

Publications from the Swedish *Hylobius* Research Program (1997 – 2018)

International publications

- Axelsson, K., Konstanzer, V., Rajarao, G. K., Terenius, O., Seriot, L., Nordenhem, H., Nordlander, G. & Borg-Karlson, A.-K. 2017. Antifeedants produced by bacteria associated with the gut of the pine weevil *Hylobius abietis*. *Microbial Ecology* 74: 177-184. [\[ABSTRACT\]](#)
- Azeem, M., Rajarao, G. K., Nordenhem, H., Nordlander, G. & Borg-Karlson, A. K. 2013. *Penicillium expansum* volatiles reduce pine weevil attraction to host plants. *Journal of Chemical Ecology* 39: 120-128. [\[ABSTRACT\]](#)
- Azeem, M., Rajarao, G. K., Terenius, O., Nordlander, G., Nordenhem, H., Nagahama, K., Norin, E., & Borg-Karlson, A. K. 2015. A fungal metabolite masks the host plant odor for the pine weevil (*Hylobius abietis*). *Fungal Ecology* 13: 103-111. [\[FULL TEXT\]](#)
- Björklund, N. 2008. Cues for shelter use in a phytophagous insect. *Journal of Insect Behavior* 21: 9-23. [\[ABSTRACT\]](#) [\[FULL TEXT\]](#)
- Björklund, N. 2009. Non-destructive tree trunk funnel trap for capturing *Hylobius warreni* (Coleoptera: Curculionidae) ascending stems of trees. *The Canadian Entomologist* 141: 422-424. [\[ABSTRACT\]](#) [\[FULL TEXT\]](#)
- Björklund, N., Nordlander, G. & Bylund, H. 2003. Host-plant acceptance on mineral soil and humus by the pine weevil *Hylobius abietis* (L.). *Agricultural and Forest Entomology* 5: 61-65. [\[ABSTRACT\]](#) [\[FULL TEXT\]](#)
- Björklund, N., Nordlander, G. & Bylund H. 2005. Olfactory and visual stimuli used in orientation to conifer seedlings by the pine weevil, *Hylobius abietis*. *Physiological Entomology* 30: 225-231. [\[ABSTRACT\]](#) [\[FULL TEXT\]](#)
- Björkman, C., Bylund, H., Nilsson, U., Nordlander, G. & Schroeder, L. M. 2015. Forest management to mitigate insect damage in a changing climate. Pp. 248-266 *in*: Björkman, C. & Niemelä, P. (eds.) *Climate Change and Insect Pests*. CABI, UK, ix + 266 pp. ISBN-13: 978 1 78064 378 6.
- Bohman, B., Nordlander, G., Nordenhem, H., Sunnerheim, K., Borg-Karlson, A.-K., & Unelius, C. R. 2008. Structure–activity relationships of phenylpropanoids as antifeedants for the pine weevil *Hylobius abietis*. *Journal of Chemical Ecology* 34: 339-352. [\[ABSTRACT\]](#)
- Borg-Karlson, A.-K., Nordlander, G., Mudalige, A., Nordenhem, H. & Unelius, C. R. 2006. Antifeedants in the feces of the pine weevil *Hylobius abietis*: Identification and biological activity. *Journal of Chemical Ecology* 32: 943-957. [\[ABSTRACT\]](#)

- Bratt, K., Sunnerheim, K., Nordenhem, H., Nordlander, G. & Långström, B. 2001. Pine weevil (*Hylobius abietis*) antifeedants from lodgepole pine (*Pinus contorta*). *Journal of Chemical Ecology* 27: 2253-2262. [\[ABSTRACT\]](#)
- Bylund, H., Nordlander, G. & Nordenhem H. 2004. Feeding and oviposition rates in the pine weevil *Hylobius abietis* (Coleoptera: Curculionidae). *Bulletin of Entomological Research* 94: 307-317. [\[ABSTRACT\]](#)
- Danielsson, M., Kännaste, A., Lindström, A., Hellqvist, C., Stattin, E., Långström, B. & Borg-Karlson, A.-K. 2008. Mini-seedlings of *Picea abies* are less attacked by *Hylobius abietis* than conventional ones: Is plant chemistry the explanation? *Scandinavian Journal of Forest Research* 23: 299-306. [\[ABSTRACT\]](#)
- Day, K. R., Nordlander, G., Kenis, M. & Halldórson, G. 2004. General biology and life cycles of bark weevils. Chapter 14 (pp. 331-349), *in*: Lieutier, F., Day, K. R., Battisti, A. Grégoire, J.-C. & Evans, H. F. (eds.). *Bark and wood boring insects in living trees in Europe, a synthesis*. Kluwer Academic Publishers, Dordrecht. [\[ABSTRACT\]](#)
- Fedderwitz, F., Björklund, N., Ninkovic, V. & Nordlander, G. 2014. Diel behaviour and time budget of the adult pine weevil, *Hylobius abietis*. *Physiological Entomology* 39: 103-110. [\[ABSTRACT\]](#)
- Fedderwitz, F., Björklund, N., Ninkovic, V. & Nordlander, G. 2015. The structure of feeding behavior in a phytophagous insect (*Hylobius abietis*). *Entomologia Experimentalis et Applicata* 155: 229-239. [\[ABSTRACT\]](#)
- Fedderwitz, F., Nordlander, G., Ninkovic, V. & Björklund, N. 2016. Effects of jasmonate-induced resistance of conifer plants on the feeding behaviour of a bark-chewing insect, *Hylobius abietis*. *Journal of Pest Science* 89: 97-105 [\[ABSTRACT\]](#)
- Fedderwitz, F., Björklund, N., Ninkovic, V. & Nordlander, G. 2018. Does the pine weevil (*Hylobius abietis*) prefer conifer seedlings over other main food sources? *Silva Fennica* vol. 52(3): article id 9946 (9 pp.). [\[FULL TEXT\]](#)
- Hannertz, M., Thorsén, Å., Mattsson, S. & Weslien, J. 2002. Pine weevil (*Hylobius abietis*) damage to cuttings and seedlings of Norway spruce. *Forest Ecology and Management* 160: 11-17. [\[ABSTRACT\]](#)
- Johansson, K., Örlander, G. & Nilsson, U. 2006. Effects of mulching and insecticides on establishment and growth of Norway spruce. *Canadian Journal of Forest Research* 36: 2377-2385. [\[ABSTRACT\]](#)
- Kännaste, A., Nordenhem, H., Nordlander, G. & Borg-Karlson, A.-K. 2009. Volatiles from a mite-infested spruce clone and their effects on pine weevil behavior. *Journal of Chemical Ecology* 35: 1262-1271. [\[ABSTRACT\]](#)
- Kindvall, O., Nordlander, G. & Nordenhem, H. 2000. Movement behaviour of the pine weevil *Hylobius abietis* in relation to soil type: an arena experiment. *Entomologia Experimentalis et Applicata* 95: 53-61. [\[ABSTRACT\]](#)
- Klingenberg, M.D., Björklund, N. & Aukema, B.H. 2010. Seeing the forest through the trees: differential dispersal of *Hylobius warreni* Wood within modified forest habitats. *Environmental Entomology* 39: 898-906. [\[ABSTRACT\]](#) [\[FULL TEXT\]](#)
- Legrand, S., Nordlander, G., Nordenhem, H., Borg-Karlson, A.-K. & Unelius, C. R. 2004. Hydroxy-methoxybenzoic methyl esters: synthesis and antifeedant activity on the pine weevil, *Hylobius abietis*. *Zeitschrift für Naturforschung* 59b: 829-835. [\[ABSTRACT\]](#)

- Lieutier, F., Day, K. R., Evans, H. F. & Långström, B. 2004. General conclusions and research priorities for BAWBILT organisms in Europe. Chapter 23 (pp. 541-552), *in*: Lieutier, F., Day, K.R., Battisti, A., Grégoire, J.-C. & Evans, H.F. (eds.). Bark and wood boring insects in living trees in Europe, a synthesis. Kluwer Academic Publishers, Dordrecht. [\[ABSTRACT\]](#)
- Lundborg, L., Fedderwitz, F., Björklund, N., Nordlander, G. & Borg-Karlson, A.-K. &. 2016. Induced defenses change the chemical composition of pine seedlings and influence meal properties of the pine weevil *Hylobius abietis*. *Phytochemistry* 130: 99-105. [\[ABSTRACT\]](#)
- Lundborg, L., Nordlander, G., Björklund, N., Nordenhem, H. & Borg-Karlson, A.-K. 2016. Methyl jasmonate induced monoterpenes in Scots pine and Norway spruce tissues affect pine weevil orientation. *Journal of Chemical Ecology* 42: 1237-1246. [\[ABSTRACT\]](#)
- Långström, B. & Day, K. R. 2004. Damage, control and management of weevil pests, especially *Hylobius abietis*. Chapter 19 (pp. 415-444), *in*: Lieutier, F., Day, K.R., Battisti, A., Grégoire, J.-C. & Evans, H.F. (eds.). Bark and wood boring insects in living trees in Europe, a synthesis. Kluwer Academic Publishers, Dordrecht. [\[ABSTRACT\]](#)
- Maňák, V., Nordenhem, H., Björklund, N., Lenoir, L. & Nordlander, G. 2013. Ants protect conifer seedlings from feeding damage by the pine weevil *Hylobius abietis*. *Agricultural and Forest Entomology* 15: 98-105. [\[ABSTRACT\]](#)
- Maňák, V., Björklund, N., Lenoir, L. & Nordlander, G. 2015. The effect of red wood ant abundance on feeding damage by the pine weevil *Hylobius abietis*. *Agricultural and Forest Entomology* 17: 57-63. [\[ABSTRACT\]](#)
- Maňák, V., Björklund, N., Lenoir, L., Knape, J. & Nordlander, G. 2016. Behavioural responses of pine weevils to non-consumptive interactions with red wood ants. *Journal of Zoology* 299: 10-16. [\[ABSTRACT\]](#)
- Maňák, V., Björklund, N., Lenoir, L., & Nordlander, G. 2017. Testing associational resistance against pine weevils mediated by *Lasius* ants attending conifer seedlings. *Journal of Applied Entomology* 141: 411-416. [\[ABSTRACT\]](#)
- Nordlander, G., Nordenhem, H. & Bylund, H. 1997. Oviposition patterns of the pine weevil *Hylobius abietis*. *Entomologia Experimentalis et Applicata* 85: 1-9. [\[ABSTRACT\]](#)
- Nordlander, G., Bylund, H., Örlander, G. & Wallertz, K. 2003. Pine weevil population density and damage to coniferous seedlings in a regeneration area with and without shelterwood. *Scandinavian Journal of Forest Research* 18: 438-448. [\[ABSTRACT\]](#)
- Nordlander, G., Örlander, G. & Langvall, O. 2003. Feeding by the pine weevil *Hylobius abietis* in relation to sun exposure and distance to forest edges. *Agricultural and Forest Entomology* 5: 191-198. [\[ABSTRACT\]](#)
- Nordlander, G., Bylund, H. & Björklund, N. 2005. Soil type and microtopography influencing feeding above and below ground by the pine weevil *Hylobius abietis* (L.). *Agricultural and Forest Entomology* 7: 107-113. [\[ABSTRACT\]](#)
- Nordlander, G., Nordenhem, H. & Hellqvist, C. 2009. A flexible sand coating (Conniflex) for the protection of conifer seedlings against damage by the pine weevil, *Hylobius abietis*. *Agricultural and Forest Entomology* 11:91-100. [\[ABSTRACT\]](#)
- Nordlander, G., Hellqvist, C., Johansson, K. & Nordenhem H. 2011. Regeneration of European boreal forests: Effectiveness of measures against seedling mortality caused by the pine weevil *Hylobius abietis*. *Forest Ecology and Management* 262: 2354-2363. [\[ABSTRACT\]](#)

- Nordlander, G., Hellqvist, C. & Hjelm, K. 2017a. Replanting conifer seedlings after pine weevil emigration in spring decreases feeding damage and seedling mortality. *Scandinavian Journal of Forest Research* 32: 60-67. [\[ABSTRACT\]](#)
- Nordlander, G., Mason, E. G., Hjelm, K., Nordenhem H. & Hellqvist, C. 2017b. Influence of climate and forest management on damage risk by the pine weevil *Hylobius abietis* in northern Sweden. *Silva Fennica* 51(5): article id 7751 (20 pp.). [\[FULL TEXT\]](#)
- Puentes, A., Högberg, K.-A., Björklund, N., & Nordlander, G. 2018. Novel avenues for plant protection: Plant propagation by somatic embryogenesis enhances resistance to insect feeding *Frontiers in Plant Science* 9: 1553 (9 pp. + Appendix). [\[FULL TEXT\]](#)
- Petersson, M. & Örlander, G. 2003. Effectiveness of combinations of shelterwood, scarification, and feeding barriers to reduce pine weevil damage. *Canadian Journal of Forest Research* 33: 64-73. [\[ABSTRACT\]](#)
- Petersson, M., Örlander, G. & Nilsson, U. 2004. Feeding barriers to reduce damage by pine weevil (*Hylobius abietis*). *Scandinavian Journal of Forest Research* 19: 48-59. [\[ABSTRACT\]](#)
- Petersson, M., Örlander, G. & Nordlander, G. 2005. Soil features affecting damage to conifer seedlings by the pine weevil *Hylobius abietis*. *Forestry* 78: 83-92. [\[ABSTRACT\]](#)
- Petersson, M., Nordlander, G. & Örlander, G. 2006. Why vegetation increases pine weevil damage: Bridge or shelter? *Forest Ecology and Management* 225: 368-377. [\[ABSTRACT\]](#)
- Sunnerheim, K., Nordqvist, A., Nordlander, G., Borg-Karlson, A.-K., Unelius, C. R., Bohman, B., Nordenhem, H., Hellqvist, C. & Karlén, A. 2007. Quantitative structure–activity relationships of pine weevil antifeedants, a multivariate approach. *Journal of Agricultural and Food Chemistry* 55: 9365-9372. [\[ABSTRACT\]](#)
- Terenius, O., Björklund, N., Jaenson, T. G. T. & Nordlander, G. 2014. Premature proposal of the pine weevil as a vector of a human pathogen. *Journal of Clinical Microbiology* 52: 4115. [\[ABSTRACT\]](#)
- Thorsén, Å., Mattsson, S. & Weslien, J. 2001. Influence of stem diameter on the survival and growth of containerized Norway spruce seedlings attacked by pine weevils (*Hylobius* spp.). *Scandinavian Journal of Forest Research* 16: 54-66. [\[ABSTRACT\]](#)
- Unelius, C. R., Nordlander, G., Nordenhem, H., Hellqvist, C., Legrand, S. & Borg-Karlson, A.-K. 2006. Structure–activity relationships of benzoic acid derivatives as antifeedants for the pine weevil, *Hylobius abietis*. *Journal of Chemical Ecology* 32: 2191-2203. [\[ABSTRACT\]](#)
- Unelius, C. R., Bohman, B. & Nordlander, G. 2018. Comparison of phenylacetates with benzoates and phenylpropanoates as antifeedants for the pine weevil, *Hylobius abietis*. *Agricultural and Food Chemistry* 66: 11797-11805. [\[ABSTRACT\]](#)
- von Hofsten, H. & Weslien, J. 2005. Temporal patterns of seedling mortality by pine weevils (*Hylobius abietis*) after prescribed burning in northern Sweden. *Scandinavian Journal of Forest Research* 20:130-135. [\[ABSTRACT\]](#)
- Wallertz, K. & Malmqvist, C. 2013. The effect of mechanical site preparation methods on the establishment of Norway spruce (*Picea abies* (L.) Karst.) and Douglas fir (*Pseudotsuga menziesii* (Mirb.) Franco) in southern Sweden. *Forestry* 86: 71-78. [\[ABSTRACT\]](#)

- Wallertz, K. & Petersson, M. 2011. Pine weevil damage to Norway spruce seedlings: effects of nutrient-loading, soil inversion and physical protection during seedling establishment. *Agricultural and Forest Entomology* 13: 413-421. [\[ABSTRACT\]](#)
- Wallertz, K., Örländer, G. & Luoranen, J. 2005. Damage by pine weevil *Hylobius abietis* to conifer seedlings after shelterwood removal. *Scandinavian Journal of Forest Research* 20: 412-420. [\[ABSTRACT\]](#)
- Wallertz, K., Nordlander, G. & Örländer, G. 2006. Feeding on roots in the humus layer by adult pine weevil, *Hylobius abietis*. *Agricultural and Forest Entomology* 8: 273-279. [\[ABSTRACT\]](#)
- Wallertz, K., Nordenhem, H. & Nordlander, G. 2014. Damage by the pine weevil *Hylobius abietis* to seedlings of two native and five introduced tree species in Sweden. *Silva Fennica* 48(4): article id 1188, 14 pp. [\[ABSTRACT\]](#)
- Wallertz, K., Hanssen, K. H., Hjelm, K. & Floistad, I. S. 2016. Effects of planting time on pine weevil (*Hylobius abietis*) damage to Norway spruce seedlings. *Scandinavian Journal of Forest Research* 31: 362-370. [\[ABSTRACT\]](#)
- Wallertz, K., Björklund, N., Hjelm, K., Petersson, M. & Sundblad L.-G. Comparison of different site preparation techniques: quality of planting spots, seedling growth and pine weevil damage. *New Forests* 49: 705-722. [\[FULL TEXT\]](#)
- Zas, R., Björklund, N., Nordlander, G., Cendán, C., Hellqvist, C. & Sampedro, L. 2014. Exploiting jasmonate-induced responses for field protection of conifer seedlings against a major forest pest, *Hylobius abietis*. *Forest Ecology and Management* 313: 212-223. [\[FULL TEXT\]](#)
- Öhrn, P., Klingenberg, M., Hopkins, G. & Björklund, N. 2008 Two non-destructive techniques for determining the sex of live adult *Hylobius warreni*. *The Canadian Entomologist* 140: 617-620. [\[ABSTRACT\]](#) [\[FULL TEXT\]](#)
- Örländer, G. & Nilsson, U. 1999. Effect of reforestation methods on pine weevil (*Hylobius abietis*) damage and seedling survival. *Scandinavian Journal of Forest Research* 14: 341-354. [\[ABSTRACT\]](#)
- Örländer, G. & Nordlander, G. 2003. Effects of field vegetation control on pine weevil (*Hylobius abietis*) damage to newly planted Norway spruce seedlings. *Annals of Forest Science* 60: 667-671. [\[FULL TEXT\]](#)
- Örländer, G., Nilsson, U. & Nordlander, G. 1997. Pine weevil abundance on clearcuts of different ages: a 6-year study using pitfall traps. *Scandinavian Journal of Forest Research* 12: 225-240. [\[ABSTRACT\]](#)
- Örländer, G., Nordlander, G., Wallertz, K. & Nordenhem, H. 2000. Feeding in the crowns of Scots pine trees by the pine weevil *Hylobius abietis*. *Scandinavian Journal of Forest Research* 15: 194-201. [\[ABSTRACT\]](#)
- Örländer, G., Nordlander, G. & Wallertz, K. 2001. Extra food supply decreases damage by the pine weevil *Hylobius abietis*. *Scandinavian Journal of Forest Research* 16: 450-454. [\[ABSTRACT\]](#)

Doctoral theses

- Björklund, N. 2004. Movement Behaviour and Resource Tracking in the Pine Weevil *Hylobius abietis*. Doctoral thesis, Swedish University of Agricultural Sciences. Acta Universitatis Agriculturae Sueciae, Silvestria 302. ISSN 1401-6230. [\[LINK\]](#)
- Fedderwitz, F. 2014. Pine weevil feeding behavior in relation to conifer plant properties. Doctoral Thesis No. 2014:106, Faculty of Forest Sciences, Swedish University of Agricultural Sciences, Uppsala. ISSN 1652-6880. [\[LINK\]](#)
- Manak, V. 2014. Interactions between ants and pine weevils: Effects on forest regeneration. Doctoral Thesis No. 2014:104, Faculty of Forest Sciences, Swedish University of Agricultural Sciences, Uppsala. ISSN 1652-6880. [\[LINK\]](#)
- Petersson, M. 2004. Regeneration Methods to Reduce Damage by Pine Weevil to Conifer Seedlings. Doctoral thesis, Swedish University of Agricultural Sciences. Acta Universitatis Agriculturae Sueciae, Silvestria 330. ISSN 1401-6230. [\[LINK\]](#)
- Wallertz, K. 2009. Pine weevil feeding in Scots pine and Norway spruce regenerations. Doctoral thesis, Swedish University of Agricultural Sciences. Acta Universitatis Agriculturae Sueciae No. 2009: 60. ISSN 1562-6880. [\[LINK\]](#)

Licential thesis

- Wallertz, K. 2005. Pine weevil *Hylobius abietis* feeding in shelterwood systems. Licentiate thesis, Swedish University of Agricultural Sciences, Alnarp, Sweden. ISBN 91-576-6875-2. [\[LINK\]](#)

Conference abstracts

- Björklund, N. 2006. Sensory cues for shelter use. P. 139 in: Proceedings IUFRO Kanazawa 2003 International Symposium "Forest Insect Population Dynamics and host Influences". Kanazawa University, Japan, 176 pp. [\[ABSTRACT\]](#)
- Björklund, N., Nordlander, G., Fedderwitz, F., Ninkovic, V. Lundborg, L., Sampedro, L. & Zas, R. 2015. Improved forest regeneration by triggering the induced defence of conifer seedlings against bark-feeding insects. P 163 in: ISCE2015, International Society of Chemical Ecology, Stockholm, Sweden 29th June – 3rd July, 2015.
- Bylund, H., Nordenhem, H. & Nordlander, G. 2006. Is the parasitoid *Perilitus areolaris* a significant mortality factor for adult pine weevils? P. 144 in: Proceedings IUFRO Kanazawa 2003 International Symposium "Forest Insect Population Dynamics and host Influences". Kanazawa University, Japan, 176 pp. [\[ABSTRACT\]](#)
- Bylund, H., Petersson, M. & Nordlander, G. 2007. Is the pine weevil population density limited by the amount of breeding resources? (Abstract, 1 p.) Programme IUFRO Wien 2007 Symposium "Natural enemies and other multi-scale influences on forest insects". University of Natural Resources and Applied Life Sciences, BOKU-Vienna, Austria.
- Fedderwitz, F., Björklund, N., Ninkovic, V. & Nordlander, G. 2012. Pine weevil (*Hylobius abietis*) feeding pattern on conifer seedlings. P. 333-337 in: Proceedings of Measuring Behaviour 2012, 28-31 August 2012, Utrecht, The Netherlands, 524 pp.

- Fedderwitz, F., Björklund, N. & Nordlander, G. 2017. Artificially induced defences against pine weevil damage. P 49, Abstract Book, Joint Meeting of IUFRO WPs 7.03.05 & 7.03.10. 11-15, Forest Insects and Pathogenes in a Changing Environment: Ecology, Monitoring & Genetics, 11-15 September 2017, Thessaloniki, Greece.
- Nordlander, G. 2007. Reproduction of *Hylobius abietis* in roots of storm-felled trees: Quality determines resource availability. (Abstract of poster, 1 p.) Programme IUFRO Wien 2007 Symposium “Natural enemies and other multi-scale influences on forest insects”. University of Natural Resources and Applied Life Sciences, BOKU-Vienna, Austria.
- Nordlander, G. 2017. Insecticides are phased out in Swedish forestry – physical protection of seedlings takes over. P 68, Abstract Book, Joint Meeting of IUFRO WPs 7.03.05 & 7.03.10. 11-15, Forest Insects and Pathogenes in a Changing Environment: Ecology, Monitoring & Genetics, 11-15 September 2017, Thessaloniki, Greece.
- Weslien, J. 2004. Apparent genotypic resistance in Norway spruce to feeding by the weevil *Hylobius abietis*. XXII International Congress of Entomology, 15-21 Aug. 2004 Oral presentations, Abstracts, ISBN 0-646-43816-6, Brisbane Australia.
- Zas, R., Björklund, N., Nordlander, G., Cendán, C., Hellqvist, C. & Sampedro, L. 2013. Moving to the field: effective protection of conifer seedlings against a forest pest by eliciting jasmonate-induced resistance. Proceedings: Induced resistance in plants against insects and diseases, Avignon, France, 10-13 June 2013. IOBC-WPRS Bulletin 89: 277-281.

Patents

- Nordenhem, H. & Nordlander, G. 2002. Protection of tree plants. Swedish and EPC Patent 02798893.0-2103-SE0201693. [\[LINK\]](#)
- Nordlander, G., Nordenhem, H., Borg-Karlson, A.-K. & Unelius, R. 2000. Use for conifer sapling protection. Swedish and PCT Patent WO 0056152 A1. [\[LINK\]](#)
- Sunnerheim, K., Nordlander, G., Bratt, K., Nordenhem, R., Unelius, R. & Borg-Karlson, A.-K. 2002. Use for conifer sapling protection. Swedish and PCT Patent WO 015691 A1. [\[LINK\]](#)