to foster synergies between ecological conservation and economic development by establishing a sustainable tourism model through responsible tourism practices.

Specifically, this study not only examines the direct environmental conservation impacts of responsible tourism practices but also analyzes how these practices can create win-win outcomes for social and ecological systems through economic empowerment, community engagement, and educational initiatives. Preliminary findings indicate that implementing responsible tourism in Dongzhaigang can effectively alleviate the environmental pressures of traditional tourism models while enhancing community participation and economic opportunities, shaping a sustainable tourism model centered on ecological conservation and driven by economic development.

Global Lessons for Ecotourism in Dongzhaigang

Ecotourism has emerged as a vital approach for achieving sustainable development by promoting harmony between economic growth and ecological preservation. Defined by the International Ecotourism Society (TIES) as “responsible travel to natural areas that conserves the environment, sustains the well-being of local people, and involves interpretation and education”, ecotourism extends beyond recreation to actively contribute to conservation and community well-being (TIES, 1990). Nature-based tourism, which accounts for 25% of the global travel market, demonstrates the

economic viability of this approach while addressing pressing environmental challenges such as biodiversity loss and habitat degradation (Singh, 2016). Globally, ecotourism projects have highlighted the critical role of responsible tourism practices in creating a balance between development and conservation. For instance, initiatives in Kerala, India, have leveraged the region's biodiversity to attract eco-conscious travelers, fostering local employment and environmental awareness through jungle safaris and community-led conservation programs (Singh, 2016).

Responsible tourism, a subset of ecotourism, emphasizes minimizing environmental impacts while maximizing social benefits by engaging local communities as active stakeholders in sustainable development. In the Chhattisgarh region of India, for example, virgin protected areas have been transformed into ecotourism hubs, promoting biodiversity conservation while generating employment for tribal populations through sustainable wildlife tourism (Singh, 2016). Similarly, the Slow Adventure initiative in Northern Europe integrates slower, immersive travel experiences with local culture and natural settings, emphasizing collaboration and community participation in tourism management (Koščak & O'Rourke, 2023). These cases demonstrate that community-based management and participatory conservation are key to building sustainable ecotourism models that benefit both people and nature.

Mangrove ecosystems, due to their ecological importance and vulnerability, are particularly suitable for ecotourism. Globally, mangrove forests serve as critical habitats, providing ecosystem services such as carbon sequestration, shoreline protection, and biodiversity support (Hu et al., 2015). Case studies from Southeast Asia have highlighted the successful integration of ecotourism with mangrove conservation. For instance, community-led initiatives in the Sundarbans in Bangladesh have reduced illegal deforestation by promoting alternative livelihoods for local residents through ecotourism-related activities, such as guided tours and educational programs (Gossling, 2002).

In the Chinese context, the Dongzhaigang Mangrove Scenic Area exemplifies the potential of responsible ecotourism to create synergies between ecological preservation and economic development. Restoration activities like mangrove replanting and invasive species removal have fostered community engagement while directly contributing to ecosystem health (Li et al., 2020). Although still evolving, the project serves as a local example of how global principles of ecotourism can be

effectively adapted to promote sustainable tourism and community development in sensitive ecosystems.

Problems and Changes Faced by the Case

Dongzhaigang Mangrove Nature Reserve is located in the northeastern part of Hainan Island, China. This unique ecosystem demonstrates both the challenges and opportunities in implementing responsible tourism practices. The area's distinctive geographic features, including tidal flats, estuaries, and complex mangrove root systems, create an ideal environment for developing responsible tourism initiatives that can protect natural resources while providing meaningful visitor experiences.

Dongzhaigang's ecological significance extends far beyond its scenic beauty. The mangrove ecosystem serves multiple critical environmental functions, with particularly notable carbon sequestration capabilities. Research has shown that the reserve captures approximately 29.56×104 t tons of carbon, with an impressive carbon sequestration rate of 187.54 t/hm2 per unit area (Hu et al., 2015). This carbon storage capacity positions Dongzhaigang as a crucial player in climate change mitigation efforts. Beyond carbon sequestration, the mangrove ecosystem provides essential services including coastal protection, water purification, and habitat provision for diverse marine and terrestrial species. The complex root systems of mangroves not only protect coastlines from erosion but also create nursery environments for numerous marine species, contributing to regional biodiversity and fishery sustainability.

However, the area faces significant environmental challenges that threaten these ecological functions. The most pressing issues stem from pollution sources associated with traditional tourism and local economic activities. Mudflat aquaculture operations release harmful substances, including sewage and wastewater, directly into the wetland ecosystem (Huang, 2017). This pollution, combined with solid waste from tourism activities, poses a serious threat to the mangrove's health and biodiversity. The impact extends beyond immediate environmental damage, affecting the ecosystem's long-term resilience and its ability to provide essential environmental services. The traditional tourism landscape in Dongzhaigang has contributed to these environmental pressures in multiple ways. Prior to the implementation of ecotourism initiatives, the area struggled with several key issues. Tourism development lacked distinctive features that would attract environmentally conscious visitors, resulting in

a focus on mass tourism that often exceeded the ecosystem's carrying capacity. The use of diesel-powered boats for tourist transportation, as evidenced in the area's traditional tourism operations, contributed significantly to both air and water pollution. Inadequate waste management systems and insufficient environmental protection measures further compounded the ecosystem degradation, threatening the very features that make the area attractive to visitors.

Figure 1. Diesel Boat in Dongzhaigang Mangrove Tourism Area

The local community, particularly fishing households, faced additional challenges that complicated tourism development. Fishing restrictions implemented to protect marine resources left many families without stable income sources. This economic pressure often led to conflicts between conservation goals and livelihood needs, with some community members viewing the mangrove preservation efforts as obstacles rather than opportunities (Lin, 2017). The situation highlighted the urgent need for a tourism model that could balance environmental protection with community development. Traditional fishing practices, while culturally significant, had become unsustainable in the face of declining marine resources and increasing environmental protection requirements.

Recognizing these challenges, stakeholders initiated a shift toward ecotourism as part of a broader responsible tourism strategy. This transition aimed to address multiple objectives simultaneously: to protect the mangrove ecosystem, to provide sustainable economic opportunities for local communities, and to create meaningful experiences for visitors. The new approach emphasizes several key elements that align with responsible tourism principles:

- Environmental protection through sustainable infrastructure and practices
- Community involvement in tourism operations and decision-making

- Educational programs that enhance visitor understanding of mangrove ecosystems
- Economic opportunities that align with conservation goals
- Cultural preservation and integration into tourism experiences

Initial implementation of these changes has shown promising results. The establishment of eco-friendly facilities, including water quality monitoring stations and sustainable transportation options, demonstrates a commitment to environmental protection. Moreover, the involvement of local communities in tourism operations, particularly through the transition of former fishermen into eco-tourism guides, illustrates how responsible tourism can create new economic opportunities while supporting conservation efforts. The development of educational programs and interactive experiences has enhanced visitor engagement with conservation efforts, creating a more meaningful and sustainable tourism product.

Figure 2. Entrance of the Hainan Dongzhaigang National Nature Reserve Positioning and Water Quality Monitoring Station

Case Originates from the Practice of Responsible Tourism

Dongzhaigang Mangrove Tourism Area uses the principles of responsible tourism to develop an ecotourism area and a sustainable community. By balancing ecological integrity, community involvement, and sustainable economic benefits, the project demonstrates how tourism can be an effective tool for achieving conservation goals while uplifting local communities. It minimizes the environmental footprint of tourism through eco-friendly infrastructure such as elevated wooden pathways that meander through the mangrove forest, protecting the delicate root systems while providing visitors an immersive experience. Renewable energy sources, including solar panels, power key facilities, reducing reliance on non-renewable energy.

Additionally, water conservation systems like rainwater harvesting and greywater recycling ensure that tourism operations do not deplete local water resources. These initiatives reflect principles of environmental stewardship by protecting natural habitats and minimizing resource consumption.

Efficient waste management is integral to preserving the pristine environment of the Dongzhaigang mangroves. The project has established a robust waste segregation system, emphasizing recycling and the use of biodegradable materials. Compostable cutlery and packaging are standard at tourist facilities to prevent plastic pollution, and informational signage educates visitors on proper waste disposal practices. Pollution from boating activities has been addressed by replacing diesel-powered vessels with electric and solar-powered alternatives, significantly reducing emissions and water contamination.

Biodiversity conservation stands as a cornerstone of the Dongzhaigang project. Efforts include regular monitoring of species populations to track ecosystem health and identify threats. Forestation projects have restored degraded mangrove areas, enhancing their carbon sequestration capabilities and providing critical habitats for wildlife. Educational programs for visitors emphasize the importance of mangroves in global biodiversity, encouraging responsible behavior and fostering a conservation mindset. Interpretative signage and guided tours enhance awareness of the mangrove's ecological significance.

The transition to ecotourism has opened diverse employment opportunities for local residents. Many former fishermen, whose livelihoods were affected by conservation restrictions, have been retrained as tour guides, hospitality staff, and conservation workers. This shift not only provides stable incomes but also strengthens the community's connection to the mangroves by aligning economic incentives with conservation goals. By incorporating local knowledge into the tourist experience, these roles enrich the authenticity of the project and empower the community.

Tourism revenues are reinvested in the local community through initiatives that enhance living standards. A portion of the earnings supports education, enabling local children to access quality schooling. Investments in healthcare facilities have improved access to medical services, addressing a critical need in the region. Infrastructure development, such as improved roads and public utilities, benefits both residents and visitors, creating a virtuous cycle of development supported by responsible tourism.

The Dongzhaigang project actively promotes local enterprises by sourcing products and services from the community. Visitors are encouraged to purchase handmade crafts, local delicacies, and other artisanal goods, ensuring that tourism expenditures directly benefit local producers. Workshops and markets organized within the mangrove area provide platforms for showcasing these products, further strengthening the local economy. This approach diversifies income sources while preserving traditional crafts and culinary heritage.

Figure 3. Lianlizhi Restaurant near the Dongzhaigang Mangrove

Celebrating local culture is integral to the Dongzhaigang ecotourism model. The project incorporates cultural elements into the tourist experience, such as performances of traditional music and dance during festivals, serving as platforms for cultural exchange while ensuring traditions are preserved and valued. Guided tours often include stories about the region's history and the cultural significance of mangroves to local communities, deepening visitors' appreciation of the area's heritage.

A participatory approach ensures that the voices of local residents are central to the planning and implementation of tourism initiatives. Regular consultations with community members provide a platform for expressing concerns and suggesting improvements. Collaborative governance structures, such as advisory councils, include representatives from local communities, conservation experts, and tourism operators, ensuring that decision-making is inclusive and balanced.

Empowerment is a key objective of the Dongzhaigang ecotourism model. Training programs equip local residents with skills in sustainable tourism management, enabling them to take on leadership roles within the project. Women, in particular,

have benefited from targeted initiatives that provide opportunities for entrepreneurship and involvement in decision-making processes. These efforts enhance the community's capacity for self-reliance while fostering a sense of ownership and pride in the project's success.

The Dongzhaigang Mangrove Ecotourism Project exemplifies the practical application of responsible tourism principles, achieving a harmonious balance between ecological preservation and socio-economic development. Through sustainable infrastructure, effective waste management, and biodiversity conservation, the project minimizes its environmental footprint while safeguarding the mangrove ecosystem. Economic benefits are maximized through job creation, revenue sharing, and support for local businesses, ensuring that tourism contributes to community well-being. Cultural respect and community involvement underpin the project's success, fostering an inclusive and sustainable tourism model.

Outcomes and Benefits from the Case

The restoration of mangrove ecosystems at Dongzhaigang has been a central component of the project's success in biodiversity protection. Over the past decade, reforestation efforts have resulted in the restoration of approximately 15% of previously degraded mangrove areas. These initiatives have improved habitat availability for a range of species, including the endangered Chinese white dolphin (Sousa chinensis) and several native bird species that rely on mangroves for nesting. Regular species monitoring indicates a steady increase in population numbers for key indicator species, underscoring the effectiveness of conservation strategies (Hu et al., 2015).

Environmental indicators provide tangible evidence of the project's ecological impact. Water quality testing conducted annually since 2015 shows a 30% reduction in pollutants, largely being attributed to improved waste management practices and reduced aquaculture runoff. Similarly, surveys of the mangrove habitat reveal an increase in vegetation density and diversity, contributing to enhanced carbon sequestration rates - a critical factor in climate change mitigation. Waste reduction initiatives have also been successful, with over 75% of solid waste generated by tourism now being recycled or composted.

The Dongzhaigang project has significantly boosted local employment and economic activity. Since its inception, over 200 jobs have been created, spanning roles such as

eco-tour guides, hospitality workers, and conservation specialists. Local income levels have risen by approximately 20%, with many households reporting greater financial stability due to consistent income from tourism-related activities. Furthermore, the growth of small businesses offering food, crafts, and accommodation has contributed to a thriving local economy, illustrating how ecotourism can drive economic development (Lin, 2017).

Historically reliant on fishing, the local economy has diversified significantly through tourism. This shift has reduced overfishing pressures on marine ecosystems, as many former fishers have transitioned to tourism-related occupations. The establishment of community-run enterprises, such as eco-lodges and handicraft workshops, highlights the potential for tourism to support sustainable livelihoods while reducing dependency on environmentally harmful industries. This diversification not only strengthens economic resilience but also aligns economic activities with environmental conservation goals.

One of the project's most profound impacts has been on community empowerment. Local ownership of tourism businesses has grown steadily, with nearly 40% of enterprises in the area now operated by residents. Training programs in sustainable tourism and business management have equipped community members with the skills needed to lead these initiatives. Moreover, cultural festivals and events have fostered a renewed sense of pride in local traditions, uniting the community around shared goals of conservation and sustainable development.

By balancing economic growth with environmental preservation, the Dongzhaigang project has set a benchmark for sustainable development. Improved infrastructure, including upgraded roads and access to clean water, has enhanced living standards without compromising the area's ecological integrity. Collaborative decision-making processes have ensured that development aligns with community needs and environmental constraints, creating a model of inclusive and sustainable growth. This approach not only benefits current residents but also safeguards resources for future generations.

Research Exploration of Applied Replicability

The successful implementation of responsible tourism principles in the Dongzhaigang Mangrove Tourism Area provides valuable insights for scaling similar models to other ecologically sensitive regions. The project's achievements in balancing

environmental conservation with community development offer a framework that can be adapted to diverse contexts while maintaining core sustainability principles. The Dongzhaigang model's scalability rests on several key transferable elements. The integration of local communities into tourism operations, particularly the successful transition of fishermen to eco-tourism guides, demonstrates how traditional resource-dependent communities can adapt to sustainable economic alternatives. This approach can be especially relevant for other coastal areas facing similar challenges in balancing conservation with local livelihoods. The project's emphasis on environmental monitoring and protection, exemplified by its water quality monitoring station and restoration initiatives, provides a template for maintaining ecological integrity in tourism development (Gu, 2023).

The scalability potential of the Dongzhaigang responsible tourism model was evaluated through a systematic mixed-methods research framework combining quantitative metrics and qualitative assessments. Our methodology employed a three-phase research design to comprehensively assess the model's transferability to other ecologically sensitive regions.

Phase One involved comparative case analysis of 15 coastal tourism projects in Asia-Pacific regions with similar ecological characteristics to Dongzhaigang, particularly focusing on mangrove ecosystems and traditional fishing communities. The analysis utilized a standardized assessment matrix evaluating five key dimensions: environmental impact mitigation, community engagement levels, economic benefit distribution, cultural preservation effectiveness, and governance structure sustainability. Data collection included environmental monitoring records, community development indicators, and tourism revenue distribution patterns across all sites. The findings revealed that projects incorporating strong community integration and robust environmental monitoring systems demonstrated 40% higher success rates in maintaining ecological integrity while generating community benefits.

Phase Two comprised structured stakeholder interviews and focus group discussions with tourism operators, policymakers, and community leaders across different regions. The research protocol included semi-structured interviews with 30 key stakeholders and six focus groups involving 48 participants in total. Interview data was analyzed using thematic content analysis to identify critical success factors and implementation challenges. The findings informed the development of policy recommendations,

emphasizing the importance of regulatory frameworks that balance ecological protection with sustainable tourism development.

Figure 4. On-site Interview with Tourists at Dongzhaigang Mangrove Tourism Area

Phase Three consisted of comprehensive environmental impact assessments conducted across varied ecological contexts. This phase employed:

- Ecological carrying capacity assessments using standardized metrics
- Environmental sensitivity mapping through GIS analysis
- Tourism impact monitoring through established indicator systems
- Community resource dependency assessments
- Economic viability analysis of tourism operations

The research identified three key variables affecting scalability: ecosystem sensitivity, infrastructure capacity, and community resource dependence. Statistical analysis of these factors using multiple regression models indicated that successful adaptation requires careful calibration of tourism development intensity based on local ecological thresholds.

Longitudinal studies of community engagement patterns and economic benefit distribution in scaled tourism projects supplemented the primary research phases. Data collection spanned three years, tracking key performance indicators including:

- Environmental quality metrics
- Community participation rates
- Economic benefit distribution patterns
- Cultural preservation indicators
- Tourism management effectiveness

The findings suggest that long-term sustainability correlates strongly with the establishment of robust monitoring systems and adaptive management practices. Projects implementing regular environmental monitoring programs and community

feedback mechanisms showed 60% higher sustainability indicators compared to those without such systems. These results provide quantitative support for scaling the Dongzhaigang model while highlighting the importance of context-specific adaptation.

This comprehensive research framework has identified both opportunities and challenges in scaling the Dongzhaigang model. While the model offers valuable insights for sustainable tourism development, successful replication requires systematic adaptation to local contexts through evidence-based decision-making and continuous monitoring. Future research directions should focus on developing standardized cross-contextual assessment metrics and investigating the impact of varying cultural and ecological contexts on implementation success.

Conclusion

The Dongzhaigang Mangrove Tourism Area demonstrates how responsible tourism can harmonize ecological preservation with socio-economic growth. By adopting sustainable practices, including mangrove reforestation, pollution reduction, and community involvement, the project has successfully revitalized the local environment while creating new livelihoods for residents. The integration of community-driven enterprises and cultural preservation into the tourism model highlights the transformative potential of ecotourism as a tool for sustainable development in sensitive ecosystems.

This case study offers a saleable framework for balancing conservation and development, providing valuable lessons for other regions facing similar challenges. Key to its success are adaptive management, stakeholder collaboration, and robust environmental monitoring, ensuring that tourism activities remain aligned with ecological and social priorities. Ultimately, the Dongzhaigang Mangrove Ecotourism Project serves as a beacon of hope, illustrating that through innovative practices and inclusive approaches, tourism can transition from a source of environmental strain to a catalyst for sustainability and shared prosperity.

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A brief analysis of responsible tourism from the perspective of ecological civilization

By WANG Xiaoqiong[1], GAO Junqi[1]

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Abstract: At present, with the rapid development of the economy and society, the quality of life of the people has been rising, and the tourism industry has become a new engine to meet people's new expectations for a better life. However, behind the "explosive" growth of the tourism industry, it may have negative impacts on the local ecological environment, social culture, biodiversity, resource utilization and other aspects. The development of responsible tourism has also become an important focus for the tourism industry to promote high-quality development based on the requirements of the era of ecological civilization. This article analyzes responsible tourism behavior from the perspective of ecological civilization, and combines the research and practice of responsible tourism led by social organizations to propose that the healthy, mutually beneficial and win-win tourism relationship advocated by responsible tourism is highly consistent with the concept of ecological civilization. The mainstream development of responsible tourism will become an important engine to promote the construction of ecological civilization.

Key words: Ecological civilization, responsible tourism, biodiversity, environmental protection

WANG Xiaoqiong, GAO Junqi. A brief analysis of responsible tourism from the perspective of ecological civilization. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

Research progress on microplastic pollution in agricultural soil

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Abstract: In recent years, the pollution of Microplastics (MPs) in agricultural soil has gradually received attention, and the environmental risks associated with it have become increasingly recognized. More and more studies on the impact of MPs on the agricultural soil environment have been conducted. This paper summarizes the research achievements and progress so far regarding MPs in agricultural soil, especially the progress in research on the impact of MPs on soil nutrients, the migration of heavy metals in soil, and soil enzyme activity. It also clarifies the current status and characteristics of research on MPs pollution in agricultural soil; discusses the main sources of MPs in farmland in China; and summarizes and analyzes the impact of MPs on the nutrients and migration of heavy metals in agricultural soil. The paper concludes that the sources of MPs in agricultural soil are diverse, and agricultural plastic film is one of the main sources of MPs in farmland, which has certain impact on soil nutrients, heavy metals, and soil enzyme activity. The paper also discusses the problems existing in the current research on MPs pollution in agricultural soil and presents prospects for future research.

Key words: Microplastics, farmland soil, soil nutrient

CHEN Yu, LI Xiaoyong. Research progress on microplastic pollution in agricultural soil. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

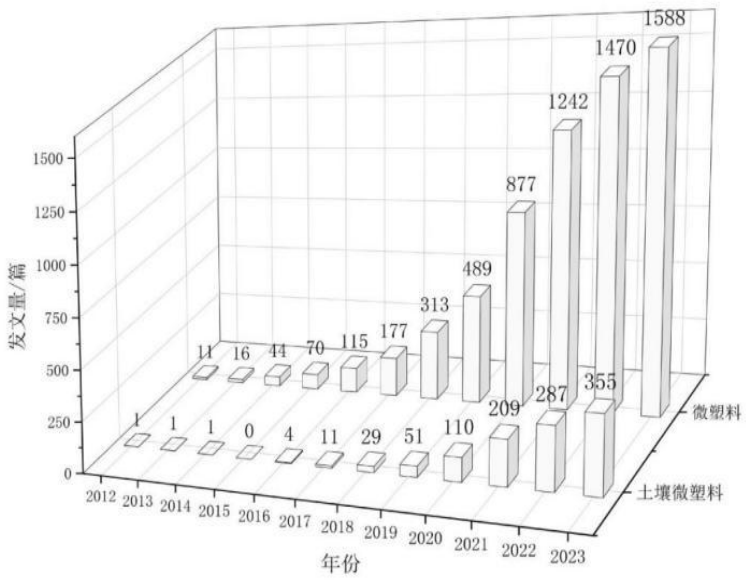

Figure 1 Statistics of soil MPs pollution research based on Web of Science

Empathy development of children in education for animals

By ZHANG Yuanyuan

(Researcher of General Education, One Health Research Institute, Wenzhou Medical University)

Abstract: This article is compiled based on the author's speech at the 2024 Nature Education Academic Seminar at Beijing Normal University. The article includes "Basic Information: The relationship between animal content and empathy development", "Phenomenon Observation: How animals are treated in nature education", and "Practical Guide: Application of the Life Care Mental Model Integrated Development Framework in nature education". In combination with the content of the book Life's Meaning and One Health with the author as executive editor, the article further elaborates on the thinking on the development of empathy.

Key words: Empathy, animals, nature education, life care, One Health

ZHANG Yuanyuan. Empathy development of children in education for animals. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

Source: Organized according to the *Caring for Life Education: A Mental Model Based Framework*

Analysis based on the public survey report on wetland protection in the Yellow River Basin

By ZHAO Yuping[1], AO Xiang[1], WANG Shuai[2]

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Abstract: This paper is based on the results of a public survey on wetland protection conducted in Qinghai and Shandong provinces from October to November 2023 as part of the first phase of the project "Evaluation of the Effectiveness of Important Wetland Protection in the Yellow River Basin". It aims to understand the public awareness, public participation and public satisfaction with wetland protection in the Yellow River Basin from the aspects of wetland protection awareness, public participation willingness, recognition of protection effectiveness, and satisfaction with protection effectiveness, and identify existing problems, contradictions and conflicts in wetland protection, in order to provide reference for wetland protection in the Yellow River Basin in terms of the formation and improvement of the public participation mechanism for wetland protection.

Key words: Wetland protection, wetland protection effectiveness, public participation, public satisfaction

ZHAO Yuping, AO Xiang, WANG Shuai. Analysis based on the public survey report on wetland protection in the Yellow River Basin. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

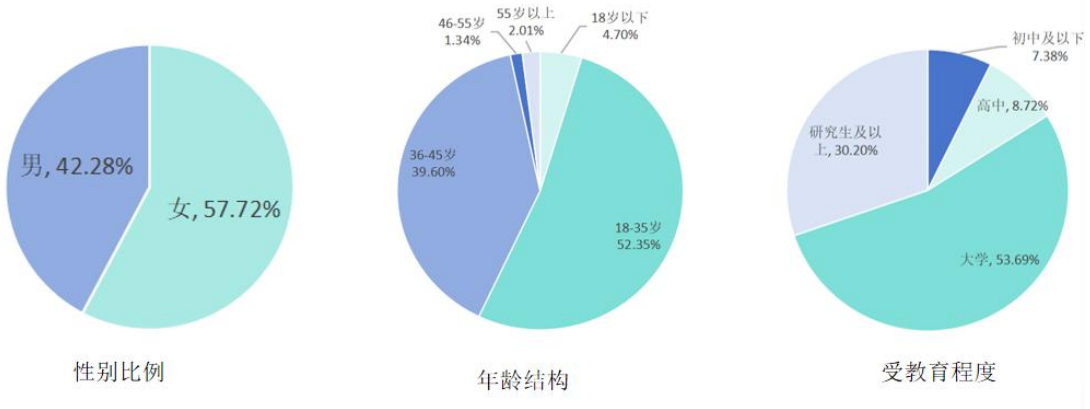

Figure 1 Basic information of participants in the questionnaire survey

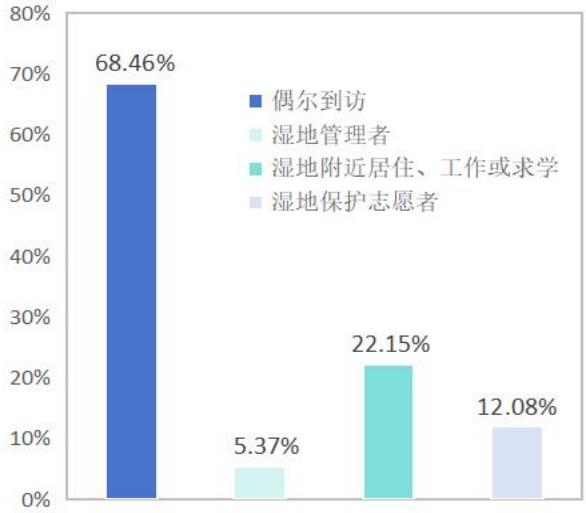

Figure 2 Relationship between respondents and specific wetlands

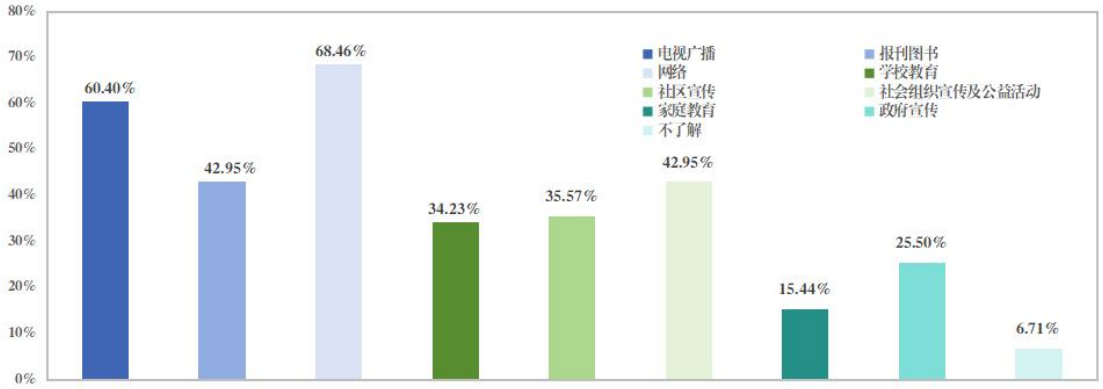

Figure 3 Channels through which respondents learned about wetland protection

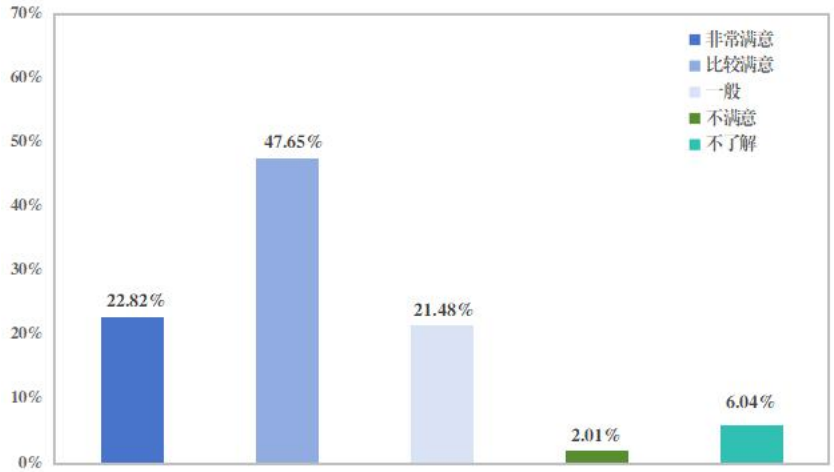

Figure 4 Respondents' satisfaction with government departments' work on wetland protection information disclosure, public participation and supervision

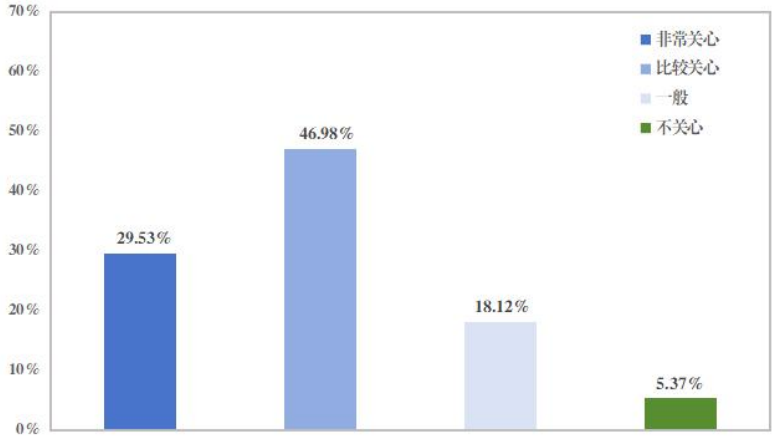

Figure 5 Do respondents care about wetland protection?

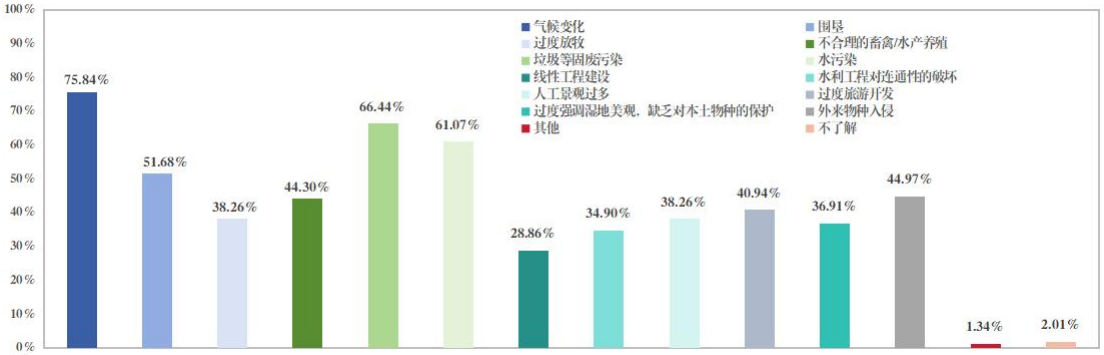

Figure 6 Public awareness of the key areas of wetland protection work

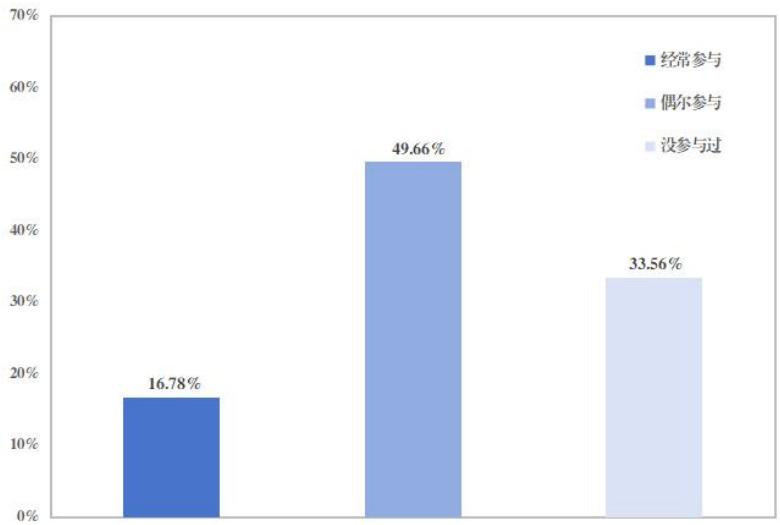

Figure 7 Public participation in wetland protection activities

Betousa stylophora (Lepidopetera, Thyrididae) has invaded China

By LIU Huajie

(Peking University, Beijing 100871, China)

Abstract: Galls made by *Betousa stylophora* (Lepidopetera,Thyrididae) parasitic on the branches of the *Phyllanthus emblica* (Phyllanthaceae) was found on November 7, 2023 when the author traveling on a trail of Pingshan District, Shenzhen of Guangdong Province, China. Later, the author saw the same galls again in the Nanshan District of the same city. The size and shape of the gall are similar to that of gall made by *Coccotorus beijingensis* or *Coccotorus chaoi* on the tree of *Celtis bungeana* (Cannabaceae). There have been some studies about this gall and larvae of *Betousa stylophora* in Indian literature. On December 10, 2024, the author returned to Shenzhen to check the situation of that plant *Phyllanthus emblica* being parasitized by the insect *Betousa stylophora* and found a bad fact that the invasion of this insect into China is getting worse after about one year. The relevant departments of China should pay attention to avoiding the invasion from expanding.

Key words: Invasion, *Betousa stylophora*, *Phyllanthus emblica*, gall, Shenzhen

LIU Huajie. *Betousa stylophora* (Lepidopetera, Thyrididae) has invaded China. BioGreen - Biodiversity Conservation and Green Development. Vol.1, January 2025. Total Issues 72. ISSN2749-9065

1. Basic facts of the gall and the larva of *Betousa stylophora*

On November 6, 2023, we traveled along a trail in Pingshan District (Shenzhen City, Guangdong Province, China), watching the interesting wild plants such as *Cinnamomum burmanni*, *Syzygium hancei*, *Desmos chinensis*, *Mussaenda kwangtungensis*, *Lithocarpus glaber*, *Antirhea chinensis*, *Tetracera sarmentosa*, *Ilex pubescens*, *Jasminum lanceolaria*, *Aporosa dioica*, etc. We also tasted the little fruits

of *Acronychia pedunculata* (Rutaceae), which looks like a very small size ugly orange and tastes very well.

In order to pick a few wild fruits of *Phyllanthus emblica* (Phyllanthaceae, formerly Euphorbiaceae) with more than one meter high, I found some nodules on the twigs, estimated to be some kind of galls made by insects. These galls are similar to the galls made by *Coccotorus beijingensis* (= *Coccotorus chaoi*) common on *Celtis bungeana* (Cannabaceae). Immediately I bit open a gall, then a small black bug in it was found. It was impossible to judge what it is. On December 1, 2023, I came to Shenzhen from Beijing for a meeting, and took the opportunity to climb the Tanglang Mountain near the Southern University of Science and Technology twice, and encountered such galls on the tree of *Phyllanthus emblica* again along the trail.

After returning to Beijing, I wanted to know exactly what species the black larvae are in the gall of *Phyllanthus emblica*. Observing the appearance of the larva, basically Coleoptera can be denied. I guessed it belongs to Lepidoptera. The reference books at home are too limited to make sure its name. From the perspective of symbiosis or parasitism, it is a good way to check insects by host plants. According to the locking relationship between plant and insect, I was very lucky that it is the *Betousa stylophora* (Lepidoptera, Thyrididae), which can be counted as a new record in Shenzhen, China. So the Chinese name “yu-gan-zi-zhi-ying-wang-e” (余甘子枝瘿网蛾) was given (Liu HJ, 2024). The shape of gall is an ellipsoid, with two axes of length 15-40mm and 6-15mm respectively. The length of larvae of *Betousa stylophora* is 6-10mm, and diameter is 2-3mm. The head is brownish yellow, the body is mostly pure black, and each one is very active when the gall is open.

The genus *Betousa* was established by the British entomologist Francis Walker (1809-1874) in 1865 under the family Crambidae, who described only one species *Betousa dilecta*, before the genus changed to the family Thyrididae. In EOL (2006) of London Natural History Museum, *Betousa* contains still only this species, found in the Moluccas, Woodlark Island, St. Aignan, Ternate and Fergusson Island. After 1895, a large number of English literatures discussed another species *Betousa stylophora* under the genus *Betousa*, and the authors were mainly Indian scholars.

Phyllanthus emblica is common in southern China and is a kind of wild fruit, which has been developed and utilized in China, but the detailed research on the insect inside the parasitic gall has not been found. The plant is distributed in India, Sri Lanka, Indochina Peninsula, Indonesia, Malaysia and the Philippines. In India, *Phyllanthus emblica* is one of the most important local fruit trees, and scholars have studied it more.

Fig.1 The galls on twigs of *Phyllanthus emblica*, containing one larva of *Betousa stylophora* in every gall. The shape of galls is ellipsoidal to round. November 6, 2023, in Pingshan District, Shenzhen city.

According to the study of Sunil Pareek et al (2011), Prahad Swarnkar et al (2014), Dhanoliya Neelesh et al (2017), and Saikat Gantait et al (2021), there are many kinds of agricultural pests of *Phyllanthus emblica*, including *Betousa stylophora*, *Gracilaria acidula*, *Cerciaphis emblicai*, *Indarbela tetraonis*, *Virachola isocrates*, *Deuoderix isocrates*, *Selepa celtis*, *Oxyrhachis tarandus*, *Nipaecoccus vastator*, *Odontotermes* spp., *Myllocerus discolor* etc. In comparison, the biggest damage is from the *Betousa stylophora*.

Literature records that *Betousa stylophora* is mainly distributed in India, Sri Lanka, Myanmar, Bengal, Hong Kong of China and Java (Haldhar et al, 2018). After a few days to study a variety of literature (Haldhar et al, 2022; Patel et al, 1996; Bharpoda et al, 2009; Meshram et al, 2003), I get the following results: Chinese scholars published a paper listing diseases and pests total 17 class (Yang et al, 2012), and another paper

listed diseases and pests total 35 class (Jiang et al, 2021), but did not contain the species of *Betousa stylophora* described in this paper.

Fig.2 Close-up photos of the larvae of *Betousa stylophora*, collected in Pingshan District, Shenzhen city on November 6, 2023.

According to the paper (Huang et al, 2023), the natural distribution of *Phyllanthus emblica* is about 130,000 hectares in China, and about 38,000 hectares are planted artificially, which has formed an industry, and the pests mentioned in this paper should be studied carefully in advance.

Fig.3 Branches and fruits of *Phyllanthus emblica*, January 5, 2019, in Menghai County, Yunnan Province.

2. The Historical Review of Lepidoptera Research in China

The world records of family Lepidoptera are more than 600 species, and the number in China is increasing. According to an article by Zhu Hongfu and Wang Linyao in 1981, most of the insects in this family are found in tropical and subtropical regions. For example, there are more than 200 species in India, which is similar in South America, but only 1 in Europe, 3-4 in northern Asia, and also in North America (Zhu and Wang, 2021). The book *Lepidoptera Records in China* lists 18 species of moth, but no species of this *Betousa stylophora* (Zhu and Wang, 2021). There are 21 species of 9 genera in Jianfengling of Hainan with the largest number of species of Lepidoptera in China (Liu YF, 1993), but this species *Betousa stylophora* has not been recorded. Chen Hanlin (1994) said in his article that in 1992, China had reported 77 species of net moths (Lepidoptera), distributed in 21 provinces and regions, among which Yunnan and Fujian have the most, with 28 species each. Chen Hanlin lists a new record species Hypolamprus rubicunda Warren that may be related to *Betousa stylophora* (Chen, 1994).

Betousa stylophora (Swinhoe, 1895) was defined by Swinhoe. This Swinhoe was not the familiar Chinese British diplomat and naturalist Robert Swinhoe (1836-1877, translated as 郇和 or 史温侯), because he had died in 1895. According to the British journal *Nature*, it was Charles Swinhoe (1836-1923), Robert's brother, a British naturalist of the Regional Lepidopteran entomology of India. Charles Swinhoe was one of the eight founding members of the Bombay Natural History Society (Bombay Natural History Society). He was also a British officer in India. He was a lieutenant colonel in 1881 and promoted to colonel in 1885. He also liked birds, but contributed mainly in entomology. Charles with the British-born journalist and entomologist Everard Charles Cotes (1862-1944) jointly published the first part of Catalogue of the Moths of India, Calcutta (1887-1889), and assisted in the compilation Lepidoptera Indica. After Charles, the book was mainly composed by Frederic Moore (1830-1907).

Finally, some words about the scientific name should be noted:

Name 1: The name *Betousa stylophora* (Swinhoe, 1895) is commonly used by scholars. In addition, Indian scholars occasionally use the following names:

Name 2: *Hypolamprus stylophora* (Swinhoe, 1895), which has been approved by GBIF (the Global Biodiversity Information Facility, 2023), which is also marked in literature (Haldhar et al, 2018) and (Singh et al, 2015). The genus name *Hypolamprus* was established in 1893 by the British entomologist George Francis Hampson (1860-1936). According to *Global Lepidoptera Index*, it is the basionym of the following:

Name 3: *Rhodoneura stylophora* (Swinhoe, 1895). It is equivalent to:

Name 4: *Hypolamprus vinosata* (Warren, 1908). The Warren in parenthesis refers to William Warren (1839-1914), a famous lepidopteran entomologist in Britain.

For the above four names, the first three have zero observation records on iNaturalist, and the fourth one has only one record (visit time is 2023.04.27), which shows that in reality, it is difficult to observe.

3. Invasion is expanding, and should be taken seriously

One year later, from December 10-13, 2024, the author visited Shenzhen again and successively inspected several trails in Longgang District, Pingshan District, Yantian District, and Baoshan District to investigate the invasion situation of this insect. The results of three days' tracking confirmed an unfavorable fact: the invasion is expanding and accelerating. Among 115 of the wild trees of *Phyllanthus emblica* (Phyllanthaceae), 35 had galls of *Betousa stylophora*, with as few as 2-3 per tree and as many as 10-20 per tree. Interestingly, there are usually more galls on the small tree than on the large tree. Twelve galls were opened in field, each containing a live black larva inside. Multiple specimens were collected for DNA sequencing and other studies. *Phyllanthus emblica* is an important native wild plant and a potential wild fruit resource. Based on the growth rate of the larva and the extent of invasion speed, this insect species might have arrived in China before 2018. If no action is taken, the consequences over several years could be unimaginable. One formal proposal is that Shenzhen municipal government and biodiversity conservation departments of China should pay attention to and study this insect, and come up with specific response measures.

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Reflection on Global Biodiversity Framework target implementation difficulties for private sector resulting from diffusion of responsibility and collective inaction after CBD COP16

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Abstract: This article examines the situations faced by the private sector in meeting the Kunming-Montreal Global Biodiversity Framework (KMGBF) targets following the 16th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP16) in Cali, Colombia. Drawing on the concepts of diffusion of responsibility and collective inaction, as well as the Triangle of Inaction and Spiral of Inaction theories, the discussion reveals how various actors - governments, businesses, and individuals - shift accountability to one another. Ultimately, the robust regulation and a thorough shift toward genuine and comprehensive actions to conserve biodiversity are essential for the private sector to translate policy into practical and sustainable outcomes.

Key words: CBD COP16, Kunming-Montreal Global Biodiversity Framework, private sector, sustainability, biodiversity conservation

HE Jingxiao. Reflection on Global Biodiversity Framework target implementation difficulties for private sector resulting from diffusion of responsibility and collective inaction after CBD COP16. BioGreen - Biodiversity Conservation and Green Development. Vol. January 2025. Total Issues 72. ISSN2749-9065

Introduction

The 16th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP16 or COP16) was held from the end of October to early November 2024, in Cali Colombia. While the event garnered praise for centering

Local Communities and Indigenous Peoples, it did not lay enough emphasis on the private sector, which is a key player to fight against the biodiversity loss, even though there was a Business and Biodiversity forum. Despite multiple global agreements stressing business engagement, companies often find themselves paralyzed by the phenomenon of diffusion of responsibility - assuming that governments, civil society, or other corporations will take the lead. This inertia is compounded by collective inaction, wherein stakeholders hesitate to act when others remain passive. In the wake of COP16, reflecting on how these dynamics hinder private-sector compliance with global biodiversity targets is crucial. By examining historical context, current policy trends, and existing theories, this article explores why businesses struggle to transform mission into tangible action.

CBP COP16 highlights

Colombia was intended to hold a “People’s COP”, for which local community and indigenous people were for the first time ever put in the center of the stage, and the world thus, knew much better their critical role in the biodiversity conservation. Further, the Green Zone attracted more than 700,000 participants to learn about biodiversity and its criticality and interaction with human beings (UNEP, 2024).

Besides the breakthrough success in terms of organization of the event for people, the COP16 also achieved many global consensus, such as the Cali Fund decision that stipulates that companies utilizing digital sequence information (DSI) from genetic biodiversity resources in their products must contribute a portion of their profits or revenues to the fund (WWF, 2024).

Additionally, COP16 was able to resume the discussion and add momentum on ecologically or biologically significant marine areas (EBSAs) identification, and facilitate moving forward regarding sustainable wildlife management and plant conservation, which are definitely adding blocks to the implementation of the Kunming-Montreal Global Biodiversity Framework (KMGBF) (CBD, 2024).

Despite its success in driving key agreements and outcomes, COP16 is also much criticized due to its overly intense discussion schedule and poor planning, which

resulted in the situation where the talk was extremely extended and the number of parties stayed could not reach the “quorum” needed to reach consensus on key issues (Carbon Brief, 2024).

In addition, the insufficient involvement of different stakeholders, observers, etc., in the discussion was also mentioned by some attendants. The issue was believed to have led to the situation that some discussions were ungrounded due to limited or even absent input of experts and stakeholders. This article discusses the importance of engaging and the difficulties faced by one key group of stakeholders - the private sector, which is mentioned both in the Aichi Biodiversity Targets (CBD, 2020) and KMGBF (CBD, 2024).

Historical context of private sector involving in biodiversity conservation

International biodiversity frameworks, or, to a larger extent, many international sustainable development goals related frameworks, have long acknowledged the importance of the private sector in achieving global sustainable development goals. The Aichi Biodiversity Targets 2011-2020 specifically highlighted the need for business involvement; for instance, Aichi Target 4 called on governments, businesses, and stakeholders to achieve or have plans in place for sustainable production and consumption by 2020 (CBD, 2010). In Aichi Target 4, business is mentioned in parallel with the governments and stakeholders, and the main point is to encourage all levels to start taking actions towards sustainable production and consumption. Interpretation may also direct the comprehension of this target to encouraging collaboration. The key shortcoming is that it does not indicate the main responsible body - governments, businesses, or any other stakeholders, which would largely lead to the issue of lack of focus and dilution of responsibility. Consequently, the progress of implementation of the corresponding target would be delayed or its importance could even be ignored.

The Kunming-Montreal Global Biodiversity Framework (KMGBF), adopted at COP15 and guiding discussions at COP16, attempts to provide clearer direction and stronger incentives for private sector action. Target 15 is also about both governments

and businesses. It states that the governments' work is to leverage legal, administrative, or policy approaches to encourage and enable businesses to start actions. For the business, they assess and disclose the relevant risks, communicate to consumers to promote sustainable consumption patterns, etc., and help draw at least a big picture of what to do regarding biodiversity for businesses and the private sector (CBD, 2022).

Biodiversity is becoming the second most important topic in the sustainability world after climate and the related Greenhouse Gas (GHG) emissions topic, especially after several keystone publications. For example, the first Global Assessment of Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released in 2019 sets the fundamental consensus of biodiversity and ecosystem services loss for the whole world and also defines a common language to measure, assess, and discuss, etc., the biodiversity issues (Ruckelshaus et al., 2020). Post-2020 Global Biodiversity Framework and above-mentioned KMGBF set renewed global targets and action guidelines according to the current condition.

In the regional policy, law, and regulation level, the European Union's Corporate Sustainability Reporting Directive (CSRD) entered into force in 2023 (European Commission, 2023), which affects about 40,000 EU & 10,000 non-EU companies (Ecoact, 2023). The EU Commission released the European Sustainability Reporting Standards (ESRS) as a delegated act, in which Biodiversity is one among five Environmental topics, namely, Climate change, Pollution, Water and marine resources, Biodiversity and ecosystems, and Resource use and circular economy. From then on, biodiversity became a topic to understand for the sustainability manager in businesses in the EU.

For businesses or the private sector, since 2020, the Science Based Targets Network (SBTN) has published many guidelines for the private sector to try to duplicate the success of the Science Based Targets initiative (SBTi), which is an assessment and net-zero target setting guidance for the private sector regarding climate and GHG emissions. The Taskforce on Nature-related Financial Disclosures (TNFD) is the biodiversity version of the Task Force on Climate-Related Financial Disclosures

(TCFD). Its beta version was launched in 2023, and the official version was launched in 2024. TNFD, as a reporting recommendation framework, successfully propagates the concept and lets the private sector recognize the importance of biodiversity by emphasizing the nature-related dependencies, impacts, risks, and opportunities. In addition, in 2024, the Global Reporting Initiative (GRI), the most followed sustainability reporting standard, updated their biodiversity standard; and the Carbon Disclosure Project (CDP), a well-recognized environmental impact disclosure standard and rating organization, included biodiversity topic data points.

All above-mentioned academic publications, policy, laws, regulations, guidelines, standards, and national-level ones not mentioned though, contribute to the current attention to biodiversity in the private sector.

Current situations

Despite the apparent and sound scientific results indicating that urgent actions from all levels should be taken to stop biodiversity loss and conserve biodiversity, the entire world has barely started effective actions compared to what are actually needed. Much attention and focus, regarding biodiversity conservation, have been put on some specific species, as urged and always reminded by the endangered lists, such as the IUCN Red List of Threatened Species. It is not to state that protecting these “star species” is not correct, but it is critical to think in a comprehensive way, when it comes to biodiversity conservation - biodiversity encompasses ecosystem diversity, species diversity, and genetic diversity, and the interaction of the three diversities. The phenomenon of paying too much attention to “star species” is easily and commonly observed in all levels, i.e., government, private sector, NGOs, and the public. Lack of awareness and scientific knowledge, especially about the priority of actions, is one of the fundamental factors that lead to the ineffective actions.

The decision framework Mitigation Hierarchy should be well respected at the global level to protect biodiversity. It provides a clear order of the actions to be taken, namely, Avoidance, Minimisation or Mitigation, Rehabilitation or Restoration, and finally Offsetting or Compensation (S Arlidge et al., 2018). The Science-Based

Targets Network (SBTN), a group of organizations providing guidance for the private sector and cities to measure and set targets to reduce impacts on nature, does not mention Offseting or Compensation. Instead, it includes Transform as a key action pillar to encourage fundamental changes (SBTN, 2024). In short, the much more effort should be made to avoid impacts on biodiversity to achieve effective biodiversity conservation targets (Phalan B, Hayes G, Brooks S, et al., 2018). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment on Biodiversity and Ecosystem Services, published in 2019, serves as the milestone scientific report that unifies the understanding of biodiversity and ecosystem services. The report categorizes the impacts on biodiversity into five pressures, also known as the five direct drivers of biodiversity erosion (IPBES, 2019). The private sectors, or to a larger extent, all human economic activities, shall measure the impacts on biodiversity as categorized by the five pressures, i.e., land- and sea-use change, direct resource exploitation, climate change, pollution, and invasive species. After knowing the exact pressures on biodiversity, the Mitigation Hierarchy should be followed to achieve the highest efficiency and effectiveness of biodiversity conservation actions.

Triangle of Inaction Theory and diffusion of responsibility

The commonly observed inaction, ineffective, or insufficient actions in the private sector can be explained by the Triangle of Inaction theory, constructed by Pierre Peyretou, to explain the situation faced by the world in the context of climate actions, that results in insufficient or even no action (Decathlon, 2024). The Triangle of Inaction theory includes three key groups: Government (the State / public authorities), the Private Sector (Companies), and Individuals. The theory depicts how three main groups tend to shift responsibility for environmental action onto one another. Each actor argues that another group holds the real power or should act first, creating a cycle of passivity and delaying meaningful change. This theoretical model vividly summarizes how diffusion of responsibility perpetuates collective inaction, leading to

inadequate follow-through on the Kunming-Montreal Global Biodiversity Framework at the practical and operational level.

The evolution of human civilization and development of society is accompanied by the progress of the division of labor and growth of information, especially since the beginning of the information era. In such progress, individuals is more and more educated and trained with specific knowledge in more segmented domains rather than by general education, which leads to the non-voluntary diffusion of responsibility in the social level. Diffusion of responsibility is a concept in the field of social psychology, describing a phenomenon where people are less likely to take responsibility for their actions or inactions when others are present, which is known as the bystander effect. In a larger context, i.e., at the societal level and even the whole world, the bystander effect is easily and commonly observed, when it comes to the sustainable development topics. The Triangle of Inaction is one example.

The spiral of Inaction is another theory that explains the current inaction situation towards climate change fact at the societal level by mentioning four logical steps (Bouman et al., 2022). The theory is specifically about climate action, but it is applicable to actions to halt biodiversity loss. First, climate action of biodiversity action may well threaten people's or a group of people's value, leading to "value conflicts". This "value conflict" can be interpreted as monetary or economic value and, apparently, relatively short-term value. Second, the motivated people may not know the means to make change, or they can also be faced with huge obstacles to taking real actions. Third, when people make decisions, one may not take the impact of the choices into consideration. Undeniably, people making decision can be the situation that individuals make choices on the consumption or purchase, but it can also be the decision maker either in the companies or the governments. In such context, only lack of awareness and knowledge and the bystander effect can explain the behavior of not taking into consideration the impact of the choices. Fourth, inaction may be contagious, meaning that after observing inaction, one can be encouraged to stay in inaction. Again, "one" can be both individuals and companies and governments. The diffusion of responsibility is not only observed at individual

level, but the companies always conduct benchmark activity to compare themselves to their direct or indirect competitors and even sometimes the leader in other fields to determine their own strategy or action plan. In this way, the inaction or ineffective or inefficient green-washing initiatives of the largest or the most prestigious companies are very likely to be considered as "good" references for their industry and their value chain. Such companies are very influential, and thus, the inaction or "canny" way of action would be passed throughout the whole private sector.

Taking responsibilities and starting meaningful actions

Taking responsibility seems not a trendy or fashionable world in today's world of consumerism and hedonism. However, the human being's economic activities have already passed the boundaries and limits within which we could say that our operations are sustainable and safe, as illustrated by the Planetary Boundaries theory (Richardson et al., 2023).

Taking responsibilities is based on the fact that an individual or decision maker, either in companies or governments, is aware of the status quo, not only about climate change or biodiversity loss, but more importantly, the relationship between human activities and the climate and biodiversity and ecosystem services, as commonly perceived in the dependency and impact pathways. The Triangle of Inaction Theory underscores the importance of education and raising awareness, believing that education and knowledge can break up the triangle of inaction.

However, as depicted in the Spiral of Inaction, one (individuals or companies) can still stay inactive due to many reasons, e.g., lack of interests, inaction of others, etc. (Decathlon, 2024) Therefore, being aware of the sole climate change or biodiversity loss information may not necessarily lead to actions. Taking meaningful actions is based on the comprehensive knowledge of human beings' or companies' dependency and impact on biodiversity.

Furthermore, the Governments (the State / public authorities), as one actor in the Triangle of Inaction Theory and a crucial functioning part of the whole society, should definitely take their own responsibility. Spiral of Inaction Theory states that

the governments and businesses can more easily overcome the barriers for individuals (Bouman et al., 2022). Indeed, the governments and companies are more exposed to the fact of dependency and impact and the relevant pathway information. Together, the Governments and the Private sector shall act in duo to tackle the urgent environmental problems that the world is facing. The Governments (the State / public authorities) should proactively make effective new laws and regulations with rigorous implementation in reality to enforce the change in the whole society (Mair et al., 2024), and the Private sector should follow the laws, regulations, and standards comprehensively, but not only convert the sustainability action into superficial marketing and communication activities, without taking any substantial actions.

Conclusion

Addressing the implementation difficulties faced by the private sector to meet the KMGBF targets requires breaking the cycle of diffusion of responsibility and collective inaction. Governments and intergovernmental bodies play a pivotal role by setting robust legal frameworks and holding businesses accountable. Yet companies themselves must move beyond symbolic gestures, adopting transparent reporting and science-based targets that demonstrate genuine progress. Overcoming this collective inaction demands clear regulations, consistent enforcement, and a broader cultural shift that values genuine biodiversity conservation over short-term gain. Ultimately, a collaborative effort - coupled with greater awareness of the real impacts of inaction - is essential to reverse the current trend.

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The ecological impact of *Thalia dealbata* in China: A non-native species analysis

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Abstract: *Thalia dealbata* (T. dealbata), commonly known as powdery alligator-flag, is an aquatic plant native to the southeastern United States, recognized for its environmental and ornamental significance. However, its introduction to China has sparked concerns due to its dominance, resilience, and unique pollination mechanisms, which may pose risks to local ecosystems. This paper examines the current status of T. dealbata in China, assessing its impact on biodiversity and ecosystem dynamics. Through a comprehensive review of existing literature and field observations, we assess the invasive potential of the species and classify it as a species of "high invasive risk" in China. Additionally, we propose further research into the ecological impacts of its unique pollination mechanism and have set up plausible methods of measuring the potential consequences that the mechanism may have on local food chains and biodiversity.

Key words: *Thalia dealbata*, invasive species, non-native species, aquatic plant, biodiversity, pollination mechanism

Francine Hou. The ecological impact of *Thalia dealbata* in China: A non-native species analysis. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

1. Introduction

Thalia dealbata (T. dealbata), commonly known as powdery alligator-flag or powdery thalia, is a species of aquatic plant native to the southeastern United States. As a valuable plant, the *Thalia dealbata* has both environmental and ornamental value (Chang et al., 2024). However, the dominance and resilience of the plant, paired with its unique pollination mechanism, has raised concerns about potential ecological harm

from this non-native species in China. This paper aims to explore the status of T. dealbata in China and its implications for local biodiversity and ecosystem management.

2. Background

T. dealbata is a perennial herbaceous species within the Marantaceae family, commonly known as the powdery alligator-flag, hardy canna, or powdery thalia.

2.1 Morphological Characteristics

The emergent aquatic plant reaches a height of 100-250 cm, with foliage spanning 60-150 cm. The leaves are ovate-lanceolate to oblong, with dimensions of 20-50 cm in length and 10-20 cm in width, and exhibit a hard, papery texture. The leaf surface is gray green with purple edges, and the entire margin is smooth. The dorsal surface of the leaves is covered in a waterproof white powder. (North Carolina Extension Gardener Toolbox)

The flowers of this plant are arranged in sessile pairs and exhibit zygomorphy. Each flower has three purple-colored sepals, and three petals fused at their base. They are in bloom through the months of May to September with fruits throughout the summer (Powdery Thalia, United States Department Of Agriculture Natural Resources Conservation Service). Once the fruits turn brown, seeds can be collected from its thin shell.

2.2 Reproduction

As a plant in the Marantaceae family (Wilson & Morrison, 2000), the T. dealbata is capable of a specialized pollination method known as explosive secondary pollen presentation. This mechanism relies on the sensitivity of the flower stamen and style (Aruli & Reddi, 1995), where vigorous movement triggered by a pollinator would cause the style to be thrusted forward, depositing pollen onto the pollinator. Adapted to this mechanism, the pollen grains of the T. dealbata are smooth and large as this increases the surface area touching the stigma (Kennedy, 1978). This mechanism serves two purposes: pollen deposition, where the sudden action forces the pollinator into contact with the anthers, depositing pollen onto its body; and pollen collection, where the motion facilitates the retrieval of pollen from the pollinator, ensuring cross-pollination.

The mechanism is advantageous for the plants because it maximizes the efficiency of pollen transfer while minimizing the amount of wasted pollen. Additionally, it ensures that only the right pollinators - typically specific bee species - trigger the pollen transfer (Davis, 1987), ensuring high reproductive success in the competitive ecosystems in which they natively inhabit.

The effects of this pollination method on foreign environments will be explored later.

2.3 Native Habitat and Distribution

In its native range, T. dealbata is found in the southeastern United States, primarily in states such as Florida, Louisiana, and Texas. (Flora of North America)

The plant typically thrives along rivers and lakes where the soil contains high levels of organic matter and can tolerate nutrient levels similar to those found in wastewater from typical single-family home septic systems (Powdery T., United States Department Of Agriculture Natural Resources Conservation Service). This tolerance makes it extremely adaptable and able to thrive in areas not suitable for the growth of other more sensitive species, thus potentially creating a threat of invasion.

3. Introduction to China

Although it is unclear what the original means of introduction of the T. dealbata to China was, it is likely due to its ornamental or environmental value, especially in purification and pollution control (Chang et al., 2024). The plant tolerates acidic, alkaline, and water-logged soils and requires very little maintenance. Its adaptability to a range of climates and ability to thrive in and improve eutrophic waters have made it a valuable addition to artificial wetlands and urban landscaping projects in China (Li, 2021), especially with the growing trend of urban greening.

That said, China's booming economy and rapid urbanization is resulting in an invasive species crisis (Ding etc., 2008), with a rapidly growing population of these resilient, highly reproductive plants in the southwestern and eastern regions in particular (Yan etc., 2014). With the increasing change in climate, the distribution of these alien aquatic plants is reaching higher altitudes and larger regions, sharpening the threat of invasive species (Wu & Ding, 2019). Although the plants may have originally been introduced for their beneficial ornamental or environmental value, the research on the long-term effects of certain non-native plants has not been made enough to determine the net benefit of its introduction. Thus, it is imperative that steps are to be taken to assess the invasive risk of aquatic non-native species like the T. dealbata.

4. Positive Ecological Impacts

The T. dealbata, like many other non-native aquatic plants, can bring both immense ornamental and restoration uses. They are a great addition to gardens and lakes with their large round leaves and vibrant purple flowers. Additionally, the functional uses of its planting are abundant and beneficial to environmental conservation and restoration efforts.

4.1 Purification

The T. dealbata has been referenced in several studies for its effectiveness in purifying polluted water. This includes the removal of excess Phosphorus through the synthesis of biochar microspheres derived from T. dealbata (Cui etc., 2016), and the

remediation of cadmium-containing soil, which would otherwise produce toxic rice if planted directly (Genchi etc., 2020), by intercropping it between rice (Ni etc., 2024). The ability to restore polluted soil is especially rewarding for agricultural production and can enhance the efficiency of land use, providing economic benefits to the area as well.

Nitrogen pollution is another severe environmental hazard that requires improvement. For example, the excess nutrients degrade soil and create dead zones through eutrophication of surface waters. Luckily, T. dealbata has also been found to have the highest efficiency in total nitrogen removal compared to several others when planted in constructed wetlands (Wu etc., 2021), thus making it an effective and natural way of managing nitrogen pollution.

Studies have examined the allelopathic effects of T. dealbata and other macrophytes on cyanobacteria (Zhang, 2011), using the aqueous root extracts of the plant. Biochemical analyses of the samples showed that exposure to the extract reduced the ability of the cyanobacteria to proliferate, likely due to the lipid peroxidation of the cyanobacteria which damages the cell membrane and other key parts of the structure. The study was concluded with a confirmation of the use of macrophytes like T. dealbata to support ecological restoration.

T. dealbata has been demonstrated to offer the benefits of water purification, waste biomass utilization, and increased productive land use, allowing for more agricultural productivity for the area.

These research results have been applied in a Nanping sewage facility (Li, 2021) and the plant has been found in lining artificial reservoirs and wetlands.

5. Negative Ecological Impacts

5.1 Effects on Native Flora

Previous research on the competition that the T. dealbata brings to the local ecosystem has found that not only is the plant “highly aggressive” but also very reproductive and holds “high risk of invasion” (Li, 2021). T. dealbata has also been tested to be able to withstand two months of storage at zero degrees Celsius, making it a very tenacious

and adaptable plant. Such resilience makes it a threat to local species as it will rapidly expand in population and create high competition for resources in the area (Gioria, 2023). Ultimately, this results in the loss of biodiversity and the domino-effect of a deteriorating local ecosystem.

There has also been incidence of T. dealbata plants in Hungary exhibiting a growing Sugarcane mosaic virus infection (Agoston, 2023), a plant pathogenic virus that causes the destruction of chlorophyll and thus hinders the growth abilities of sugarcane plants (Lu etc., 1984). Although it is the first and only case of such infection, the possibility of more undocumented cases is not negligible and could further pose threats to the local plant population. If such infected species were to be planted in alternation with rice as a method of reducing cadmium levels in the soil (previously mentioned above), it would pose severe risks to the entire crop.

5.2 Effects on Fauna

The plant's unique explosive pollination mechanism that, while well-adapted for its native ecosystem, may have ecological consequences in its new environment that warrant closer examination. The T. dealbata flowers are structured in a manner that can inadvertently trap visiting pollinators, often leading to smaller insects being trapped and starved to death within the floral tube. This phenomenon poses a significant concern for native pollinator populations (Beth Chatto) and may be a detriment to local plant diversity. The scarcity of pollinators, an issue that has already plagued the globe due to pollution and rapid urbanization, would reduce the number of plants that can successfully reproduce sexually through natural pollination. This in turn reduces seed production, hinders plant regeneration and triggers a cascading effect throughout the food web (Johnson etc., 2002). This collapse of the food chain may also occur directly. If too many small insects - that are typically prey for other water-residing organisms - are unintentionally trapped and killed by T. dealbata, it results in a decline in population of these insects, leading to higher competition for food resources for secondary consumers. In worse case scenarios, this pattern will continue up the food chain, affecting all organisms in the local ecosystem. As a result, the balance of the local ecosystem is disrupted and a loss in biodiversity ensues. The

lack of biodiversity is well-known in the scientific community for altering ecosystem productivity and destabilizing the stability of the ecosystem. If the T. dealbata has the potential to become a dominating plant in the area, the scenarios above are worthy of noting.

6. Invasive Potential

Although the T. dealbata has yet to be identified as an invasive species by major environmental agencies, regional studies in the British Isles and areas in China have identified it as having moderate ecological risk and invasive potential.

The plant also holds a score from the Australian Weed Risk Assessment (Gordon, 2010) index much higher than its cutoff of 6, making it a species of high invasive risk (Chen & Ding, 2011). Perhaps a lack of consensus is what prevents the plant from receiving a formal and universally recognized level of risk.

7. Conclusion

While further research is needed to fully understand its long-term impacts, initial observations suggest that this non-native species has the potential to alter local ecosystems through its resistance and adaptability to extreme temperatures and environments. Unfortunately, the author has yet to find research or information on the effects of the explosive style mechanism on the local insect population and pollination status, but the author hopes that other researchers could one day gain the opportunity and resources to complete a full study and reach a conclusion on said issue. This would include measuring the number of insects that can perish in a sprig of T. dealbata within a period of time and the species that are particularly vulnerable to the trap. With a more measurable account of the potential damage done by the plant's pollination mechanism within non-native ecosystems, it would be much easier to assess the overall risk of the plant. Until further research can be made, the T. dealbata should be deemed a species of "high invasive risk" in China due to the compelling risk identification mechanism found in this previous 2011 risk assessment paper: (Chen & Ding, 2011). The author hopes that more studies can be made regarding T.

dealbata and other non-native plants in China as its current prominence in local green infrastructure could potentially lead to an abundance of unintended consequences.

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China's Green Code for Fighting Plastics: To end plastic pollution and fight for a better future

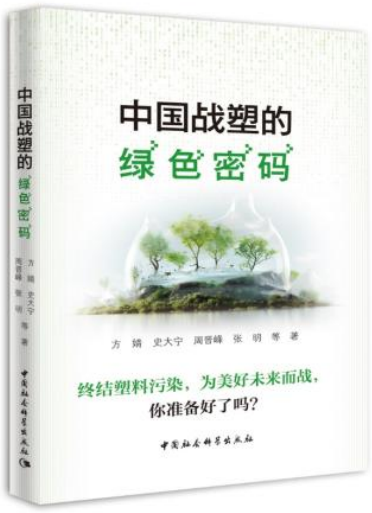
By WANG Xiaoqiong[1], WANG Jing[1]

(1.China Biodiversity Conservation and Green Development Foundation)

Abstract: The book *China's Green Code for Fighting Plastics* was co-authored by Zhejiang University of Science and Technology, China Biodiversity Conservation and Green Development Foundation, Ecological and Environmental Publicity and Education Center of Zhejiang Province, Hangzhou Research Institute of Chemical Industry and other institutions, and was published by China Social Sciences Press in November 2024. Coinciding with the convening of the fifth session of the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment (INC-5), it seems to be a fateful encounter, and it is also a strong response to China's consensus and actions to deal with plastic pollution. It is hoped that this book can enable readers to have a better understanding of plastics, their pollution and governance, and take actions, starting with the small "reducing plastics consumption" and "picking up plastic waste" around them, to accumulate momentum and energy to end plastic pollution and move towards a better green future.

Key words: Plastic pollution, microplastics, INC-5, Peoples vs. Plastics

WANG Xiaoqiong, WANG Jing. *China's Green Code for Fighting Plastics*: To end plastic pollution and fight for a better future. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065


中国战塑的
绿色密码
方 婧 史大宁 周晋峰 张 明 等 著
终结塑料污染，为美好未来而战，
你准备好了吗？

Dr. Zhou Jinfeng, Fellow of World Academy of Art and Science, and Executive Committee Member of The Club of Rome, innovatively put forward the theory of "Human-based Solutions", "Three Axioms of Pollution Treatment" and "Four Principles of Ecological Restoration", and Biodiversity Conservation in Our Neighborhood (BCON), "Carbon Equality" theories, etc.

Three-leaf derris and mangroves are mutually exclusive and mutually beneficial, and the protection is not a life-and-death struggle

By ZHOU Jinfeng

(Fellow of the World Academy of Art and Science)

Abstract: This article is based on the author's rich experience and thinking in frontline wetland surveys for many years, and shares his views on whether three-leaf derris will affect mangrove protection. This article believes that the three-leaf derris is a local species, and there is a mutual growth and restraint between it and mangroves. Mutual growth and restraint are inevitable laws in nature and are natural laws. This article emphasizes that the core of protection in the context of ecological civilization is to minimize and reduce human interference and damage as much as possible.

Key words: Three-leaf derris, mangrove, nature, biodiversity

ZHOU Jinfeng. Three-leaf derris and mangroves are mutually exclusive and mutually beneficial, and the protection is not a life-and-death struggle. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065

In early November 2023, ZHOU Jinfeng and ZHAO Derun went to Beihai, Guangxi to explore mangrove protection

Rhizophora stylosa Griff. in the mangroves of Jinhai Bay, Beihai, Guangxi. Photo: ZHOU Jinfeng.

The Motivation of Process Poetics: The literary imagination from global citizens

By BAI Ya

(Founder of process poetics)

Abstract: The contemporary issues facing global citizens are not only political, economic, and technological issues, but also ethical, philosophical, and poetic issues. In a narrow sense, process poetics is a school of poetry that leads the poetic consciousness in the era of ecological civilization. In a broad sense, it is a practice of poetry education that undertakes the responsibility of global citizens and the new mission of the times. From the motivation and imagination of process poetics to the practice of process poetry education, it is deeply influenced by the background of the times and is a need for the new mission of the times. This article briefly describes the influence of the power of the times on the motivation of process poetics from the perspectives of ecology, technology, and psychology.

Key words: Process poetics, process poetry education, AI poetry, ecological civilization

BAI Ya. The Motivation of Process Poetics: The literary imagination from global citizens. BioGreen - Biodiversity Conservation and Green Development. Vol. 1, January 2025. Total Issues 72. ISSN2749-9065