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Forests and Forest Health in Central Asia

Kazakhstan • Kyrgyzstan • Uzbekistan • Turkmenistan • Tajikistan

Forest types, area, health pressures, emerging pests and urban trees

Forest Invasive Species Network for Europe and Central Asia (REUFIS), 9–11 June 2026, Kyrgyzstan

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Introduction

The **five Central Asian countries** in regional context.

Forest cover is low in strict FAO terms, but **protective ecological functions** are very **high**.

Saxaul desert woodlands, tugai forests, mountain conifers and **walnut-fruit forests** are the core systems.

Forest health is strongly driven by **drought, water scarcity, salinization, fire, grazing** and **land-use pressure**.

Urban and **peri-urban trees** are part of the same green infrastructure and phytosanitary risk system.

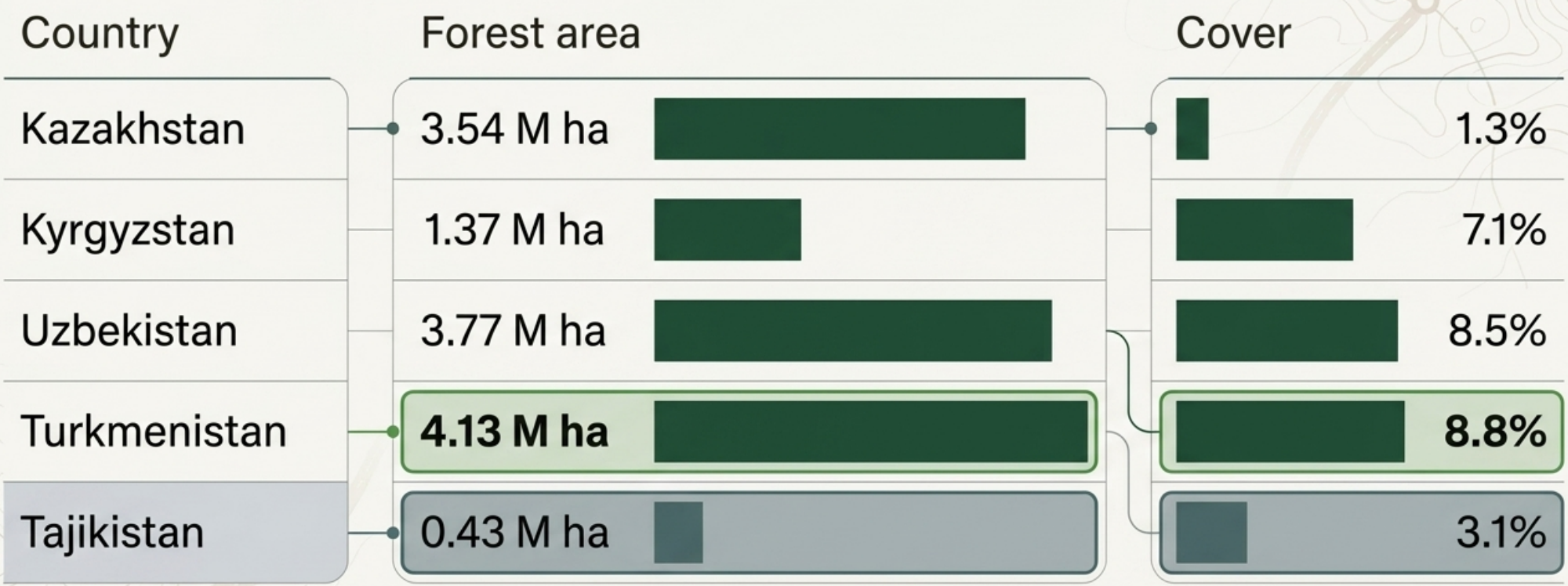
Central Asia: forests are often **more important for protection, resilience** and **livelihoods** than for timber.

Sources: UNECE/FAO State of Forests of the Caucasus and Central Asia; World Bank/FAOSTAT forest area indicators.

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Forest area and forest cover in Central Asia

Forest area, 2023(million ha)



Sources: World Bank/FAOSTAT, Forest area (sq. km) and Forest area (% of land area), 2023.

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Forests and forestry in Central Asian countries

Country	Dominant forest / woodland systems	Primary roles
Kazakhstan	Northern birch–aspen–pine; ribbon pine; saxaul; tugai; mountain spruce	Sand fixation, fire protection, shelterbelts, watershed protection
Kyrgyzstan	Mountain spruce; walnut-fruit; juniper; tugai	Watershed protection, biodiversity, nuts/fruits, erosion control
Uzbekistan	Saxaul/shrub desert forests; juniper; pistachio; tugai	Aral Sea restoration, dust control, land protection, NTFPs
Turkmenistan	Saxaul, cherkez, kandym; juniper remnants; tugai	Desertification control, grazing-buffer landscapes, settlement protection
Tajikistan	Juniper; pistachio; almond-pistachio; walnut-fruit; tugai	Slope stability, erosion control, rural livelihood support

Common feature: forests are fragmented, stress-prone and strongly connected to agriculture, grazing, water management and cities.

Sources: UNECE/FAO regional forest profile; World Bank Country Forest Note for Uzbekistan; national and regional forestry summaries.

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Major forest types and ecosystem functions



Saxaul afforestation in desertified drylands



Mountain conifer forests of the Tian Shan

Saxaul and desert shrub woodland: sand stabilization, dust/salt reduction, shelterbelt function.

Mountain conifers and juniper: watershed regulation, erosion control, landslide and mudflow protection.

Walnut-fruit and pistachio forests: biodiversity, genetic resources, non-wood forest products.

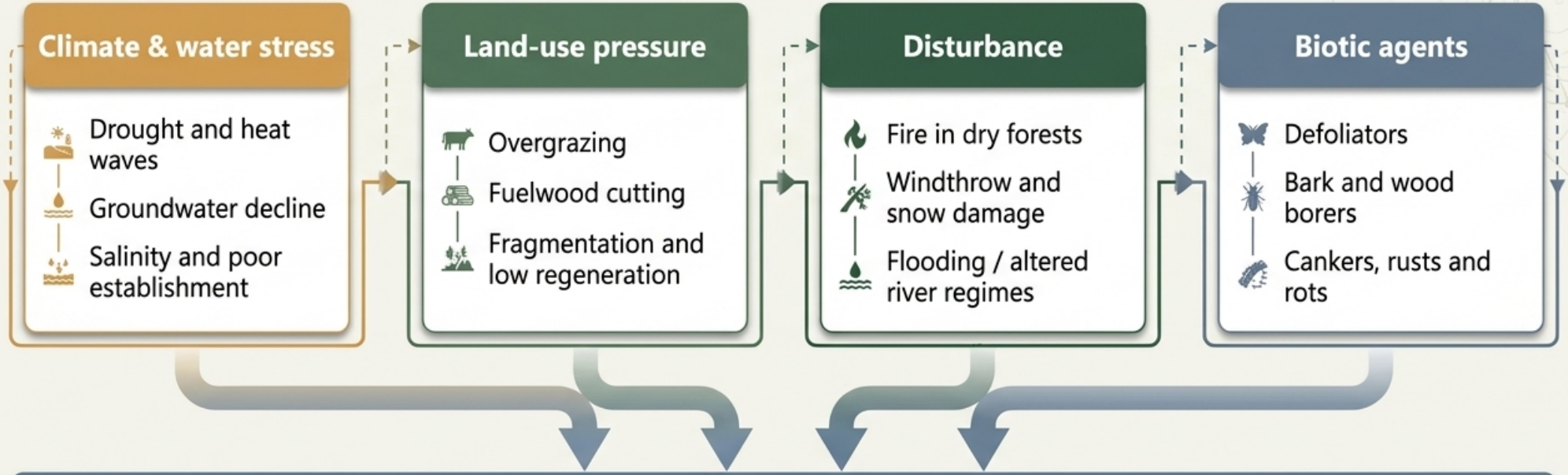
Tugai / riparian forests: riverbank protection, floodplain habitat and ecological corridors.

Functional lens: the value of Central Asian forests is best measured through protection, adaptation and livelihood services.

Sources: UNECE/FAO State of Forests of the Caucasus and Central Asia; UNDP Aral Sea afforestation information; regional forest-type descriptions.

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Major forest health problems



Action/Insight

Forest pests and diseases often become most damaging when drought, salinity, grazing pressure or fire has already weakened trees. The practical challenge is not only to identify pests, but to detect where stressed stands are becoming outbreak-prone.

Remote sensing, field surveillance and local reporting should be connected in one early-warning workflow.

Sources: UNECE/FAO regional forest-health threats; FAO forest pest and disease reviews; Central Asian forest pest literature.

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Main insect pests and diseases

Forest / tree system	Examples of major damaging agents	Typical impact
Walnut-fruit forests	Spongy moth, winter moth, tent caterpillars, walnut moth, scale insects; cankers/leaf spots	Defoliation, shoot damage, fruit/nut loss
Pistachio & almond stands	Seed and fruit moths, scale insects, fungal leaf spots and cankers	Reduced regeneration and seed production
Conifer and juniper forests	Bark beetles, longhorn beetles, sawflies; rusts and trunk rots	Decline after drought, fire or windthrow
Tugai / riparian forests	Poplar/willow borers, leaf beetles, cankers, trunk rots, Dutch elm disease risk	Loss of riverine shelter and biodiversity
Saxaul woodlands	Gall-forming insects, root/stem pests, establishment losses in plantations	Reduced survival and protective function
Urban trees	Fall webworm, scales, borers, cankers, root/trunk rots, nursery-introduced pests	Tree decline, public-safety risk, loss of shade

Sources: FAO Kyrgyz Republic forest pest profile; UNECE Uzbekistan country profile; Gafforov et al. on Central Asian forest pests and diseases.

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Emerging native pests

Spongy moth *Lymantria dispar*
Defoliation in fruit-nut and broadleaved systems

Asian walnut moth *Garella musculana*
Walnut shoot/nut damage and quarantine relevance for EUR

Bark beetles & borers *Ips, Phloeosinus, Monochamus*
Outbreak risk after drought/fire/windthrow







Emerging invasive pest



Fall webworm *Hyphantria cunea*
Broadleaved forest, orchards and urban trees

Urban plantings, nurseries, orchards and shelterbelts can act as pathways between agricultural and forest landscapes. Detection should focus on high-risk corridors: border trade, plant nurseries, city parks, riparian belts and restoration sites.

Sources: FAO Kyrgyz Republic pest profile; FAO global forest pest review; EPPO/forest pest literature for emerging walnut and defoliator risks.
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Sources: FAO Kyrgyz Republic pest profile; FAO global forest pest review; EPPO/forest pest literature for emerging walnut and defoliator risks.
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Country-level forest-health priorities

Country	Highest-priority risks	Notes for surveillance
Kazakhstan	Fire, drought, saxaul degradation, bark/wood borers in mountain conifers, pests in green belts	Focus on Aral Sea afforestation, pine/spruce stands and urban peri-urban plantations
Kyrgyzstan	Walnut-fruit defoliators, fall webworm, grazing pressure, disease in mountain forests	Strengthen monitoring in walnut-fruit forests and urban broadleaved trees
Uzbekistan	Saxaul decline, salinity, tugai degradation, many recorded forest pests/diseases	Link Aral Sea restoration, urban greening and nursery biosecurity
Turkmenistan	Extreme aridity, saxaul woodland degradation, limited pest data	Prioritize basic inventories and drought/salinity-tolerant urban species
Tajikistan	Fuelwood pressure, overgrazing, erosion, fruit-nut and pistachio pests	Combine slope protection, regeneration control and rural livelihood support

Regional lesson: forest-health planning must be country-specific but surveillance protocols should be harmonized.



Sources: World Bank/FAOSTAT; UNECE/FAO regional and country forest profiles; FAO Kyrgyz and Uzbekistan pest/disease sources.

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Current pest and disease control methods used



Traditional Context: Traditional control is usually reactive: outbreak reports, localized sanitation felling, aerial/ground treatment, and quarantine action.

Restoration Context: Forest restoration methods also act as health measures: grazing exclusion, firebreaks, mixed species, resistant planting material and nursery hygiene.

Prevention Context: For sparse dryland forests, prevention and establishment success are often more cost-effective than later pest suppression.

Urban Context: Urban control requires a different scale: tree-by-tree inspection, risk pruning, irrigation correction and rapid removal of infested nursery stock.

Preferred direction: Integrated Pest Management (IPM) combined with climate-adapted silviculture and urban tree-care systems.

Sources: FAO global forest pest management guidance; FAO Kyrgyz pest-control discussions; UNECE/FAO regional forestry recommendations.

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Forests and trees in urban areas



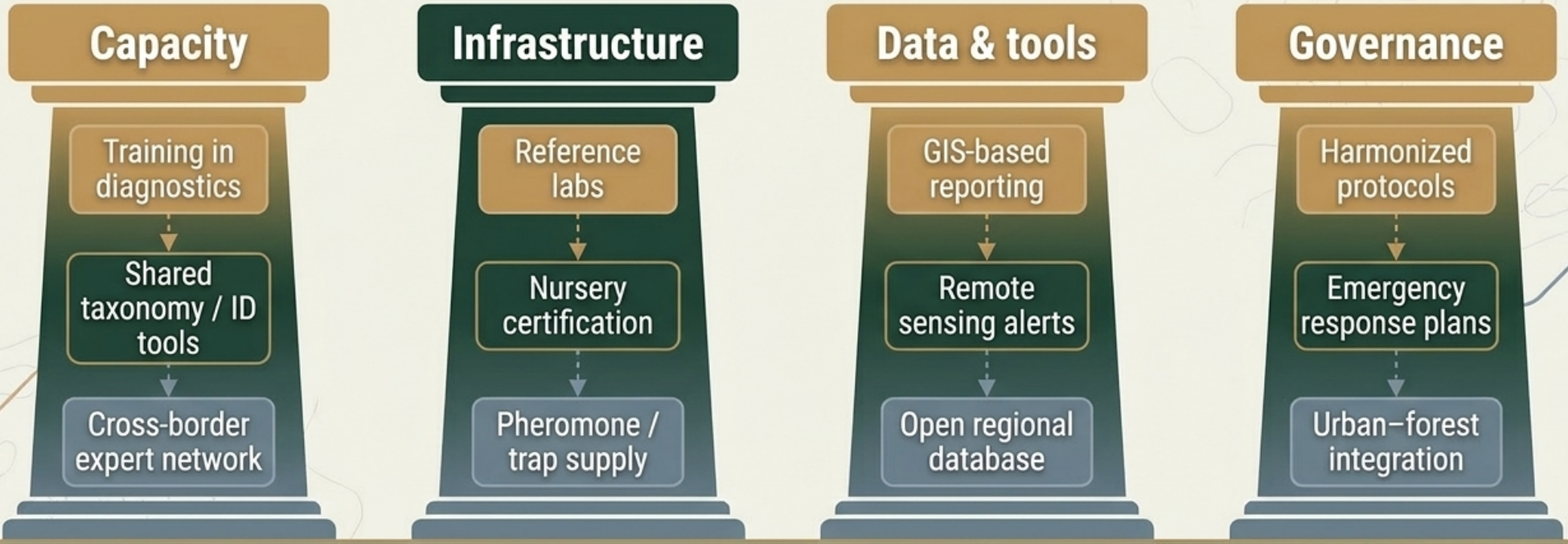
Urban greening and young street trees in Almaty

- Urban trees are essential green infrastructure: shade, cooling, air-quality improvement, dust trapping and recreation.
- Main stressors: heat island effect, compacted soil, limited rooting volume, salinity, irregular irrigation and mechanical damage.
- Cities can amplify pest spread through nursery stock, transport corridors, parks, street trees and home gardens.
- Urban tree cadastres and regular health inspection are needed for safety, maintenance planning and early pest detection.
- Urban forestry should be integrated into national forest-health and biosecurity systems.

Sources: UNECE urban forestry discussions for Central Asia; UNDP Uzbekistan urban/ afforestation planning recommendations; city greening examples.

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Needs and challenges in management



REUFIS opportunity: a regional early-warning and knowledge-sharing system connecting national forest services, cities, nurseries, researchers and restoration programmes.

Practical first step: agree on a short list of priority pests/diseases and a minimum common surveillance protocol for each forest type.

Sources: UNECE/FAO regional forest sector needs; FAO forest-health recommendations; REUFIS-oriented interpretation by the author.

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Four illustrative pest examples for REUFIS

Urban trees, orchards, transport corridors and forests must be monitored as one connected system

Profenusa pygmaea
Oak mining sawfly
Host/pathway: Bishkek urban oaks
Signal: leaf mines / early yellowing





Rhagoletis completa
Walnut husk fly
Host/pathway: walnut orchards and gardens
Signal: husk damage / fruit-quality loss

Polygraphus proximus
Four-eyed fir bark beetle
Host/pathway: *Abies* forests and fir plantings
Signal: bark galleries / fir mortality





Corythucha arcuata
Oak lace bug
Host/pathway: oak forests, parks and roadsides
Signal: leaf bronzing / range expansion

Selected examples to supplement the Central Asian forest-health overview

Common message: **invasive forest pests often enter and build up in human-modified tree systems before they become large-scale forest problems.**

Sources: CyberLeninka and local reports on Profenusa in Bishkek; EPPO Global Database / EPPO Reporting Service; BOKU oak lace bug meeting; Viklund et al. 2022.

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Urban oaks and walnut pathways

Two cases linking cities, orchards, home gardens and forest genetic resources

Case File



Profenusa pygmaea on oaks in Bishkek

- Leaf-mining sawfly on oak: broad mines cause early yellowing.
- **Bishkek case:** recurrent urban damage and treatment needs; useful sentinel site.
- **Urban relevance:** public concern, repeated maintenance, and strong connection with nursery/transport pathways.
- **Host:** oaks (*Quercus* spp.) • **System:** parks, streets, botanical gardens

Case File



Rhagoletis completa on walnut in Europe

- Larvae develop in walnut husks and reduce nut quality.
- North American species established in Europe; fruit movement, orchards and gardens support spread.
- **Pathway relevance:** fruit movement and fragmented walnut landscapes can support spread.
- **Host:** *Juglans regia* • **System:** orchards, gardens, walnut-fruit forests

Surveillance idea: combine urban tree inspection, orchard monitoring and nursery plant checks in one reporting workflow.

Sources: Temirkul 2016 / CyberLeninka on *Profenusa pygmaea* in Bishkek; AKIPress and local reports on oak treatment; EPPO PM 7/107 and EPPO Global Database for *Rhagoletis completa*.

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Current distribution of *P. pygmaea*

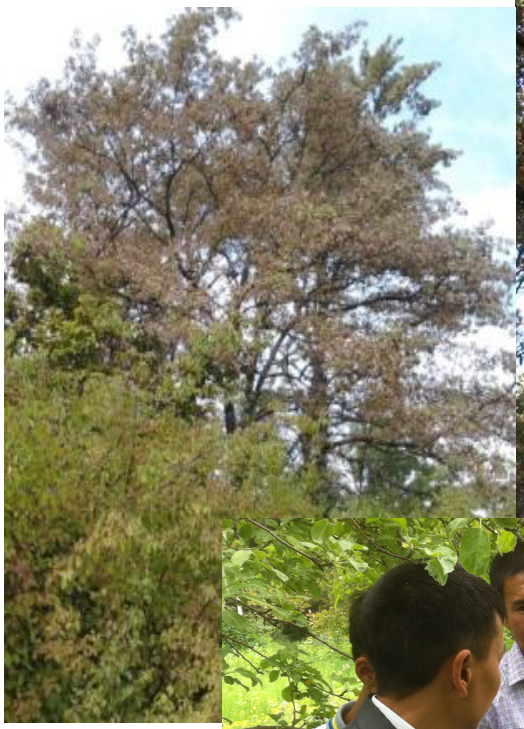


Oak leaf mining wasp in Bishkek

- Host: *Quercus robur*
- First record: 2007
- High damage level:
  - 2011: 70-75%
  - 2012: 75-80%
  - Still high level











Differences between Europe (native) and Kyrgyzstan (invasive?)

Europe	Kyrgyzstan
Widely distributed species without considerable damage	Serious damage in urban areas
Natural enemies e.g.: • *Scambus inanis* • *Grypocentrus* sp.	Lack of natural enemies
Flying time from 2nd week of May until beginning of July	Flying time from 2nd week of April until beginning of July
Sexual reproduction (?)	Parthenogenesis (?)

Conifer and oak forest pathways

Two examples showing how climate stress and transport accelerate forest pest impacts

Case File



Polygraphus proximus on fir (*Abies*) in Russia. Far Eastern bark beetle associated mainly with *Abies*. Invasive in Siberia/European Russia; *Abies sibirica* dieback reported; risk rises in stressed stands and wood corridors.

Central Asian relevance: mountain conifers are limited but highly protective; imported wood and plants are key pathways.

Host focus: *Abies* spp. • **Pathways:** logs, transport corridors, plantations

Case File



Corythucha arcuata on oaks in Europe. Sucking on leaf undersides causes chlorosis and bronzing. Native to North America; first found in Europe in Italy in 2000; spread favoured by warming and traffic corridors.

Central Asian relevance: planted oaks in cities and parks can become bridgeheads for forest and shelterbelt pests.

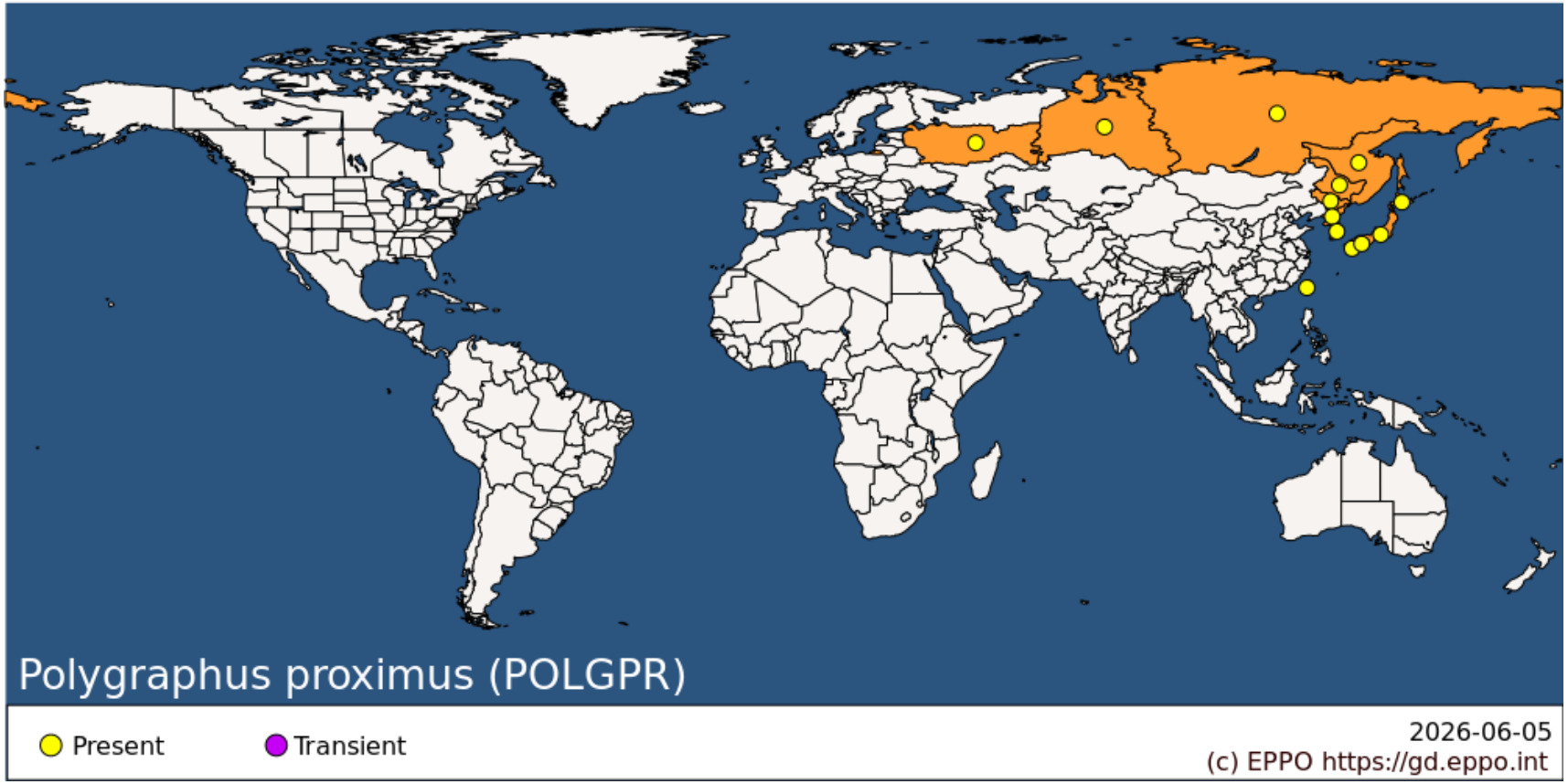
Host focus: *Quercus* spp. • **Pathways:** roads, railways, cities, nurseries

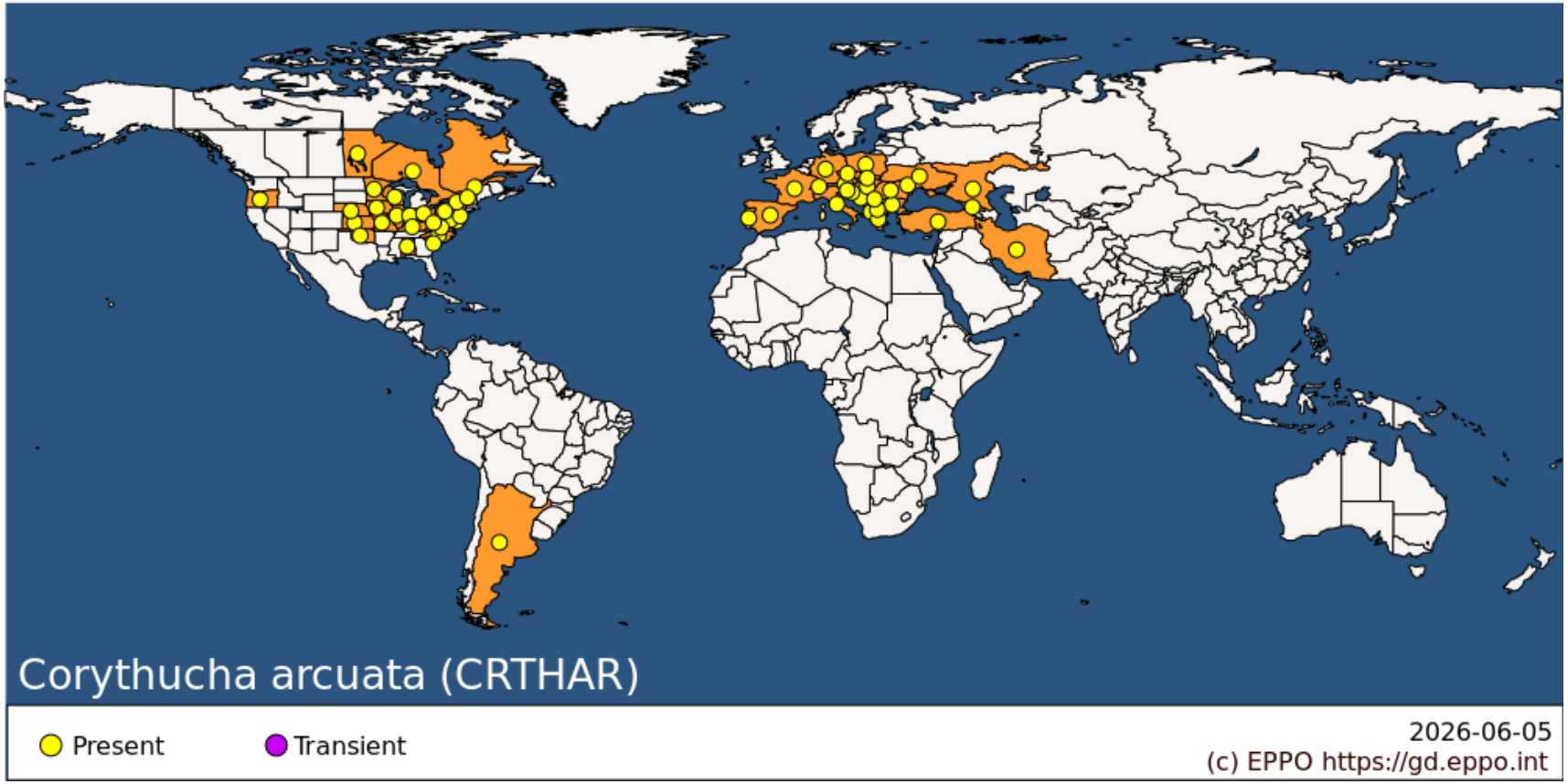
Climate adaptation message: stressed trees are more vulnerable; early pest detection is part of resilience planning.

Sources: EPPO Reporting Service on *Polygraphus proximus*; Viklund et al. 2022; BOKU 2024 oak lace bug meeting; recent European oak lace bug literature

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Polygraphus proximus (POLGPR)
Present
Transient
2026-06-05
(c) EPPO https://gd.eppo.int


Corythucha arcuata (CRTHAR)
Present
Transient
2026-06-05
(c) EPPO https://gd.eppo.int

What these examples mean for Central Asia

From individual pest records to a regional early-warning logic

Shared surveillance priorities

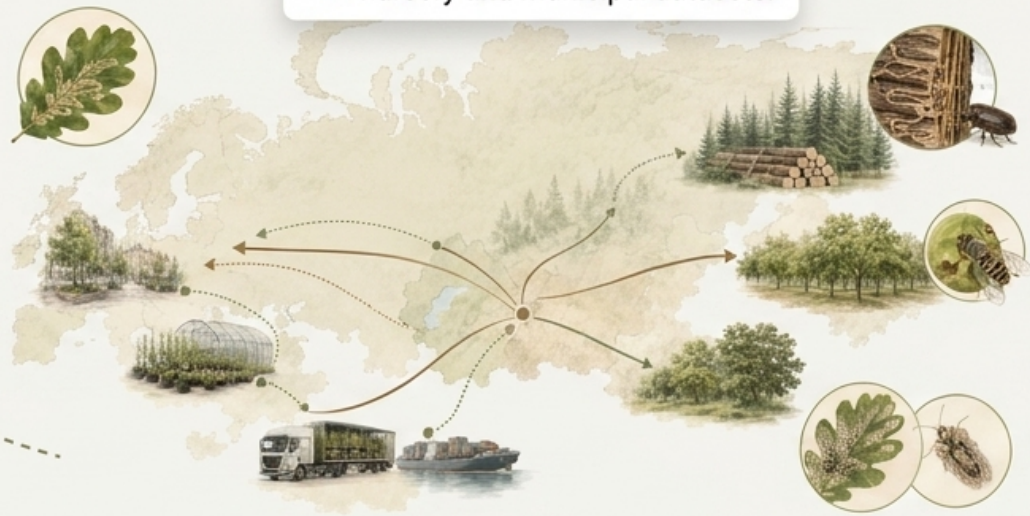
Use urban trees as sentinel sites for early detection.

Connect forest, orchard, nursery and municipal datasets.

Map transport corridors, border crossings and planting-material flows.

Define a short REUFIS priority list with host, symptom and reporting protocol.

Train local teams in symptom recognition and prepare response options before outbreaks.



Thesis 1:

Key principle: surveillance should follow pathways, not only forest boundaries.

Thesis 2:

REUFIS opportunity: a common regional “case file” format for pest records, images, host trees, control measures and follow-up monitoring.

Interpretation based on the four example pests and REUFIS-oriented forest-health needs: urban sentinel monitoring, pathway analysis, shared diagnostics and harmonized reporting.

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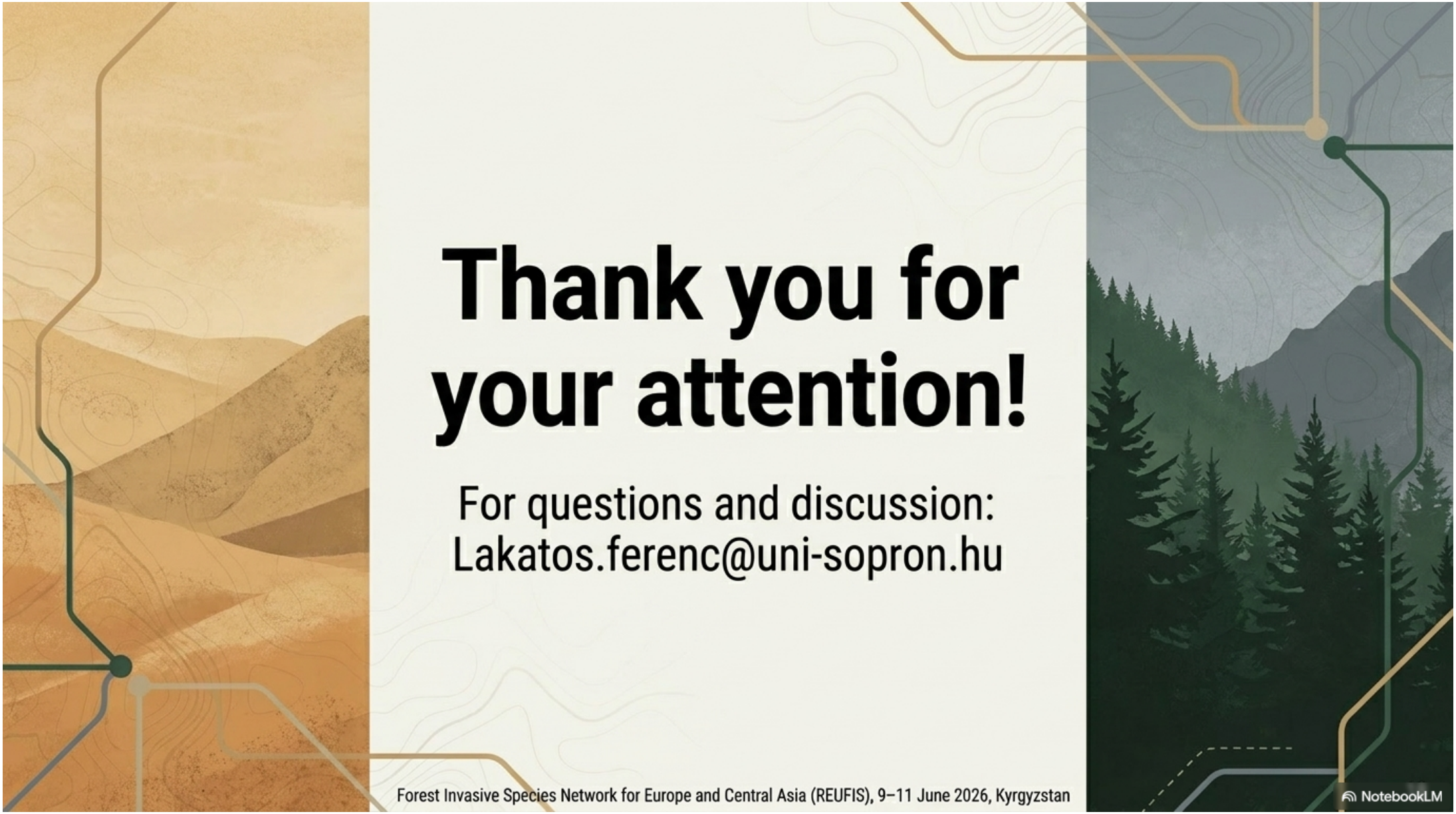
Sources and data basis

Main sources used for the regional overview and the additional pest examples

- World Bank / FAOSTAT forest area and forest-cover indicators, 2023.
- UNECE/FAO: State of Forests of the Caucasus and Central Asia; country profiles and forest landscape restoration materials.
- FAO country forest-pest profiles and Global Review of Forest Pests and Diseases.
- Gafforov, Orozumbekov, Rakhimova, Nam & Stenlid: Pests and Diseases of Forest Trees in Central Asia.
- Temirkul (2016) on *Profenusa pygmaea* under Bishkek conditions; AKIPress/local reports on oak treatments in Bishkek.
- EPPO Global Database / EPPO PM 7/107 for Rhagoletis completa; EPPO Reporting Service for Polygraphus proximus.
- Viklund et al. (2022), Chemoecology: pheromone components and invasion risk of *Polygraphus proximus*.
- BOKU scientific meeting and recent European research on Corythucha arcuata / oak lace bug spread and impacts.

Generated explanatory illustrations were created for this presentation to support non-photographic visual explanation.
Bugwood.org, forestryimages.org

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Thank you for your attention!
For questions and discussion:
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