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RESDiNET NEWS

Seeing the Unseen: Innovations for Climate-Resilient Forests across Europe



TOP NEWS OF MAY - JUNE 2025

VELKÝ POLOM CAMPAIGN EXPANDS



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RESDiNET's 2025 field season continues in the Velký Polom Nature Reserve, Slovakia, where researchers study why some spruce trees resist bark beetles. Combining remote sensing, genomics, and molecular ecology, they seek to uncover physiological and chemical defences underpinning tree resilience. This cross-disciplinary effort aims to inform Europe-wide strategies for climate adaptation and pest mitigation.

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RESDiNET researchers in Sweden developed a high-resolution drone-based method to detect bark beetle attacks weeks before ground-based monitoring, showing how multispectral imaging and vegetation indices can be scaled across large landscapes. This breakthrough accelerates detection efforts and exemplifies RESDiNET's cross-border collaboration in addressing Europe's bark beetle emergency.

DRONES DETECT BEETLES EARLY

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HYPERSPECTRAL BREAKTHROUGH WINS AWARD

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Dr Langning Huo has been awarded the 2024 SLU Umeå and Sparbanksstiftelsen Norrland Innovation Prize for her pioneering work on early beetle detection using hyperspectral sensors. Her method captures subtle spectral changes in stressed trees, offering a powerful new tool to detect infestations well before visible damage appears. The award is a hallmark of RESDINET's interdisciplinary approach to addressing forest resilience in a rapidly changing climate.

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A decade-long field study from the University of Eastern Finland shows that early symptoms of bark beetle infestation can be used to predict long-term outbreak dynamics in spruce forests. As a RESDINET partner, the UEF team contributes critical longitudinal insight to the broader European effort to manage forest health under climate stress.

FINLAND STUDY TRACKS OUTBREAK

EARLY BARK BEETLE SIGNALS

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A collaborative study between RESDINET researchers at SLU and NLS FGI confirms the effectiveness of Green Shoulder Indices, a hyperspectral tool for detecting beetle infestations before visible symptoms appear. The innovation allows forest managers to respond much earlier to outbreaks. The research highlights RESDINET's commitment to advancing early detection systems that integrate precision technology with ecological knowledge.

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EARLY PINE STRESS DETECTED

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In a study published in *Remote Sensing*, RESDINET researcher Dr Langning Huo and colleagues demonstrate that multispectral drones can detect early signs of disease stress in Scots pine. The method reveals vitality loss long before defoliation or mortality occurs. This finding not only showcases a significant advance in forest health monitoring but also supports RESDINET's mission to develop timely, science-based tools for climate-resilient forest management.

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Bark beetle outbreaks are devastating spruce forests across Europe, but new hope lies in the skies. Dr Huo's award-winning research has led to drone-mounted imaging systems that can detect beetle attacks at earliest stages. The tools transform forest management by timely interventions that save trees. As a flagship innovation of the RESDINET network, this breakthrough is a beacon for climate-smart forestry across Europe.

DRONE TECH TACKLES BEETLES

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Sweden's State Secretary Daniel Liljeberg visited SLU to learn about emerging technologies in forest health monitoring. RESDINET researcher Dr Huo demonstrated advanced drone-based tools for detecting forest damage. The visit underscores growing governmental interest in scientific innovation for real-world climate challenges, highlighting value of RESDINET's work in supporting data-driven forest management policies.

STATE SECRETARY VISITS SLU

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BC LEADS IN SMART FORESTRY

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British Columbia's long-term investments in climate-resilient forestry and tree breeding offer practical solutions for Europe's escalating bark beetle crisis. At the Kalamalka Forestry Centre, researchers breed trees that are better adapted to climate stressors, including drought and pest attacks. RESDINET partners are closely following such examples to inform next-generation adaptation strategies.

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Dr Langning Huo has been appointed docent (associate professor) in technology at the Swedish University of Agricultural Sciences (SLU), recognising her outstanding contributions to remote sensing and forest health monitoring. Her promotion marks a personal achievement and reflects the growing impact of RESDINET research in developing early-warning systems for climate-related forest disturbances. As RESDINET continues to shape the frontier of forest remote sensing in Europe, this milestone highlights the scientific excellence driving its mission.

DOCENTSHIP MILESTONE AT SLU