

New records of Northern bats (*Eptesicus nilssonii*) in boreal clear cuts emphasize the value of green-tree retention for conservation

Neue Nachweise der Nordfledermaus (*Eptesicus nilssonii*) unterstreichen den Erhalt von Einzelbäumen auf borealen Kahlschlägen

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Abstract

Increasing management intensification of forests worldwide has decreased biodiversity across multiple taxonomical groups. To limit these losses conservationists promote green-tree retention in combination with prescribed fires in boreal forests. We evaluated the potential value of retention trees on prescribed-burned clear cuttings for bats, an important target taxon in nature conservation. Beneath loose bark of fire-killed retention trees we found two adult male individuals of *Eptesicus nilssonii* roosting in less than two meters' height. This finding underlines the importance of tree retention on clear cuttings for nature conservation in boreal forests.

Keywords

conservation, forest management, *Eptesicus nilssonii*, prescribed fires, Finland.

Zusammenfassung

Durch eine Intensivierung der Waldbewirtschaftung sind die unterschiedlichsten taxonomischen Gruppen weltweit gefährdet. Um die negativen Effekte der Waldbewirtschaftung zu limitieren, treiben Naturschützer den Erhalt von Einzelbäumen, sogenannten „Retention-Trees“, in Kahlschlägen, sowie künstliche Feuer in borealen Wäldern, voran. In dieser Studie haben wir stichprobenartig überprüft, ob diese Retention-Trees als Quartier für Fledermäuse geeignet sind. In Rindenschuppen von verbrannten Bäumen konnten zwei adulte Männchen der Nordfledermaus (*Eptesicus nilssonii*) in weniger als 2 m Höhe gefunden werden. Diese Beobachtung untermauert die Bedeutung solcher Bäume als Naturschutzinstrument in borealen Wäldern.

Schlüsselwörter

Naturschutz, Forstwirtschaft, *Eptesicus nilssonii*, Kontrolliertes Feuer, Finnland.

1 Introduction

Land-use intensification has led to an increasing pressure on forest ecosystems worldwide (FOLEY

et al. 2005). For example, increasingly intensive forest management has altered forest biodiversity across multiple taxonomical groups (PAILLET et al. 2010). To limit these losses various retention approaches have been proposed (LINDENMAYER et al. 2012). In case of boreal forests across the northern hemisphere retention approaches are increasingly commonly combined with prescribed fire of varying severity to mimic natural-disturbance dynamics (GRANSTRÖM 2001; RYAN et al. 2013). Such a combination yields significant impact in conservation of rare saproxylic beetles (HYVÄRINEN et al. 2006), birds and small mammals (FONTAINE & KENNEDY 2012). Hence, variable retention has become a common conservation measure at clear cuts in Fennoscandia since the mid-1990's (GUSTAFSSON et al. 2010). Concurrent with the development of different retention approaches forest-dwelling bats have become important conservation targets (JONES et al. 2009). Several studies have been conducted on the flight activity of these bats through various silvicultural treatments using ultrasonic detectors (MILLER et al. 2003). These studies have commonly detected differences in bat activity among various harvesting regimes and the impacts of forest edges and fragmentation on them (HENDERSON et al. 2008; HOGBERG et al. 2002; MORRIS et al. 2010; PATRIQUIN & BARCLAY 2003). Few studies have exclusively focused on prescribed burning. LOEB & WALDROP (2008) reported higher bat activities in thinned than in unharvested stands of hardwood forest in North America, whereas the activity in thinned-and-burned and burned-only stands was intermediate.

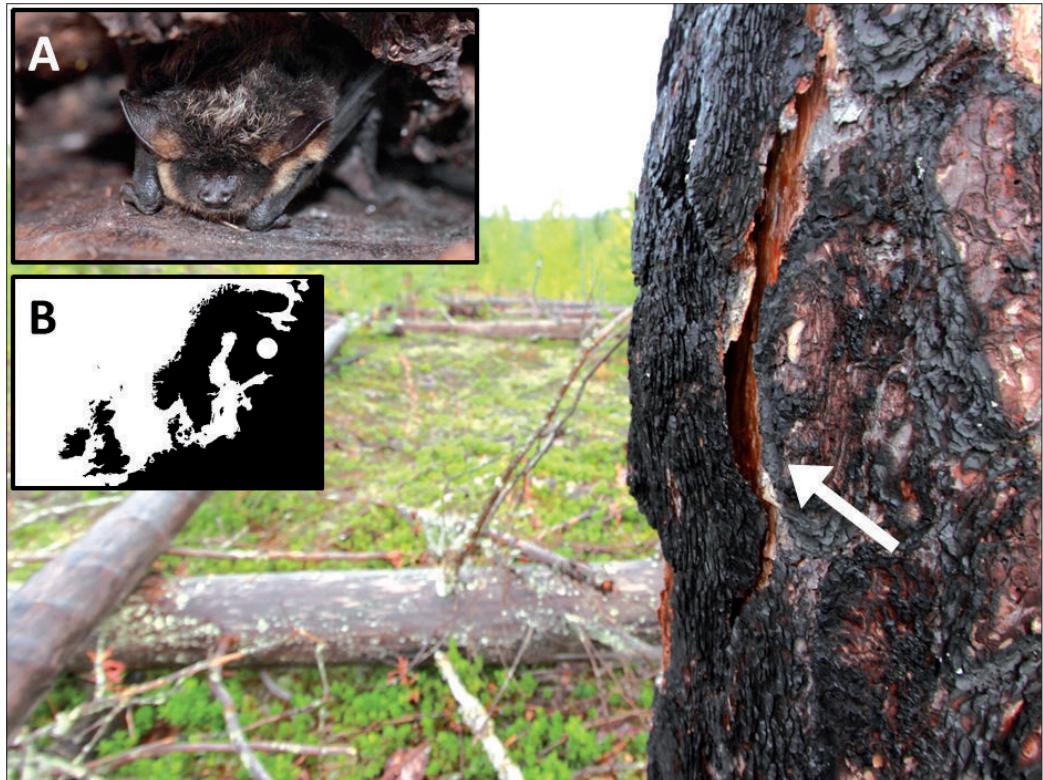


Fig. 1: Northern bat (*Eptesicus nilssonii* A) roosting in a fire-killed retention tree (white arrow) at a clear cutting in east-central Finland (white dot in box B).

Abb. 1: Nordfledermaus (*Eptesicus nilssonii* A) in einem verbrannten Baum (weißer Pfeil) auf einem Kahlschlag im östlichen Zentralfinnland (weißer Punkt in Box B).

than in vital stands and non-salvaged bark beetle-killed plots. To enable bats to benefit from the increased prey abundance at cleared plots it would be necessary to provide roosts nearby foraging grounds for lessening predation rates (BOYLES & AUBREY 2006). Our finding of roosting Northern bats, which are indeed open-habitat foragers, in the center of a clear cutting supports this assumption (MÜLLER et al. 2012). One short- and mid-term tool to create such roosting sites in retention trees is the use of prescribed fire, particularly in the light of post-fire snag longevity (DALZIEL & PERERA 2009; RUSSELL et al. 2006). At this point, comparative studies should be conducted to estimate the longevity of loose-bark roosts under different types of retention treatment. Besides the importance of retention trees for bats a continuous supply of dead and dying trees is crucial for other taxa (ROSENVOLD & LÖHMUS 2008). Hence, our finding extends the green-tree retention ap-

proach to roosting sites of bats, particularly in intensively-managed forests with low amounts of standing dead or dying trees (RUSSO et al. 2010).

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Fig. 2: A Group of retention trees (right corner) on a clearcut close to Joensuu, Central Finland.

Abb. 2: Eine Gruppe sogenannter „Retention-trees“ auf einem Kahlschlag in der Nähe von Joensuu, Mittelfinnland.

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