**Pivovar M., Mezei P., Duračiová R., Jakuš R.,** 2025. Sentinel-2 and environmental data as predictors of the spatiotemporal dynamics of bark beetle (Coleoptera: Scolytinae) - induced tree mortality in natural spruce forests

**Table S1** Scenes selected from the Sentinel imagery. The forest cover was classified for each year. We assessed the types of large-scale disturbances based on a priori knowledge of their occurrence within a specific year.

| Year | Acquisition date | Sensing time | Sentinel launch | Mapped disturbances |
|---|---|---|---|---|
| 2015 | October 3 | 09:40 a.m. | S2A | W, HF* |
| 2016 | September 30 | 09:50 a.m. | S2A | W, BB, HF* |
| 2017 | October 2 | 09:40 a.m. | S2A | W, BB, HF* |
| 2018 | September 30 | 09:50 a.m. | S2A | W, BB, HF* |
| 2019 | September 22 | 09:40 a.m. | S2A | W, BB, HF* |
| 2020 | September 21 | 09:40 a.m. | S2B | W, BB, HF* |
| 2021 | September 11 | 09:40 a.m. | S2A | W, BB, HF* |

*BB – Bark Beetle caused tree mortality, HF – Health Forest, W – Windthrow

**Table S2** Extent of forest damage and area of healthy forest obtained using MAXL supervised classification.

| Type | Year | Area (ha) |
|---|---|---|
| Forest | 2015 | 1706,94 |
| | 2016 | 1706,94 |
| | 2017 | 1461,40 |
| | 2018 | 1529,64 |
| | 2019 | 1635,05 |
| | 2020 | 1539,47 |
| | 2021 | 1503,09 |
| Initial | 2016 | 21,33 |
| | 2017 | 15,31 |
| | 2018 | 2,94 |
| | 2019 | 1,12 |
| | 2020 | 5,29 |
| | 2021 | 5,49 |
| Spread | 2016 | 184,78 |
| | 2017 | 181,78 |
| | 2018 | 127,34 |
| | 2019 | 51,72 |
| | 2020 | 139,9 |
| | 2021 | 115,11 |
| Windthrow | 2015 | 401,28 |

The data from which Fig. 3 was created divided by bark beetle infestation type, windthrow and healthy forest are shown in Table S2.

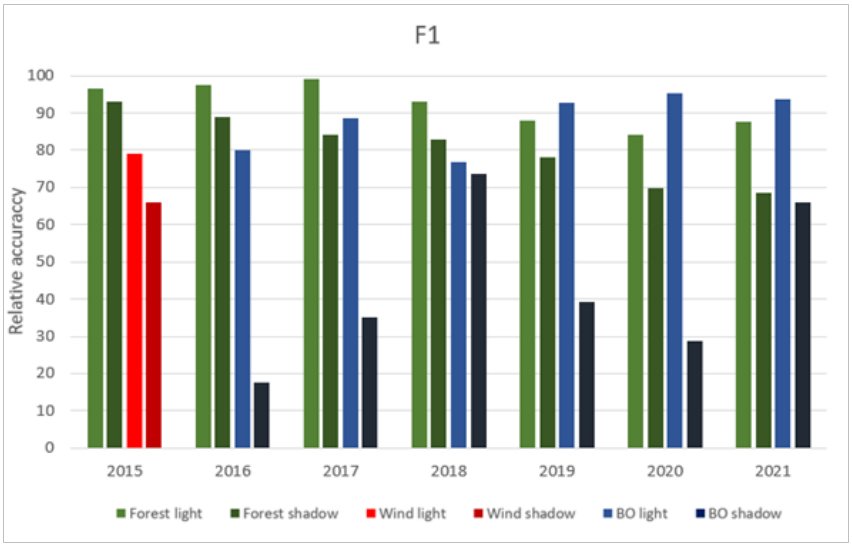


**Fig S1:** Harmonized mean accuracy and recall of MAXL classification using F1 scores for each forest damage class and healthy forest.

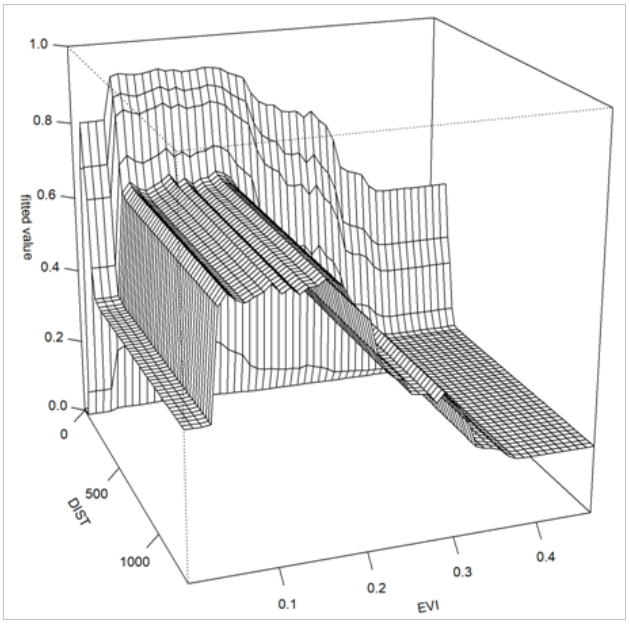


**Fig S2:** Prediction of bark beetle infestation on previously undamaged forest stands in a combination of strong correlations of spatial and spectral characteristics in 2017.

As an example of the dependence of the vegetation index EVI with the spatial characteristic Distance is shown in Fig. S2, in which we can see the strong influence of the bark beetle infestation within a distance of about 80 meters on parts of the forest that do not touch the damaged forest of the previous year and have a relatively higher level of physiological stress.

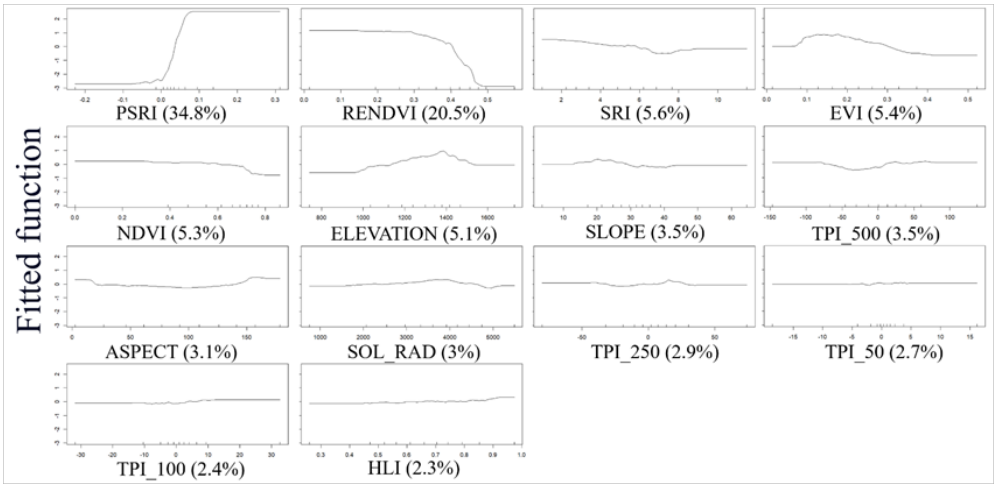


**Fig S3:** All predictor variables for wind disturbance based on BRT analysis in the Suchá dolina valley in 2014. The units of the x-axis variables are listed in Table 1.

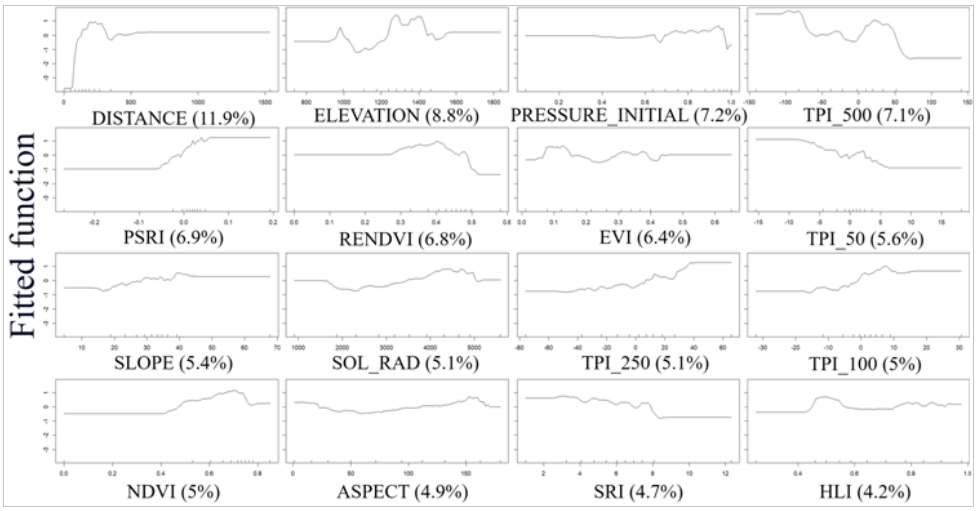


**Fig S4:** All predictor variables for initial bark beetle cased tree mortality based on BRT analysis between 2015 and 2016.

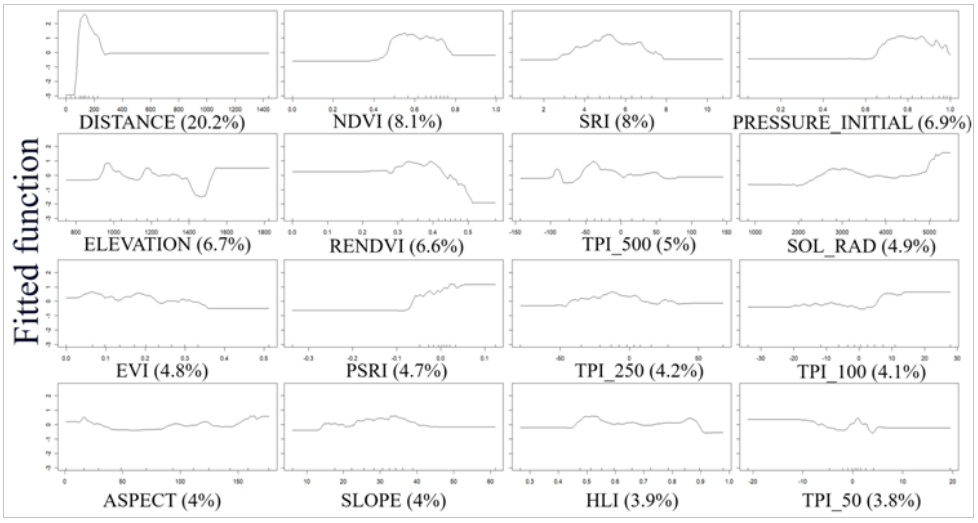


**Fig S5:** All predictor variables for initial bark beetle cased tree mortality based on BRT analysis between 2016 and 2017.

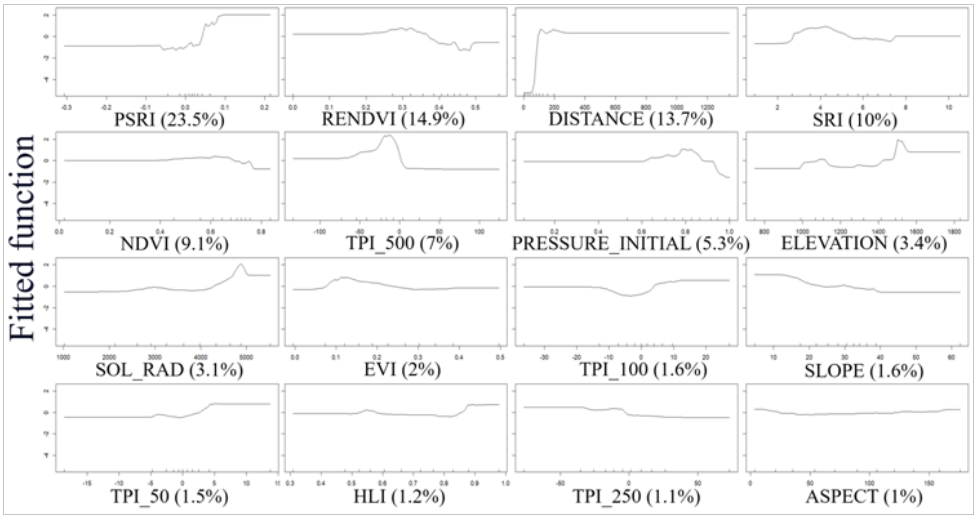


**Fig S6:** All predictor variables for initial bark beetle cased tree mortality based on BRT analysis between 2017 and 2018.

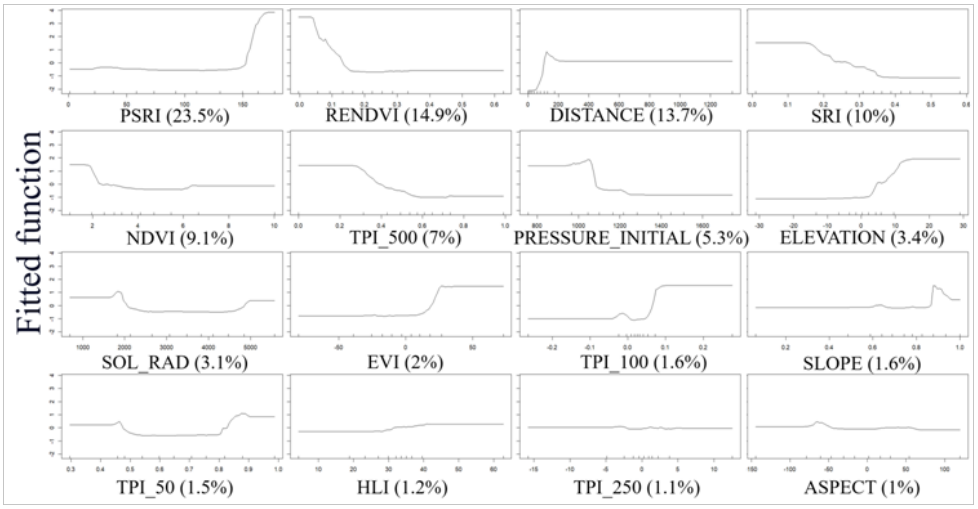


**Fig S7:** All predictor variables for initial bark beetle cased tree mortality based on BRT analysis between 2018 and 2019.

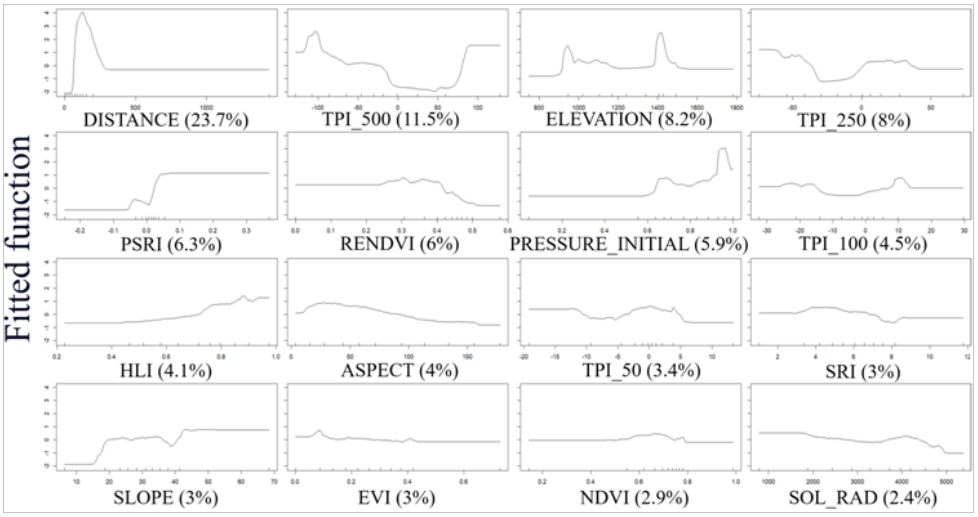


**Fig S8:** All predictor variables for initial bark beetle cased tree mortality based on BRT analysis between 2019 and 2020.

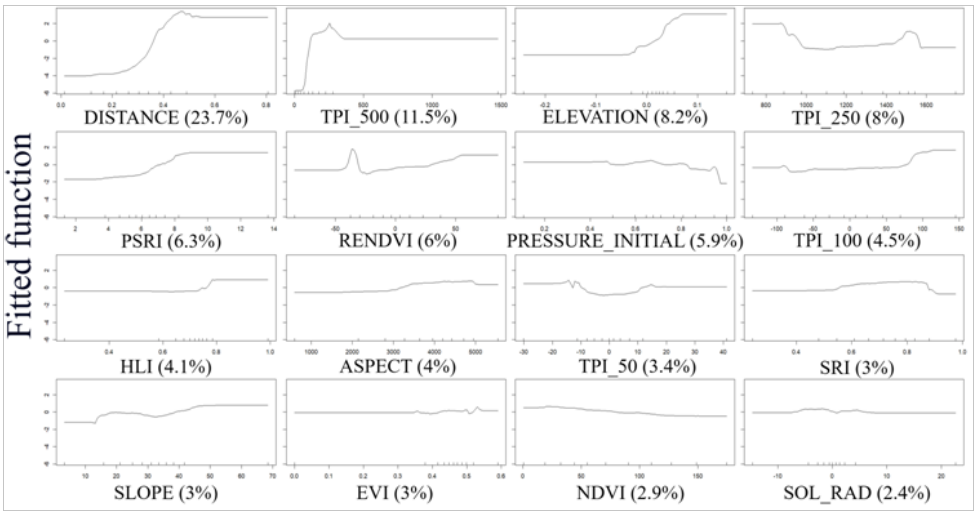


**Fig S9:** All predictor variables for initial bark beetle cased tree mortality based on BRT analysis between 2020 and 2021.

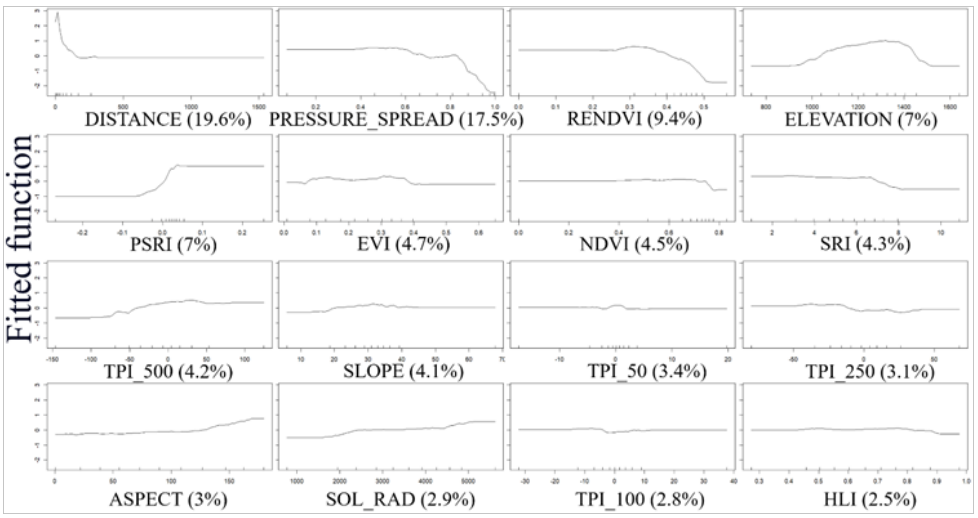


**Fig S10:** Most important predictor variables for the spread of bark beetle-induced tree mortality between 2015 and 2016.

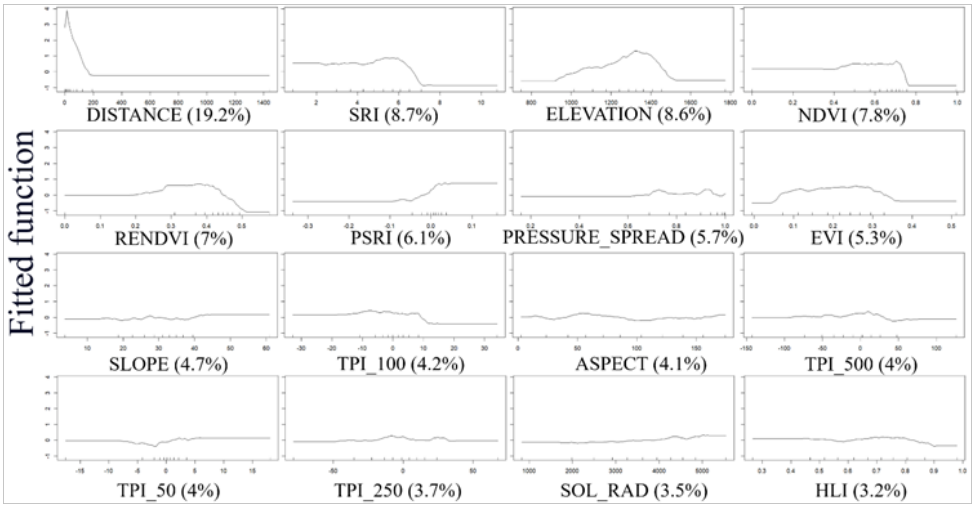


**Fig S11:** Most important predictor variables for the spread of bark beetle-induced tree mortality between 2016 and 2017.

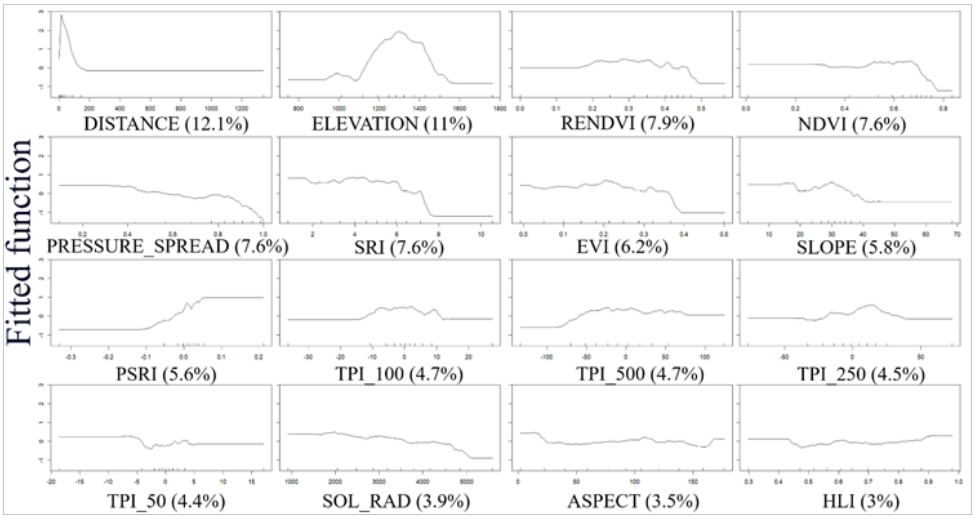


**Fig S12:** Most important predictor variables for the spread of bark beetle-induced tree mortality between 2017 and 2018.

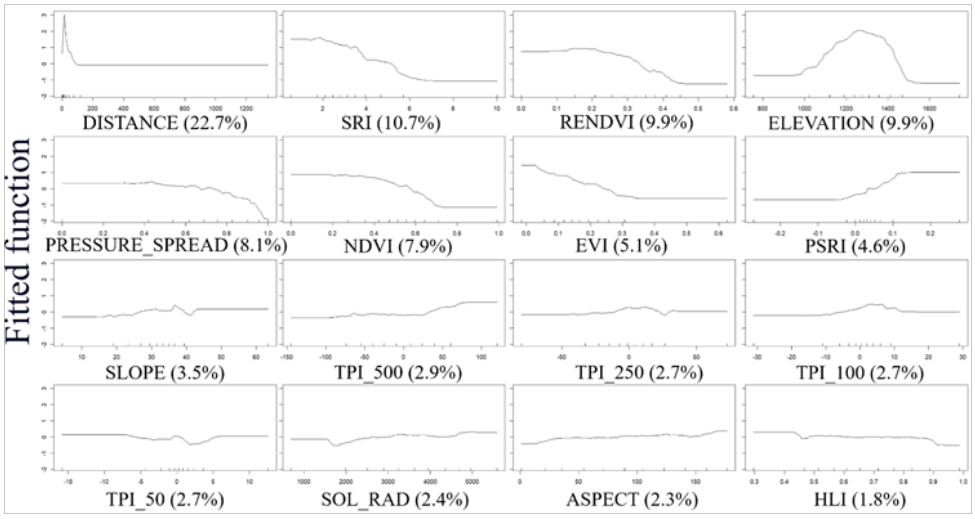


**Fig S13:** Most important predictor variables for the spread of bark beetle-induced tree mortality between 2018 and 2019.

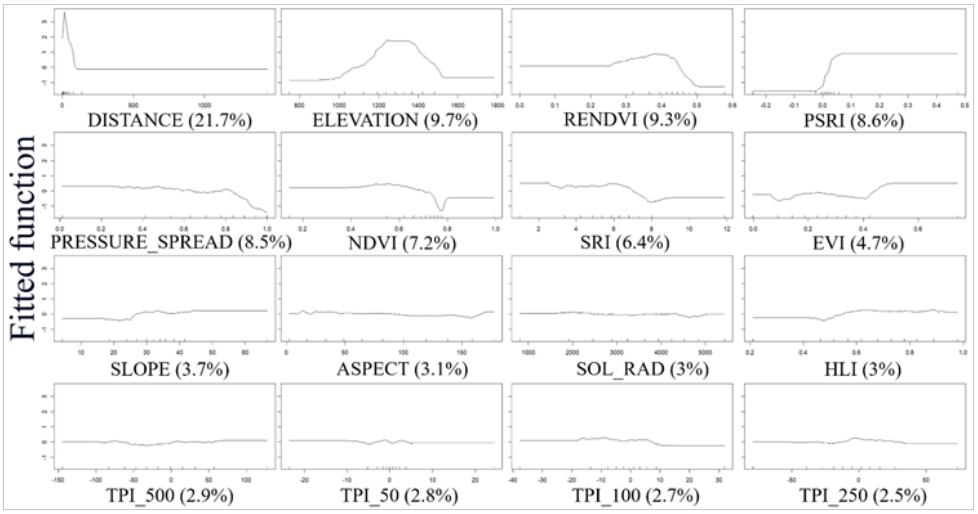


**Fig S14:** Most important predictor variables for the spread of bark beetle-induced tree mortality between 2019 and 2020.

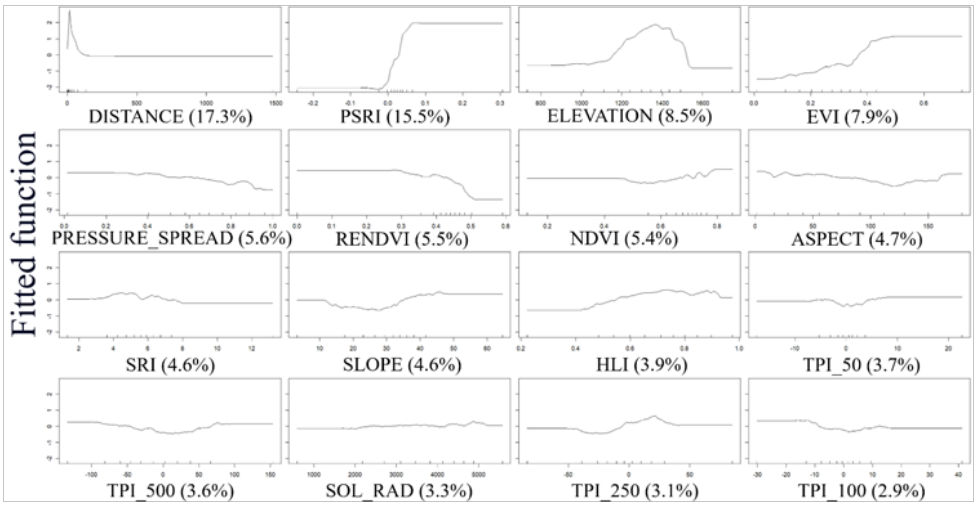


**Fig S15:** Most important predictor variables for the spread of bark beetle-induced tree mortality between 2020 and 2021.