



共同应对海运集装箱生物安全风险

Jointly Address The Biosafety Risk of Sea Container

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背景

Background

集装箱自20世纪60年代问世以来，极大地促进了交通运输和全球货物贸易的发展。当今全球贸易货值80%以上的货物使用集装箱运输，2023年全球海运物流链在国际间运送集装箱达到2.5亿次。集装箱的高流动性、重复使用性以及自身的结构特点，使得有害生物伴随其装载的货物传遍全球。海运集装箱运输带来的生物安全风险引起了国际社会的广泛关注。Since the advent of containers in the 1960s, it has greatly promoted the development of transportation and global trade. More than 80% of the goods transported in containers, and the global marine logistics chain will transport 250 million containers internationally in 2023. The high mobility and reuse of containers make the biosecurity risk factors they carry spread around the world like the cargo they load. The biosafety risk caused by sea container transportation has attracted extensive attention from the international community.

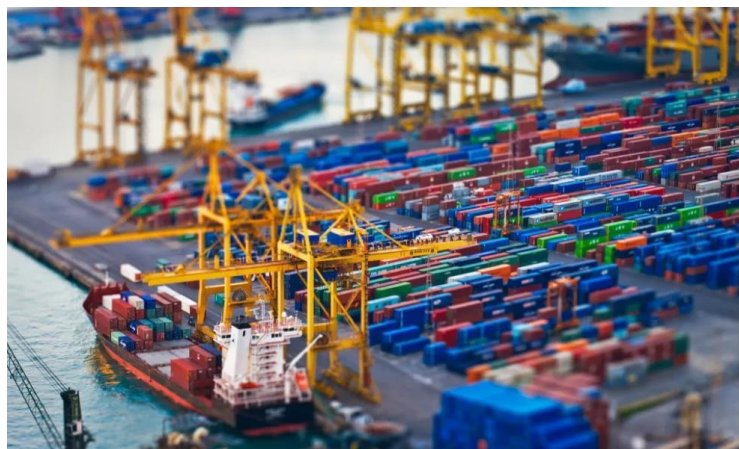


第一部分 PART I

集装箱的生物安全风险不容忽视
The Bio-safety risk of container cannot be ignored



（一）植物有害生物是出入境集装箱的主要生物安全风险



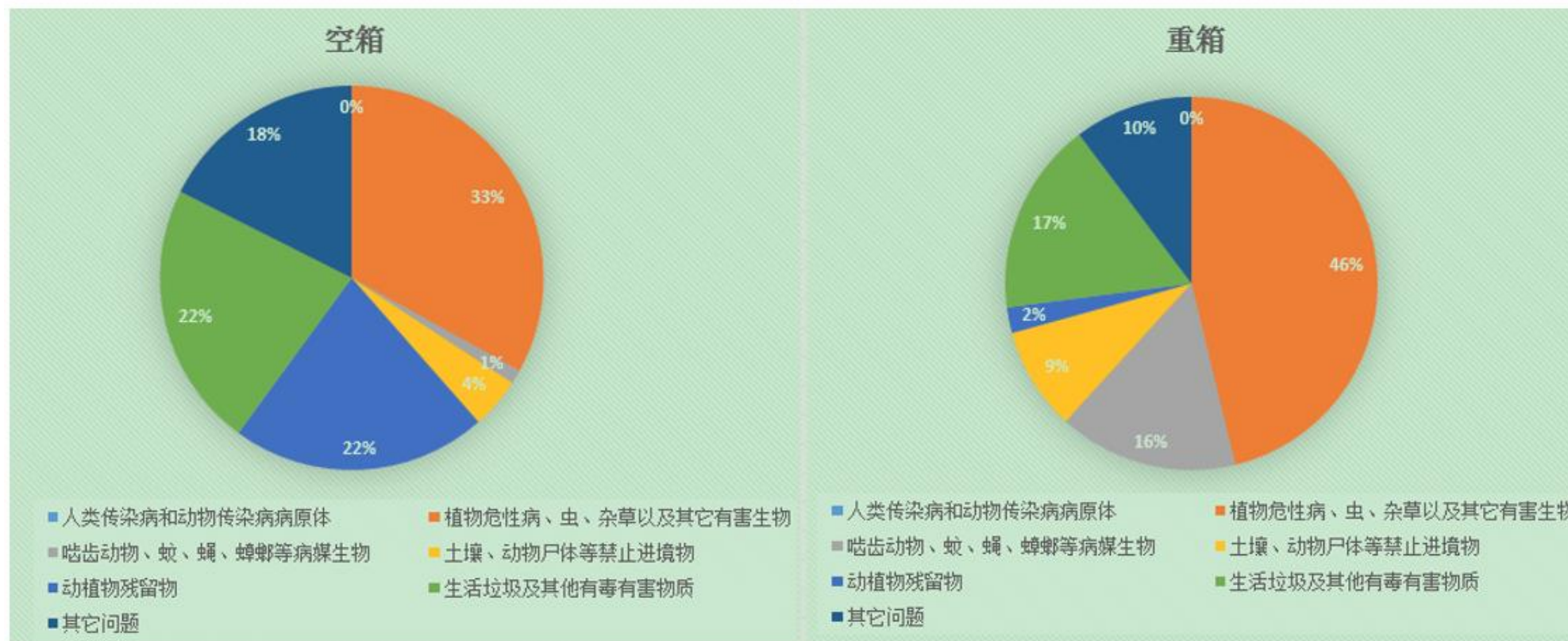
FAO把与人类、动植物生命和健康以及环境相关的风险统称为生物安全风险。集装箱是一类涉及植物检疫、动物检疫和卫生检疫多个检疫门类的高生物安全风险水平的物品。我国自2000年就开始关注集装箱生物安全风险，把出入境集装箱的生物安全风险因子分为6类：人类或动物传染病、病媒生物、植物有害生物、动植物检疫禁止进境物、动植物残留物、生活垃圾及其他有毒有害物质。

FAO refers to risks associated with the environment , human life, animal and plant health as biosafety risks. Container is a kind of conveyance with high bio-safety risk related to phytosanitary, animal quarantine and health quarantine. Since 2000, China has been concerned about the biosafety risk of containers. China divided biosafety risk factors of containers to six categories: human or animal infectious diseases, vectors, pest, animal and plant quarantine prohibited entry object, animal and plant residues, waste and other toxic and harmful substances.



（一）植物有害生物是出入境集装箱的主要生物安全风险

Plant pests are the main biosafety risk of sea containers



2017年进境集装箱检出生物安全风险因子的种类情况分析

Analysis of types of biosafety risk factors detected in inbound containers in 2017



红火蚁 (*Solenopsis invicta*)

以红火蚁为例，红火蚁是全球100种最具破坏力的入侵生物之一，由于食性复杂、习性凶猛、繁殖迅速、竞争力强，入侵后易在短时间内暴发成灾，对入侵区域的农林业生产、人体健康和生态环境等造成严重危害。

Taking *Solenopsis invicta* as an example, *Solenopsis invicta* is one of the 100 most destructive invasive species in the world. Due to its complex diet, aggression habit, rapid reproductive rate and strong competitiveness, it is easy to become disasters in a short time after invasion, causing serious harm to agricultural production, human health and ecological environment in the invaded area.





红火蚁 (*Solenopsis invicta*)

危害农林业生产，红火蚁可危害农林植物，其危害方式包括取食种子，降低出苗率；破坏根系、嫩茎、嫩芽，影响植株长势；危害果实，造成畸形、腐坏等。红火蚁还会咬蜇畜禽，造成畜禽体表出现大量脓包，甚至会蜇死幼小畜禽，降低存活率。

Harm agricultural and forestry production.

Solenopsis invicta can harm agricultural and forestry plants by feeding on seeds and reducing seedling rate. Destroy root system, stem, bud, which affect plant growth; Harm the fruit, cause deformity, spoilage and so on. *Solenopsis invicta* will also bite and sting livestock, resulting in a large number of pus on the body surface of livestock, and even kill young livestock, reducing the survival rate.

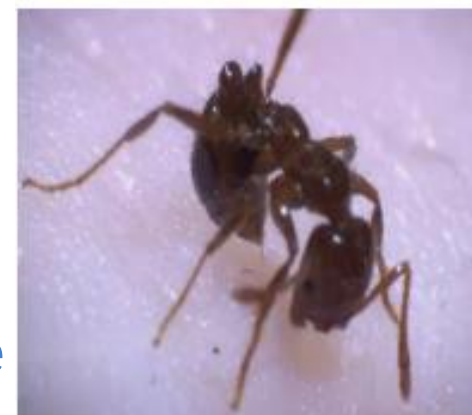




红火蚁 (*Solenopsis invicta*)

危害人体健康，若其入侵住房、学校、草坪等地，与人接触的机会较大，叮咬现象时有发生。被红火蚁蜇刺后，多数人仅感觉疼痛、不舒服，少数人可能会出现头晕、发热等症状，严重时会产生过敏性休克，不及时医治甚至有死亡的危险。

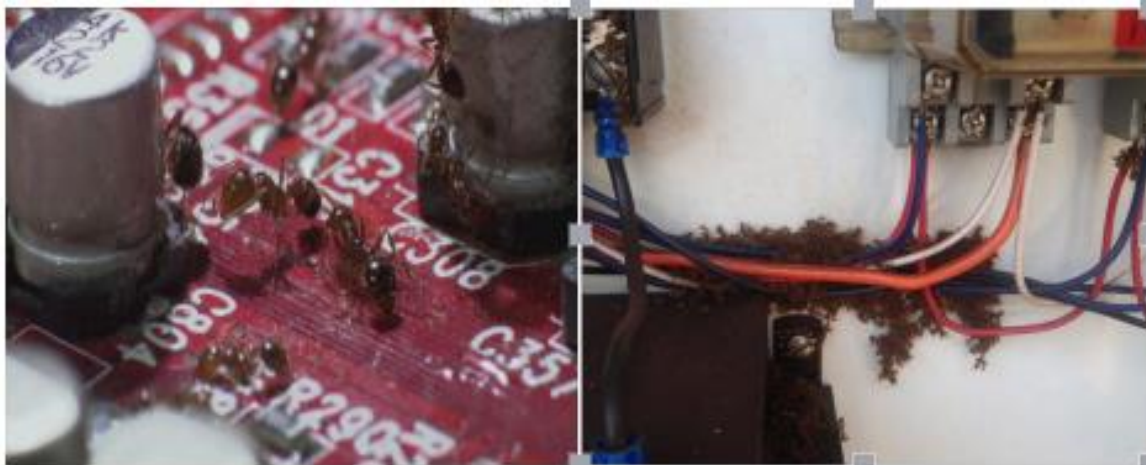
Harm the human health. If it invades houses, schools, lawns and other places which is easy to contact and bite the people. After being stung by *Solenopsis invicta*, most people only feel pain and discomfort, a few people may have dizziness, fever and other symptoms, and in serious cases will produce anaphylactic shock, and even the risk of death if not treated in time.





红火蚁 (*Solenopsis invicta*)

危害电器设备，红火蚁易受到电器热量或电磁波的吸引，在电表、通讯设备箱等电器设备中筑巢，会咬坏电线，造成电线短路、设备故障，影响人类生产生活和公共安全。经常造成电线短路甚至引发小型火灾。



Harmful to electrical equipment: *Solenopsis invicta* are easily attracted by electrical heat or electromagnetic waves, and build nests in electrical equipment such as electricity meters and communication equipment boxes, which will bite wires, cause wire short circuit and equipment failure, affecting human production and life and public safety. It often causing short circuits and even small fires.



红火蚁 (*Solenopsis invicta*)

危害生态环境，红火蚁入侵后会与本地物种竞争，攻击地栖性昆虫、鸟类等，明显降低其他生物的种类和数量，影响生物多样性，破坏生态系统稳定性。同时为防控红火蚁而大量使用化学农药，也会造成一定程度的环境污染。

Harmful to the ecological environment. After the invasion of *Solenopsis invicta*, they will compete with local species, attack terrestrial insects, birds, etc., significantly reduce the variety and quantity of other organisms, affect biodiversity, and destroy the stability of the ecosystem. At the same time, a large number of chemical pesticides are used to prevent and control *Solenopsis invicta*, which will also cause environmental pollution to a certain extent.





（二）空箱是出入境集装箱生物安全风险的关键控制点

Empty container is the key control point of biosafety risk of sea container

集装箱物流链非常复杂和敏感，集装箱运输和供应链运作效率影响每个国家乃至全球的经济表现，所涉及的利益相关者呈现全球化和多行业的特点，各国政府和集装箱运输所涉及的不同行业都被包括其中。集装箱运输本身是非农业途径，集装箱国际生物安全风险控制需要广泛参与和沟通，并着重分析物流链的运作模式与风险的关系，从而找到关键控制点。

The container logistics chain is very complex and sensitive, container transport and supply chain operation efficiency affects the economic performance of each country and even the world. The stakeholders involved are global and multi-sectoral.

Governments and the different industries involved of container transport are all included. Container transport is a non-agricultural route. The international biosafety risk control of containers requires extensive participation and communication. It need to focuses on analyzing the relationship between the operation mode of the logistics chain and the risk, to find the key control points.



（二）空箱是出入境集装箱生物安全风险的关键控制点

Empty container is the key control point of biosafety risk of sea container

目前国际集装箱物流链的运作模式是在载货前清理集装箱。重箱在入境前已经过必要的清洁，而空箱要到入境后重新载货前才会得到清理。空箱运输的路线更长更复杂，在运输和存放过程中还可能被多次污染。空箱在前一次使用卸货后和堆放期间的清洁和管理没有保障，故而空箱的生物安全风险更高。能否促进集装箱物流链流程再造让空箱在卸货后或运输出境前得到清理是控制集装箱国际生物安全风险的关键。

The current operation system of the international container logistics chain is to clean the container before loading the cargo. Heavy container have been cleaned before entry, while empty container will not be cleaned until they are re-loaded after entry. The route of empty container transportation is longer and more complex, and it may be contaminated many times during transportation and storage. There is no guarantee of cleaning and management of empty containers after the previous use and during stacking, so the biosafety risk of empty containers is higher. The key to control the international biosafety risk of containers is to promote the process reengineering of container logistics chain so that empty containers can be cleaned after unloading or before being transported abroad.



（二）空箱是出入境集装箱生物安全风险的关键控制点

Empty container is the key control point of biosafety risk of sea container

在国际贸易中，大多数发展中国家大量出口资源密集型或劳动力密集型的产品，按需进口高附加值的科技产品或高端消费品。发展中国家在集装箱物流链中普遍呈现出口重箱明显多于进口重箱，大量进口空箱的态势。因而在集装箱物流链中，大量进口空箱让发展中国家面临更大的生物安全风险。

In international trade, most developing countries export a large number of resource-intensive or labor-intensive products, and import high value-added technology products or high-end consumer goods . Developing countries in the container logistics chain generally show that the export of heavy containers is significantly more than the import of heavy containers, a large number of imports of empty containers. Therefore, in the container logistics chain, a large number of imported empty containers make developing countries face greater biosafety risks.



(三) 近年我国空箱截获有害生物的情况

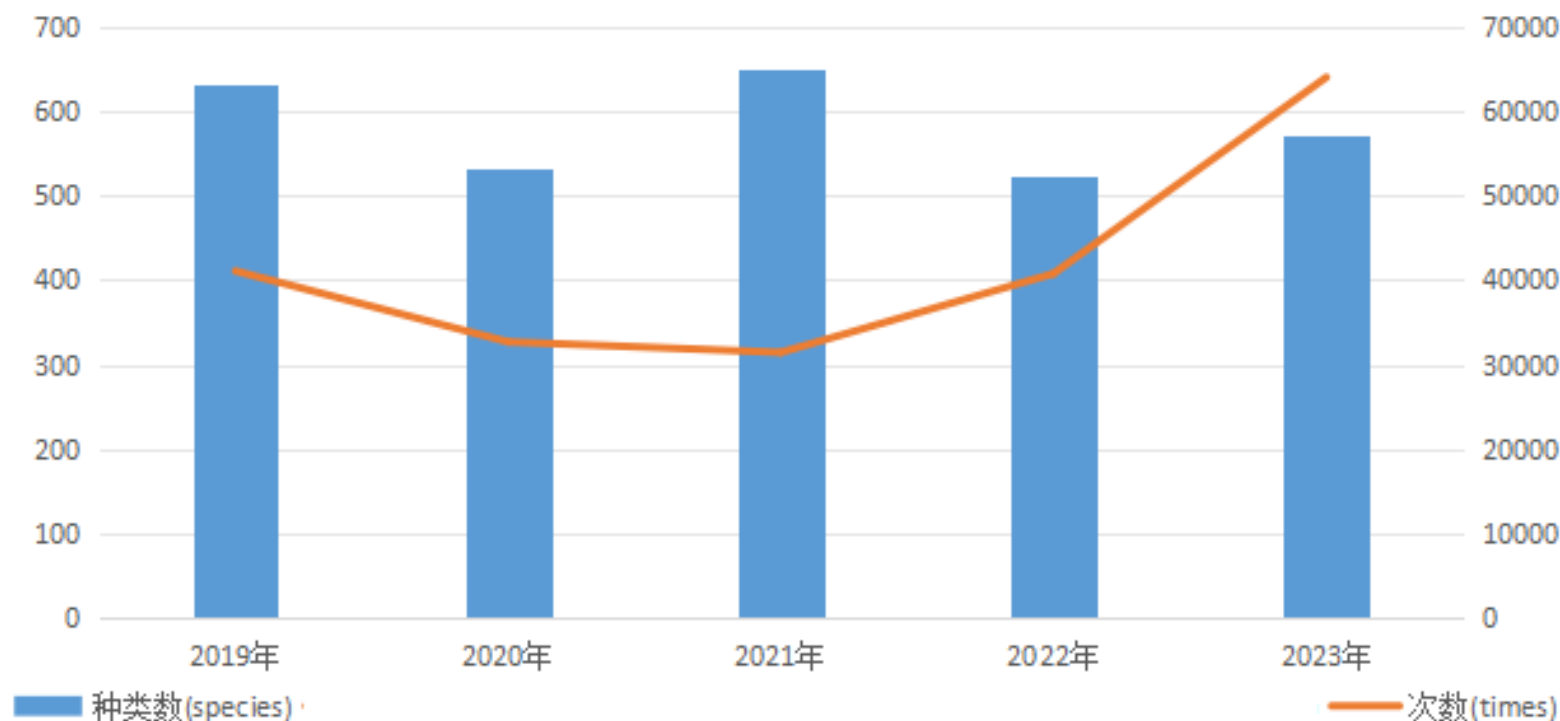
The interception of harmful organisms in empty containers in recent years.

2019-2023年，中国海关对进境空集装箱没有规定抽查比例，也没有统一布控，只由各口岸随机抽查，抽查比例极低。尽管如此各口岸在进境空集装箱中仍截获大量有害生物，共1997种，210236次。

In 2019-2023, China Customs had neither well-defined proportion of random checks on empty containers nor unified control. Only extremely low proportions of random checks were conducted at ports.

Nevertheless, a variety of pests (1997 species and 210236 times) in empty containers were intercepted at ports.

2019-2023年中国进境集装箱空箱有害生物截获种类数和次数
The species and the times of the pests intercepted in entry empty containers from 2019 to 2023





(三) 近年我国空箱截获有害生物的情况

The interception of harmful organisms in empty containers in recent years.

2019-2023年，中国各口岸在进境空集装箱中检出最多的有害生物排名依次是玉米象，赤拟谷盗，谷蠹，烟草甲，锯谷盗。其中共截获检疫性有害生物86种，661次。其中检出排名前十的检疫性有害生物依次为红火蚁、苍耳属（非中国种）、云杉八齿小蠹、四纹豆象、南方菟丝子、三裂叶豚草、刺蒺藜草、刺苍耳、豚草、假高粱（及其杂交种）。

From 2019 to 2023, The most pests detected were *Sitophilus zeamais*, *Tribolium castaneum*, *Rhizopertha dominica*, *Lasioderma serricorne* and *Oryzaephilus surinamensis*. 86 species and 661 times of quarantine pests were intercepted in empty containers at Chinese ports. The top 10 quarantine pests were *Solenopsis invicta*, *Xanthium* sp. (non-China species), *Ips typographus*, *Callosobruchus maculatus*, *Cuscuta australis*, *Ambrosia trifida*, *Cenchrus echinatus*, *Xanthium spinosum*, *Ambrosia artemisiifolia*, and *Sorghum halepense* (its hybrids).



(三) 近年我国空箱截获有害生物的情况

The interception of harmful organisms in empty containers in recent years.

2024年3月深圳、上海和宁波三个海关共同启动了海运集装箱全球生物安全风险因子监测和研究项目，在3、4月份随机检查1465个进境空集装箱，在其中来自亚洲、北美洲、南美洲、欧洲、非洲航线的135个空集装箱中截获货物残留物、昆虫、虫卵、种子和植物材料等190种次污染物，截获比例为9.2%。截获污染物的位置主要为内部底部、内部门板、内部背板、以及两侧的侧板。

In March 2024, the Shenzhen, Shanghai and Ningbo customs district jointly launched the global biosafety risk factors monitoring and research project of sea containers. During March and April, three customs district randomly inspected 1,465 inbound empty containers and intercepted 190 times of contaminations such as cargo residues, insects, eggs, , seeds and plant material in 135 empty containers from Asia, North America, South America, Europe and Africa routes. The interception rate was 9.2%. The locations where pollutants are intercepted are mainly the inner bottom, inner door panel, inner back panels, and side panels.



(三) 近年我国空箱截获有害生物的情况

The interception of harmful organisms in empty containers in recent years.

2024年3月17日，深圳海关隶属蛇口海关在来自斯里兰卡的空集装箱内部地板截获2kg的豆芽残留物，其中发现了玉米象、南苜蓿、青霉属、皱匕果芥，其中皱匕果芥在我国没有天然分布，属外来物种。

On March 17, 2024, Shekou Customs house intercepted 2kg of bean residues on the interior floor of an empty container from Sri Lanka, which found *Sitophilus zeamais*, *Medicago polymorpha* L., *Penicillium* sp., *Rapistrum rugosum*. *Rapistrum rugosum* has no natural distribution in China which is an exotic species.





（三）近年我国空箱截获有害生物的情况

The interception of harmful organisms in empty containers in recent years.

2024年4月28日，深圳海关隶属蛇口海关在来自新加坡的空集装箱内部地板截获1kg的动植物材料，发现了油菜籽、红火蚁、锯谷盗、毛雀麦、田旋花、鹤虱、狗尾草、青霉属、莽麦蔓，其中红火蚁已被列入我国《重点外来入侵物种名录》。

On March 17, 2024, SheKou Customs house intercepted 1kg of plant and animal material on the interior floor of an empty container from Singapore , which found *Brassica napus* ,*Solenopsis invicta* ,*Oryzaephilus surinamensis*, *Bromus mollis*, *Convolvulus arvensis*, *Lappula myosotis*, *Setaria viridis*, *Penicillium sp.*, *Pteroxygonum giraldii*. *Solenopsis invicta* has been included in 《List of Invasive Alien Species for Key Management 》 .





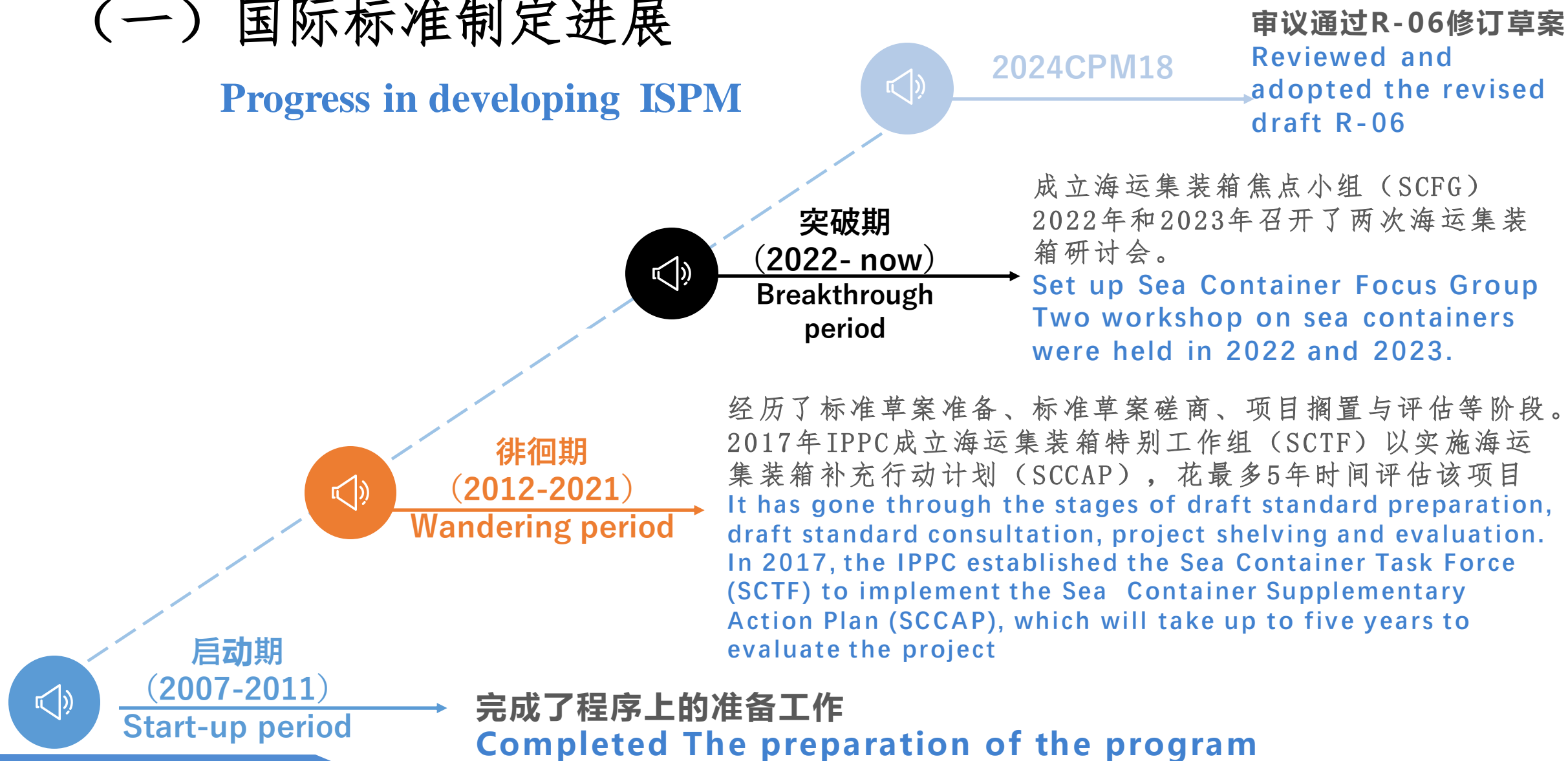
第二部分 Part II

海运集装箱国际植检标准制定
Developing International Standard for Phytosanitary Measures
(ISPM) of sea containers



(一) 国际标准制定进展

Progress in developing ISPM





（二）国际标准亟待出台 **ISPM is urgently needed**

目前中国及国际上多家企业进行了集装箱设计改造的尝试。在过往集装箱设计与改造小组也专门开会进行讨论，一致认为集装箱使用新型地板和通风口等设计，应会具有良好的效果，同时在研讨会上新设计引起了行业内多家公司的广泛兴趣。

At present, many enterprises in China and the world have carried out the attempt of new container design. In the past, the container design subgroup also discuss and agreed that the use of new floor type and vent designs for containers should have a good effect, and at the same time, the new design attracted wide interest from the industry.



(二) 国际标准亟待出台 ISPM is urgently needed

IPPC也注意到集装箱设计改造的积极意义，鼓励各国NPPO联合业界开展监测、研究和验证。2023年6月底IPPC秘书长Osama El-Lissy先生专门写信给海关总署动植检司司长王益愚，希望中国能够发挥集装箱最大进出口国和最大生产国的优势，积极参与这项工作。

The IPPC also noted the positive significance of container design and encouraged NPPO industry to carry out monitoring, research and validation. At the end of June 2023, Mr. Osama El-Lissy, Secretary General of IPPC, wrote a letter to Wang Yiyu, Director General of the Department of Animal and Plant Quarantine of GACC, hoping China can play the advantages of the largest import and export country and the largest producer of containers to actively participate in this work.



الاتفاقية الدولية
لوقاية النباتات
国际植物
保护公约

International Plant
Protection Convention
Convention internationale
pour la protection des végétaux

Международная конвенция по
карантину и защите растений
Convención Internacional
de Protección Fitosanitaria

Rome, 11 July 2023

Dear Mr Wang Yiyu,

On behalf of the IPPC, I wish to express our highest greetings and appreciations to you and to the General Administration of Customs of the People's Republic of China (GACC).

As you may be aware, the IPPC community has been diligently working for more than 10 years to develop global solutions for minimizing plant health risks associated with the international movement of sea containers. In line with this objective, the IPPC established a Sea Container Focus Group (SCFG) in 2022 to identify viable options for risk management and provide recommendations to the Commission on Phytosanitary Measures (CPM).

To further our efforts, an international workshop is scheduled to take place in Brisbane, Australia in July 2023. The workshop aims to build upon the outcomes of the 2022 London workshop, which focused on reducing the introduction of pests through the sea container pathway. A number of representatives from China, including Ms Guanghao Gu from GACC, will be attending the workshop. Outcomes of this workshop will contribute the SCFG's recommendations on potential development of long-term IPPC guidance on sea containers, to CPM-18 in 2024.

The SCFG has been tasked with investigating potential improvements to container structures to minimize plant pest risks associated with the global movement of sea containers. This work aligns with the revised draft CPM Recommendation (R-06), which also highlights the need for evidence-based research to support considerations into modifications of existing container designs.

In this context, I have learned that representatives from China, Australia, the World Shipping Council (WSC), and China International Marine Containers (CIMC) have collaborated to develop a guideline (Annex) to support the proposed survey.

To:
Mr Wang Yiyu
Director General
Department of Animal and Plant Quarantine
General Administration of Customs of the People's Republic of China
People's Republic of China



（二）国际标准亟待出台 ISPM is urgently needed

行业主张的集装箱结构材质改造与设计应受到鼓励，这个尝试很有意义也很有效，市场应继续自发考虑更合适解决方案，但这并不是解决有害生物风险的根本办法。中国和很多发展中国家一样，更多地承受了来自进境空箱的有害生物风险，当前IPPC出台的政策工具在降低国际间调运空箱的有害生物风险方面显得无能为力。

China, like many developing countries, bears more pest risks from empty entry containers. But the existing policy tools issued by IPPC are powerless to reduce the pest risks in international repositioning of empty containers.

The material transformation and design of container structures advocated by the industry should be encouraged, this attempt is very meaningful and effective, and the market should continue to consider more appropriate solutions. But this is not a fundamental solution to the pests.



（二）国际标准亟待出台 ISPM is urgently needed

与其他目前公约现有的标准制定主题相比，海运集装箱运输所带来的有害生物风险和影响更明确更严重，制定国际植物检疫措施标准（ISPM）的需求更为迫切。但目前IPPC还没有重启制定ISPM的时间表。没有一个降低海运集装箱有害生物风险的ISPM，将很难在全球范围内实现国家植物保护机构（NPPO）对国际间调运空集装箱的进境检查和出境监管，从而空集装箱的有害生物风险难以得到控制。

The pest risks and impacts from sea containers are more clear and serious than IPPC current ISPM setting topic. There is a more urgent demand for drafting the ISPM, but IPPC has not yet restarted the timetable for drafting ISPM. Without an available ISPM specific to pest risks of sea containers, it will be tough for the National Plant Protection Organization (NPPO) to supervise the entry and exit of internationally repositioned empty containers, and hardly possible to control the pest risks from empty containers.



(三) 中国在国际规则制定中发挥的作用

China role in International rule setting



2016年4月中国代表参加ITF第2016年集装箱国际公约方大会
April 2016 China Delegate attending 2016 ITF Container Convention

November 2017, 1 SC APAC Meeting (Shanghai)
April 2016 China Delegate attending Special Session of Sea Container



（三）中国在国际规则制定中发挥的作用

China role in International rule setting

2023年中国成立了海关总署“海运集装箱植物检疫要求研究工作专家组”，强化集装箱植物检疫监管，积极参与IPPC应对集装箱有害生物风险的各项活动。

In 2023, GACC established the "Phytosanitary Requirements for Sea Containers Expert Group", strengthened phytosanitary supervision of containers, and actively participated in IPPC's activities to address the risks of pests in containers.

中华人民共和国海关总署动植物检司便函

动植物检司关于成立海运集装箱植物检疫要求研究工作专家组的通知

沈阳、上海、宁波、深圳海关，标法中心：

为保护我国生态安全，促进对外贸易发展，积极发挥我国在国际植物检疫标准制定中的作用，经研究，我司成立海运集装箱植物检疫要求研究工作专家组，组织开展国际植物保护公约（IPPC）海运集装箱焦点小组工作，具体要求如下：

一、工作目的

各单位要以习近平新时代中国特色社会主义思想为指导，积极践行人类命运共同体理念，贯彻落实总体国家安全观，在植物检疫全球治理中发挥推动和引领作用，扎实推进智慧海关建设和“智关强国”行动，全面强化集装箱植物检疫监管，切实筑牢国门生物安全防线。



第三部分 Part III

中国进出境集装箱检疫管理体系
Quarantine management system for inbound and
outbound containers in China



- 中国恪守IPPC缔约方责任，高度关注海运集装箱有害生物风险。2011年起派专人积极参与和跟踪IPPC海运集装箱有害生物风险应对工作，并在本国法律框架下积极作为，开展了扎实有效的工作，形成了具有中国特色的进出境集装箱检疫管理体系。
- China abides by its responsibilities as a contracting party of IPPC and always places its focus on pest risks associated with sea containers. Since 2011, China has assigned special personnel to participate in and track IPPC's activities against pest risks associated with sea containers, and actively advanced effective works under its domestic legal frameworks. A quarantine management system for inbound and outbound containers with Chinese characteristics has been formed



我国现有法律法规

Existing laws and regulations in China

2020年我国正式发布的《生物安全法》明确规定进出境集装箱应当符合我国生物安全管理要求。

In 2020, the Biosecurity Law of the People's Republic of China clearly stipulates that inbound and outbound containers should meet the requirements of biosafety management in China.

生物安全法发布

2020

Publish the Biosecurity Law of the People's Republic of China

2000年1月发布实施国家出入境检验检疫局第17号令《进出境集装箱检验检疫管理办法》，该办法涵盖了集装箱植物检疫、动物检疫和卫生检疫。在此基础上，规范了装运非法检货物的进出境集装箱和来自疫区空箱的检疫要求。

In January 2000, Order No. 17 of the C.I.Q was issued and implemented, "Regulations on Inspection and Quarantine of Entry And Exit Containers", which covered container plant quarantine, animal quarantine and health quarantine. On this basis, the quarantine requirements for entry And exit containers carrying illegal goods and empty containers from epidemic areas are standardized.

国家检验检疫局成立

1998

Establish the C.I.Q

我国与集装箱检疫有关法律

Before 1998

China's laws related to container quarantine

1987 颁布《中华人民共和国国境卫生检疫法》 1989 颁布《中华人民共和国进出口商品检验法》 1991年颁布《中华人民共和国进出境动植物检疫法》。

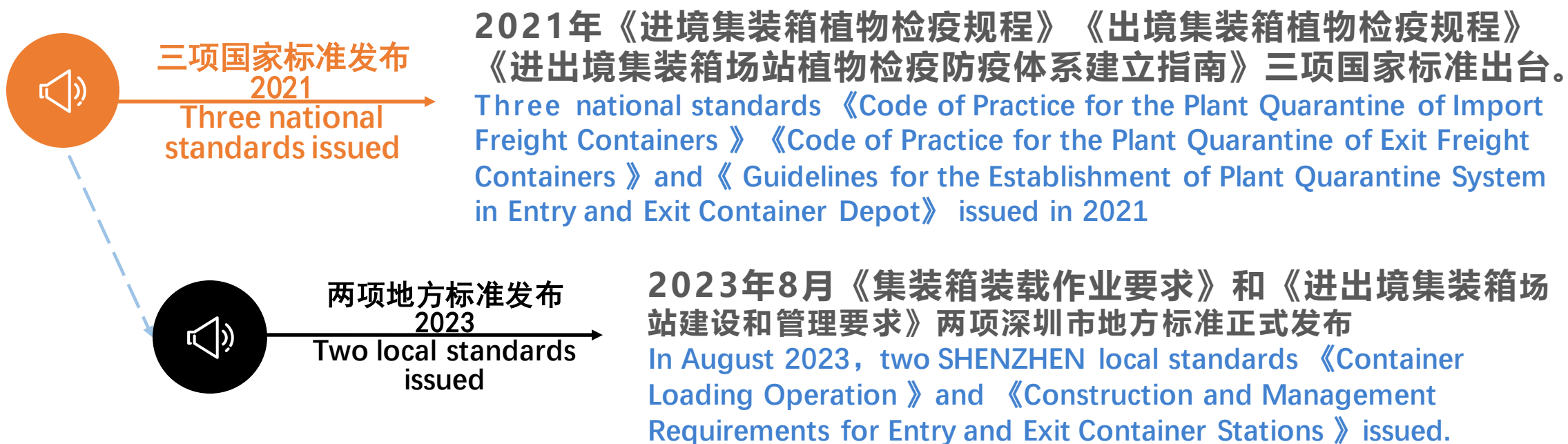
1987 《Frontier Health and Quarantine Law of the People's Republic of China》

1989 《Law of the Peoples RepuB/Lic of China on Import and Export Commodity Inspection》

1991 《Law of people's Republic of China on the Entry and Exit Animal and Plant Quarantine》



三项国家标准、两项地方标准 Three national and two local standards



5项标准基本形成了我国进出境集装箱植物检疫标准体系，涉及进出境集装箱植物检疫、场站建设、集装箱物流链上植物检疫防疫体系建立以及集装箱装载流程中的生物安全风险控制。

The five standards have basically formed the plant quarantine standard system for Entry And Exit containers in China, involving plant quarantine for containers, construction of depot, establishment of plant quarantine system on the container logistics chain, and biosafety risk control in the container loading process.



- 在全球化的今天，集装箱作为国际贸易的重要载体，其安全性和卫生状况对全球供应链的稳定至关重要。有害生物的潜在威胁不容忽视，它们不仅可能破坏生态平衡，还可能对人类健康和经济发展造成严重后果。海运集装箱植物有害生物风险防控是一项艰巨任务，不但需要口岸严格把关，政府部门的相互支持，更需要全社会的关注、集装箱行业的配合以及国际间的合作。
- Nowadays, container as an important carrier of international trade, its safety and health conditions are crucial to the stability of the global supply chain. The potential threat of pests cannot be ignored. They may not only disrupt the ecological balance, but also have serious consequences for human health and economic development. The prevention and control of plant pests in sea containers is a difficult task, which not only requires strict control of ports, mutual support of government departments, but also requires the attention of the whole society, the cooperation of the container industry and international cooperation.



THANK YOU
感谢各位聆听