

THE HUNGARIAN ACADEMY OF SCIENCES
SECTION OF BIOLOGICAL SCIENCES
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Trouble on the horizon: anticipating biological invasions through futures thinking

lecture of **Professor Philip E. Hulme**

DATE TIME

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VENUE

Hungarian Academy of Sciences, Felolvasóterem
(1053 Budapest, Széchenyi István tér 9.)

SUMMARY

Anticipating future biosecurity threats to prevent their occurrence is the most cost-effective strategy to manage invasive alien species. Yet, biological invasions are complex, highly uncertain processes. High uncertainty drives decision-making away from strategic preventative measures and towards operational outcomes aimed at post-invasion management. The limited success of preventative measures in curbing biological invasions reflects this short-term mindset and decision-makers should instead apply strategic foresight to imagine futures where biosecurity threats are minimised. Here, four major futures thinking tools (environmental scanning, driver-mapping, horizon scanning, and scenario planning) that describe probable, possible, plausible and preferable futures are assessed in

terms of their potential to support both research and policy addressing biological invasions. Environmental scanning involves surveying existing data sources to detect signals of emerging alien species through knowledge of changes in either the likelihood or consequences of biological invasions. Several approaches are widely used for biosecurity including automated scans of digital media, consensus-based expert scoring, and prediction markets. Automated systems can be poor at detecting weak signals because of the large volume of 'noise' they generate while expert scoring relies on prior knowledge and so fails to identify unknown unknowns which is also true of prediction markets that work well for quite specific known risks. Driver-mapping uses expert consensus to identify the political, economic, societal,

technological, legislative, and environmental forces shaping the future and is a critical component of strategic foresight that has rarely been applied to biological invasions. Considerable potential exists to extend this approach to develop system maps to identify where biosecurity interventions may be most effective and to explore driver complexes to determine megatrends shaping the future of biological invasions. Horizon scanning is a systematic outlook of potential threats and future developments to detect weak signals of emerging issues that exist at the margins of current thinking. Applications have been strongly focused on emerging issues related to research and technological challenges relevant to biosecurity and invasion science. However, most of these emerging issues are already well known in current-day research. Because horizon scanning is based on expert consensus, it needs to embrace a diversity of cultural, gender, and disciplinary diversity more adequately to ensure participants think intuitively and outside of their own subject

boundaries. Scenario planning constructs storylines that describe alternative ways the political, economic, social, technological, legislative, and environmental situation might develop in the future. Biological invasion scenario planning has favoured structured approaches such as standardised archetypes and uncertainty matrices, but scope exists to apply more intuitive thinking by using incasting, backcasting, or causal layered analysis. Futures thinking in biological invasions has not engaged with decision-makers or other stakeholders adequately and thus outcomes have been light on policy and management priorities. To date, strategic foresight addressing biological invasions has applied each approach in isolation. Yet, an integrated approach to futures thinking that involves a diverse set of stakeholders in exploring the probable, possible, plausible, and preferable futures relating to biological invasions is crucial to the delivery of strategic biosecurity foresight at both national and global scales.