

Gozdnogojitvene usmeritve za obnovo gozdov po naravnih ujmah

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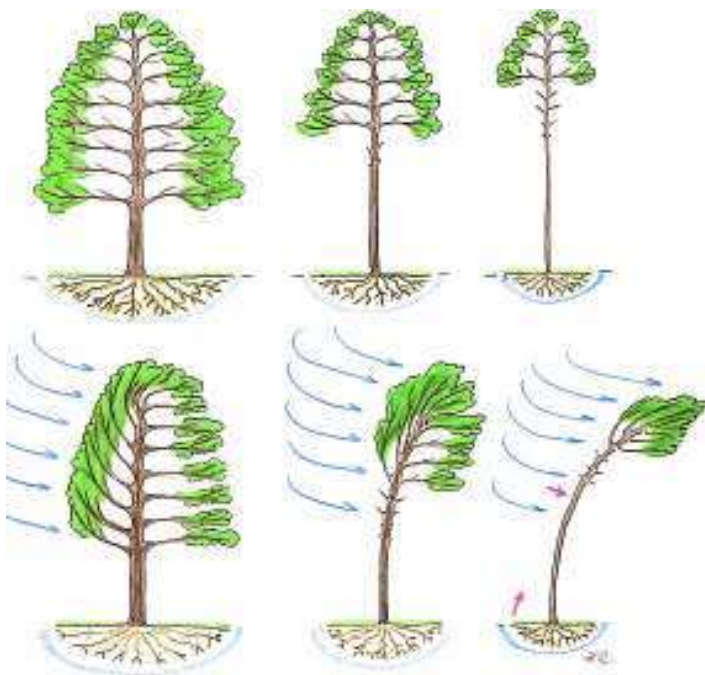


1 Zmanjševanje tveganja

- redno gospodarjenje/nega
obhodnjica 5-7 let (60-80
 m^3/ha)
- mešani raznodobni
(prebiralni / trajni) gozdovi
- izbira drevesnih vrst¹
- dolge pomladitvene dobe /
skrajševanje obhodnje?
- intenzivnejše poseganje²
za pionirje in svetloljubne
vrste?
- novi negovalni modeli

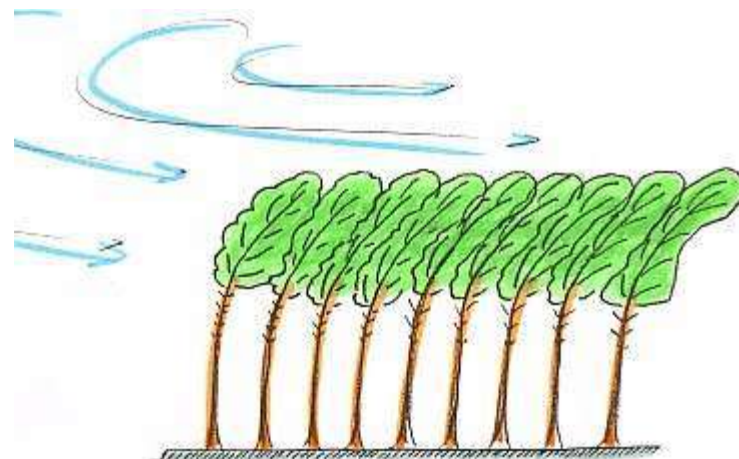


Novi negovalni modeli

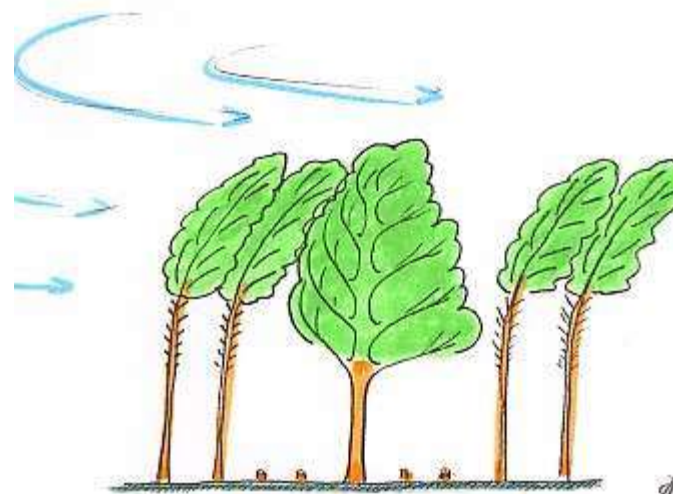


Individualna stabilnost

Prioritete pri izbiri:
stabilnost, kakovost, razdalja



Kolektivna stabilnost



Kombinacija
individualne in
kolektivne stabilnosti

H.R.
Helmut Rieger 2004

2 Sanitarna sečnja?

- presoja:
 - + zdravje gozda, lažje delo na obnovi, prihodek, svetloljubne vrste, mineralna tla
 - izguba antagonistov in varovalnih učinkov odmrih dreves ter mikroklima, stroški, poškodbe mladja in preostalega sestoja, manj razvito mladje (20 % nižje), več objedanja, zbijanje tal in erozija (gozdne gradnje)
- svet¹ (-) vs Srednja Evropa (+/-)

DAVID B. LINDENMAYER,
PHILIP J. BURTON, AND JERRY F. FRANKLIN



SALVAGE LOGGING
AND
ITS ECOLOGICAL
CONSEQUENCES



Site factors are more important than salvage logging for tree regeneration after wind disturbance in Central European forests

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ARTICLE INFO ABSTRACT

What disturbance is the main natural driver of forest dynamics in Central and Western Europe, but little is known regarding the general patterns of tree regeneration following windthrow in this region. On the basis of 60 windthrow sites, we quantified natural tree regeneration 10 and 20 years after wind

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ORIGINAL PAPER

Post-windthrow management in protection forests of the Swiss Alps

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Influence of salvage logging on forest recovery following intermediate severity canopy disturbances in mixed beech dominated forests of Slovenia

Gal Fidej¹, Andrej Rozenbergar¹, Dusan Rozenbergar¹, Jurij Diaci¹

The practice of salvage logging dead and damaged timber following large high severity disturbances has raised much controversy, partly because of the negative ecological effects that such practices have on forest ecosystems. Many of the studies on salvage logging effects, however, have been done on sites damaged by large, severe disturbances. Little is known about the ecological consequences of salvage logging following intermediate severity disturbances that cause partial canopy damage at smaller scales. We examined the response of the herbaceous layer and tree regeneration to salvaged and non-salvaged treatments following small-scale intermediate severity disturbances in eight mixed beech (*Fagus sylvatica* L.) dominated forest stands in Slovenia. The cover and diversity of herbaceous vegetation, as well as the density and diversity of tree regeneration were similar between treatments across the study sites. The only notable differences between the treatments were that salvaged sites had a larger proportion of shade-intolerant tree species in the regeneration layer, while non-salvaged sites tended to have a more well-developed regeneration layer in taller beech classes. The results suggest that salvage log-



Article
Challenges for Uneven-Aged Silviculture in Restoration of Post-Disturbance Forests in Central Europe: A Synthesis

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3 Presoja rastišča, sestoja in pomladka

- okrevanje¹
- ukrepanje odvisno od sukcesijskega razvoja => poznavanje rastišča (ekol. dejavnikov), zgodovine gozda
- presoja obstoječega pomladka, kriteriji (površina, gostota, zmes, obdobje)
 - enomerni gozd: (1) gostote kot pri saditvi ali (2) minimum za ujme: $h > 1,5$ m 1000 igl. ali 2000 lst., mladje je enakomerno porazdeljeno, vitalno, neobjedeno, sposobno preživetja, 10-20 let
- tujina²: CZ, A, D

3 Presoja rastišča, sestoja in pomladka

Vplivni dejavniki obnove po ujmah	Splošni učinki na uspešnost obnove (gostota, zastiranje, zmes)		
Prosotnost ali naraščajoča intenzivnost	Ugodni	Mešani	Neugodni
Sanitarna sečnja	[26,37,38,93]	[31,75,92,108]	[32–34,36,39,63,109–111]
Podmladek (pred ujmo)	[32,34,36,60,63,73,109,110]	[26,37] ker je pogosto slabo razvit	
Drevesa ali grmi, ki varujejo (nurse plants)/šopasta rast	[63,112,113]	[111]	
Nadmorska višina		[75]	[26,31,37,76,92,113]
Naklon	[113]	[76]	[73,96,101–103]
Ekspozicija – prisojne lege	[73,113]		[21,37,76,100]
Skalovitost	[113]		[21,73,103]
Kisla (distrična) tla			[75,114]
Razkrita mineralna tla	[40,76,115,116]		[39,101]
Dvignjena mikrorastišča, gomile, štori	[35,76,92,102,110,113,117–119]		[26,93]
Zastiranje pritalne vegetacije		[73,76] na skrajnostnih rastiščih ni negativno	[21,39,40,75,105,110,113–115,119–121]
Grmovnice	[73,92]		
Razkrojene podrtice kot kališče (smrekar, jelka) in zavetišče	[33–35,39,63,105,110,113,121]		[21,34,73,76,92,103,110] za slabo rakrojene drevesne ostanke in vejne kupe
Preostala poškodovana drevesa / sušice (hranila, gredi za ptice)	[32,36,39,63,120]		
Razdalja do gozdnega roba za klimaksne vrste, izvor smena, mikroklima			[21,34,35,73,76,101,103,105,106,114,115]
Razdalja do semenskih dreves			[21,60,76,115]
Objedanje po divjadi		[113,122,123]	[21,34,35,60,73,76,103,105,106,115,119,124]

Vir: Diaci, J., Rozenbergar, D., Fidej, G., Nagel, T.A., 2017. Challenges for uneven-aged silviculture in restoration of post-disturbance forests in Central Europe: A synthesis. Forests 8, 378.



Nepomlajeno prisojno pobočje – Črnivec 2020

4 Naravna obnova

- danes prevladuje¹
- izbira drevesnih vrst²
- divjad
- ohranjanje gozdnega roba in poškodovanih dreves, grmovnic



Označevanje in obžetev naravnega mladja (PU)³



Trajni gozdovi na severnem Bavarskem po nazadovanju smreke leta 2003

5 Umetna obnova

- saditev¹: sm+; ja-, (je, hr?)



GGE Mokronog
(foto N. Vavtar)

Nasad gorskega javorja – Črnivec 2020





Razkrojeni, odprti sestoji po žledu in namnožitvah smrekovih podlubnikov – redka saditev bukve?



Naravna obnova nasadov smreke s
spopolnitvijo breze in jelke na Češkem

5 Umetna obnova

- saditev puljenk¹
 - izhodiščni sestoj
 - pridobivanje
 - saditev



Dobra kakovost jelke

Primerne puljenke jelke so zdrave, vitalne enoosne, z dovolj fini koreninami, h = 20-40 cm, premer koreninskega vratu ca. 3-5 mm



Prekopne vile



Slaba razčlenjenost

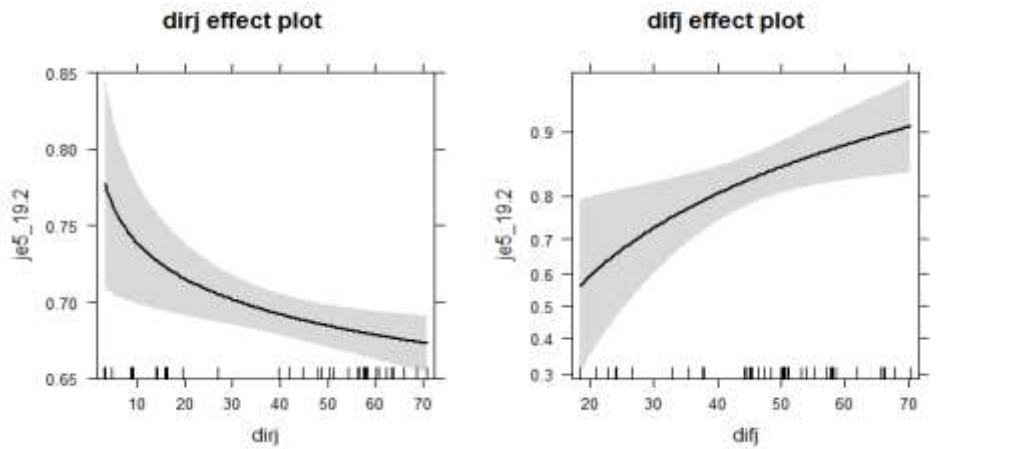


Neprimerna glavna korenina



Manjkajoče stranske korenine

5 Umetna obnova



Puljenke na Pahernikovi posesti, dve sezoni po saditvi 2018

5 Umetna obnova

- saditev
- puljenke
- setev (nizke gostote divjadi, prekopavanje, predatorstvo¹, erozija - terasiranje)



**Gozdna uprava
Eibenstock v Rudogorju:
podsetev jelke**

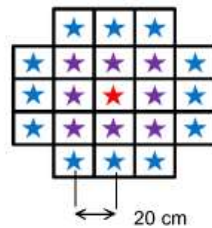


5 Umetna obnova

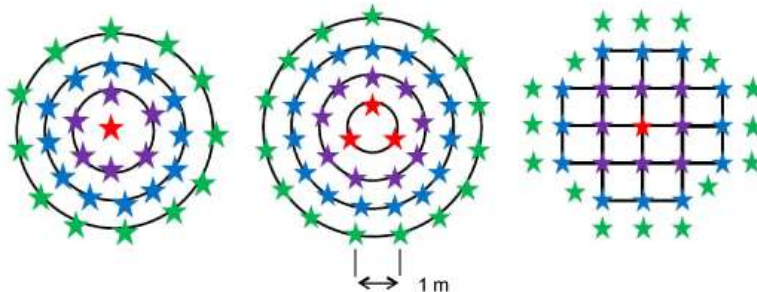
- kombinirana obnova¹ (obžetev), izbrana mesta, skupinska saditev (hrast)²

Somidh et al. 2013; Ehring in Oswald 2016

Gnezdo hrasta (h < 50 cm, 200 ha⁻¹)



Skupina hrasta (h > 80 cm, 100 ha⁻¹)



★ zunanji hrasti ★ notranji hrasti ★ centralni hrasti ★ dopolnilna vrsta



6 Nega mladega gozda po ujmah

- bujna razrast zeliščne¹, grmovne plasti in pionirjev
- selektivno uravnavanje konkurence (obžetev)²
- druga dela po desetletju³ (točkovno, 40-100 ha⁻¹, situacijska nega, ne premočno)





Pomanjkljiva nega nasada – sestojni robovi



Situacijsko redčenje v sukcesijskih sestojih po vetrolomu Lothar: izbranec češnje starosti 17 let in premerom 22 cm (kanton Aargau - CH)

7 Zaključki

- zmanjševanje tveganja¹
- sanitarna sečnja²
- presoja rastišča, sestoja in pomladka³
- naravna obnova⁴
- umetna obnova⁵: saditev, puljenke, setev, izboljšave
- težave s prekomernim objedanjem => kontrolne ograje in spremljanje objedenosti⁶
- nega: obžetev, kasneje zmerna in pogosto ukrepanje, vendar majhno število izbrancev, izobraževanje (DV)
- kvantificiranje učinkov sanacije => eksperimenti v naravi⁷