

Geo-database of Dothistroma Needle Blight Distribution

The objective of this database is to collate known records of dothistroma needle blight (DNB) spatially across Europe and related survey data i.e. on disease intensity, host and environmental conditions including stand management. A certain number of the fields will be compulsory to allow basic analysis of disease distribution by host species to be analysed, and how this has changed over time. The voluntary fields will allow more detailed analysis to be undertaken such as the potential impacts of habitat, stand composition, soil, altitude, host age/height on DNB to be assessed.

Explanation of fields and acceptable data format

NOTE! PLEASE USE MICROSOFT EXCEL 2010 OR NEWER TO FILL THE DATABASE. IF YOU USE OLDER VERSION OF EXCEL THEN THE DROP DOWN LIST MAY NOT WORK THEN YOU HAVE TO FILL DATABASE MANUALLY ACCORDING THE MANUAL.

COMPULSORY FIELDS

1. *Record code*: this field will be filled automatically. Please do not fill. Every country should insert the data into separate files!
2. *Country*: The ISO 3166-1-alpha-2 Country codes should be used from the drop down list.
3. *Location Co-ordinates*: The location should be recorded as point data (latitude and longitude) using the WGS 84 standard, use this format: 58.50372 and 26.54997 (it means: N58.50372° E 26.54997). Please insert the Co-ordinates to database without letters and °!!!
4. *Data holder and identifier*: The name of the person who collected and holds the data and who identified Dothistroma e.g. Jankovsky, L. or Jankovsky et al. (if more than one identifier).
5. *Institution of data holder*
6. *Data holder's email address*. This is to allow traceability.
7. *Host species*: Add part of the host name and then choose from the dropdown list. Following Farjon, A. (2001). World checklist and bibliography of conifers (Royal Botanic Gardens, Kew.). Each host on the site should be entered as a separate record.

8. *DNB presence and species:*

DNB Not Found

Dothistroma septosporum present (for confirmed *D. septosporum*)

Dothistroma pini present (for confirmed *D. pini*)

D. septosporum and pini present (where both species have been confirmed)

DNB present (*Dothistroma Needle Blight*) (where the species of *Dothistroma* has not been confirmed by molecular methods).

9. Teleomorph (sexual stage) *Mycosphaerella pini* has been found

YES / NO

If yes, add more specific details (date, on which needle – fallen, attached on tree). Specify in part of "host comments".

10. *Identification method:*

1= a good eye and expertise

2 = *Dothistroma* spores seen with compound microscope

3 = species-specific PCR (conventional PCR and real time PCR)

4 = sequencing

5 = pyrosequencing

Other (specify)

If more than one method, so mention always the higher (more specific) one.

11. *Date:* The exact date the site/tree was surveyed or inspected. Use format year, month, day: 2014-03-13.

OPTIONAL FIELDS

A HOST DATA

12. *Source:* the nursery source of the tree(s). I.e. where they were raised before being planted (or seeded or naturally regenerated) at the current site. This allows us to trace the movement of *Dothistroma* in a country/continent.

Please add the numbers to table on the list below.

- 1 = Natural regeneration
- 2 = Seeds
- 3 = Seedlings (potentially specify location of nursery with WGS 84 standard and name it in host comments).
- 4 = Mixed
- 5 = Unknown

13. *Provenance*: where the seed for the tree(s) came from i.e. the seed orchard. This allows us to gather information on susceptibility of different provenances. (Please name the *provenance*, see explanation in point 12).

14. *Origin*: where the species/variety is originally from.

An example of source, provenance and origin: A stand of *Pinus radiata* (Monterey pine) is surveyed for DNB in England. When planted the seedlings came from a nursery in Dumfries, Scotland – this is the source. The nursery in Dumfries, Scotland got the seeds from a seed orchard in Aberdeenshire, Scotland – this is the provenance. The seed orchard and *Pinus radiata* as a species originated from a specific area in Monterey, California – this is the origin.

15. *Needle classes of needles infected*: The year the infected **needles** grew in. E.g. if surveying in the summer of 2013 and *Dothistroma* is noted on the previous year’s needles then this field should read 2012 (see figure 1). If it is noted on two year old needles then this field should read 2011. If on more than one years’ worth of needles then enter both years separated by a comma e.g. 2012, 2011.

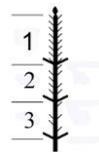


Figure 1. For example surveying in the summer of 2013 then means 2013 (current year needles), 2012 (previous year or two years old needles), 2011 (three years old needles) etc.

16. *Age of tree(s)*: in categories

- 1 = Unknown
- 2 = <10 years
- 3 = 10 – 30 years
- 4 = 31 – 50 years
- 5 = 51 – 70 years
- 6 = 71 – 90 years
- 7 = >90 years

17. *Height of tree(s):* estimation in classes

- 1 = <1 metre
- 2 = 1 – 2 metres
- 3 = 3 – 5 metres
- 4 = 6 – 10 metres
- 5 = 11 – 15 metres
- 6 = 16 – 20 metres
- 7 = 21 – 30 metres
- 8 = 31 - 40 metres
- 9 = > 40 metres

18. *Mean stand (or tree) diameter at breast height (in cm).* If the trees height is less than 1.3 m then insert “0”.

19. *Planting or stand density:* in categories

- 1 = <1000 stems or seedlings per hectare
- 2 = 1000 – 3000 stems per hectare
- 3 = > 3000 stems per hectare

20. *Other pathogens on site:* Choose from the list (below) of common European pathogens or enter one freehand (other). See details in Cech, T., 2012 Coming across other fungi on pine while looking for Dothistroma.

[http://www.forestry.gov.uk/pdf/DIAROD_052012_Fungi_Cech.pdf/\\$FILE/DIAROD_052012_Fungi_Cech.pdf](http://www.forestry.gov.uk/pdf/DIAROD_052012_Fungi_Cech.pdf/$FILE/DIAROD_052012_Fungi_Cech.pdf)

- Armillaria* spp.
- Anthostomella* spp.
- Cenangium acuum*
- Coleosporium* spp.
- Cyclaneusma* sp.
- Diplodia pinea* (syn. *Sphaeropsis sapinea*)
- Epicoccum nigrum*
- Gremmeniella abietina*
- Hendersonia acicula*
- Heterobasidion annosum s.l.*
- Lecanosticta acicola*
- Lophodermella sulcigena*
- Lophodermella conjuncta*
- Lophodermium pinastri*
- Lophodermium seditiosum*
- Phacidium infestans*
- Phacidium lacerum*
- Sclerophoma pithyophila*
- Thyriopsis halepensis*
- Zythiostroma pinastri*
- NO other pathogen

Other

21. *Other pathogen observed on the same tree or needle*

NO other pathogen
Lecanosticta acicola
Lophodermium pinastri/seditiosum
Diplodia pinea (syn. *Sphaeropsis sapinea*)
Cyclaneusma sp.
Phacidium infestans
Sclerophoma pithyophila
Coleosporium spp.
Other, name it

22. *Other stress factors acting on the tree or site*

1 = insect
2 = mammal
3 = fire damage
4 = wind damage
5 = salt damage
Other, name it

22. *Host comments: if you have any additional notes for host.*

B SITE DATA

23. *Site name*

Specify the name of the site in your database.

24. *Type of planting*

Please add abbreviations:

U = urban greenery
FP = forest plantation
NR = natural regeneration
A = arboretum
XTP = Christmas tree plantation
N = nursery
Other (please specify it)

25. *Area affected (ha)*

Please estimate the classes:

- 1 = <0.5 ha
- 2 = 0.5 – 1.0 ha
- 3 = 1.1 – 2.0 ha
- 4 = 2.1 – 5.0 ha
- 5 = 5.1 – 10.0 ha
- 6 = > 10 ha
- More ha (specify)

26. *Stand composition:*

- 0 = Pure
- 1 = Mixed

If mixed then specify tree species.

27. *Altitude:* metres above sea level

Please estimate the classes:

- 1 = <100
- 2 = 100-500
- 3 = 501-1000
- 4 = 1001-2000
- 5 = 2001-3000
- 6 = > 3000

28. *Slope:* in categories

Use slope meter, measure it from a map, or from software analysis of digital terrain models.

Categories:

- 1 = plane area with the slope 0-2°
- 2 = temperate sloped area 2-5°
- 3 = considerably sloped area 5-15°
- 4 = steep sloped area 15-25°
- 5 = very steep sloped area 25-35°

6 = escarpments 35-55°

7 = escarpment walls with the slope more than 75°

29. *Category of topography*

1 = flat

2 = slope

3 = gully

4 = ridge

Other- specify

30. *Soil type*

S = sandy soil

BE = brown earth

P = peat

BO = bog

Other (specify)

31. *Previous land use*

A = agriculture

F = forestry

N = nursery

Other (specify)

32. *Climate*

1 = tropical/megathermal climates

2 = dry climates

3 = temperate/mesothermal climates

4 = continental/microthermal climates

5 = polar and alpine climate

Use Köppen climate classification

(http://en.wikipedia.org/wiki/K%C3%B6ppen_climate_classification)

33. *Vegetative period in the year of survey*

The vegetative period is specified as a period when the average daily temperature is more than +10°C (in northern Europe +5°C). In southern Europe the vegetative period is specified by the average or sum of precipitation.

Specify the vegetative period at the site in the year of survey (see example in 33 and 34).

Use e.g.: May-September

34. *Rainfall sum during vegetative period (mm)*

e.g.. Czech Republic 2013 (survey site- town Roznov)

2013 DNB has been confirmed in urban greenery in town Roznov. Vegetative period in the year 2013 lasted 5 months (May-September)

Month	Rainfall sum (mm)
May	101
June	119
July	11
August	87
September	116
SUM	434

Average temperature in Roznov site (Czech Rep.) during the vegetative period in 2013 was 15,4°C and rainfall sum was 434 mm.

35. *Average temperature during vegetative period (°C):* add monthly temperature during the vegetative period.

Month	Temperature (°C)
May	13,1
June	16,1
July	17,4
August	17,0
September	13,4
Average	15,4

36. *Site comments:* if you have any additional notes for site.

For example records of flooding etc.

C DISEASE DATA

37. *Percentage of trees affected :*

- 1 = < 10% of trees affected in stand or park etc.
- 2 = 10 – 30 %
- 3 = 31 – 50 %
- 4 = >50 %

38. *Category on distribution of disease in the stand*

- 1 = isolated
- 2 = scattered
- 3 = clustered
- 4 = localised
- 5 = widespread
- 6 = uniform

39. *Severity on tree level*

- 1 = less than 5% needles of whole tree infected
- 2 = 5 – 10% needles
- 3 = 11 – 25% needles
- 4 = 26 – 50% needles
- 5 = 51 – 75% needles
- 6 = over 75% needles

40. *Historical disease information:* add the year of the first observation of *Dothistroma* infection on the site.

41. *Published or grey literature source:* the reference of the disease report in the literature as a full citation or not published.

D MANAGEMENT DATA

42. *Thinned:*

- 1 = Yes, within previous 2 years;
- 2 = Yes, within previous 5 years;
- 3 = Yes, within previous 10 years;
- 4 = Yes, within previous 20 years;
- 5 = Yes, unknown when;
- 6 = No
- 7 = Unknown

43. *Pruned:*

- 1 = Yes, within previous 2 years;
- 2 = Yes, within previous 5 years;
- 3 = Yes, within previous 10 years;
- 4 = Yes, within previous 20 years;
- 5 = Yes, unknown when;
- 6 = No
- 7 = Unknown

44. *Brushed:*

- 1 = Yes, within previous 2 years;
- 2 = Yes, within previous 5 years;
- 3 = Yes, within previous 10 years;
- 4 = Yes, within previous 20 years;
- 5 = Yes, unknown when;
- 6 = No
- 7 = Unknown

45. *Weed control:* herbicide treatment of the site

- 1 = Yes, within previous 2 years;
- 2 = Yes, within previous 5 years;
- 3 = Yes, within previous 10 years;
- 4 = Yes, within previous 20 years;
- 5 = Yes, unknown when;
- 6 = No
- 7 = Unknown

46. *Fungicidal control of the disease:*

- 1 = Yes, within previous 2 years;
- 2 = Yes, within previous 5 years;
- 3 = Yes, within previous 10 years;
- 4 = Yes, within previous 20 years;
- 5 = Yes, unknown when;
- 6 = No

7 = Unknown

47. *Management comments*: type of fungicide/herbicide used and regimes, thinning, pruning, brashing regimes.