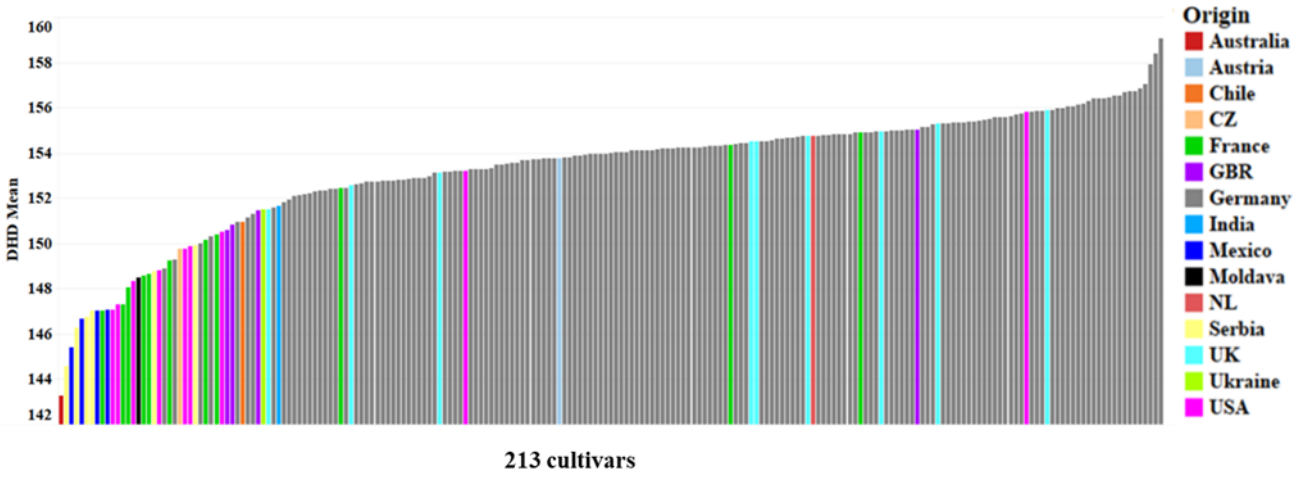

DHD Mean
160
158
156
154
152
150
148
146
144
142
213 cultivars
Origin
Australia
Austria
Chile
CZ
France
GBR
Germany
India
Mexico
Moldava
NL
Serbia
UK
Ukraine
USA

Figure1

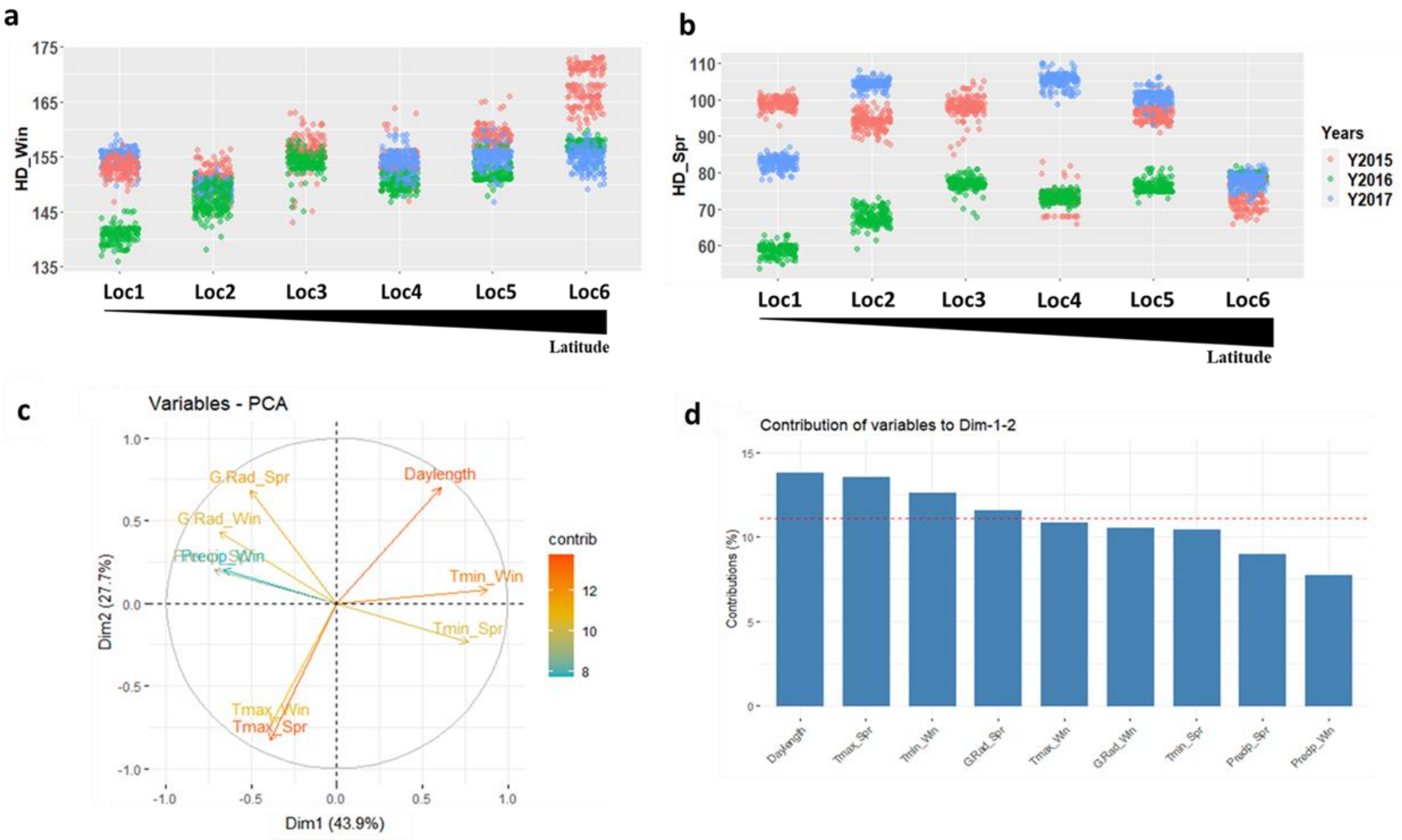

a
HD_Win
175
165
155
145
135
Loc1
Loc2
Loc3
Loc4
Loc5
Loc6
Latitude
b
HD_Spr
110
100
90
80
70
60
Years
Y2015
Y2016
Y2017
c
Variables - PCA
G.Rad_Spr
Daylength
G.Rad_Win
Precip.Win
Tmin_Win
Tmin_Spr
Tmax_Win
Tmax_Spr
contrib
Dim2 (27.7%)
Dim1 (43.9%)
d
Contribution of variables to Dim-1-2
Contributions (%)
Daylength
Tmax_Spr
Tmin_Win
G.Rad_Spr
Tmax_Win
G.Rad_Win
Tmin_Spr
Precip_Spr
Precip_Win

Figure 2

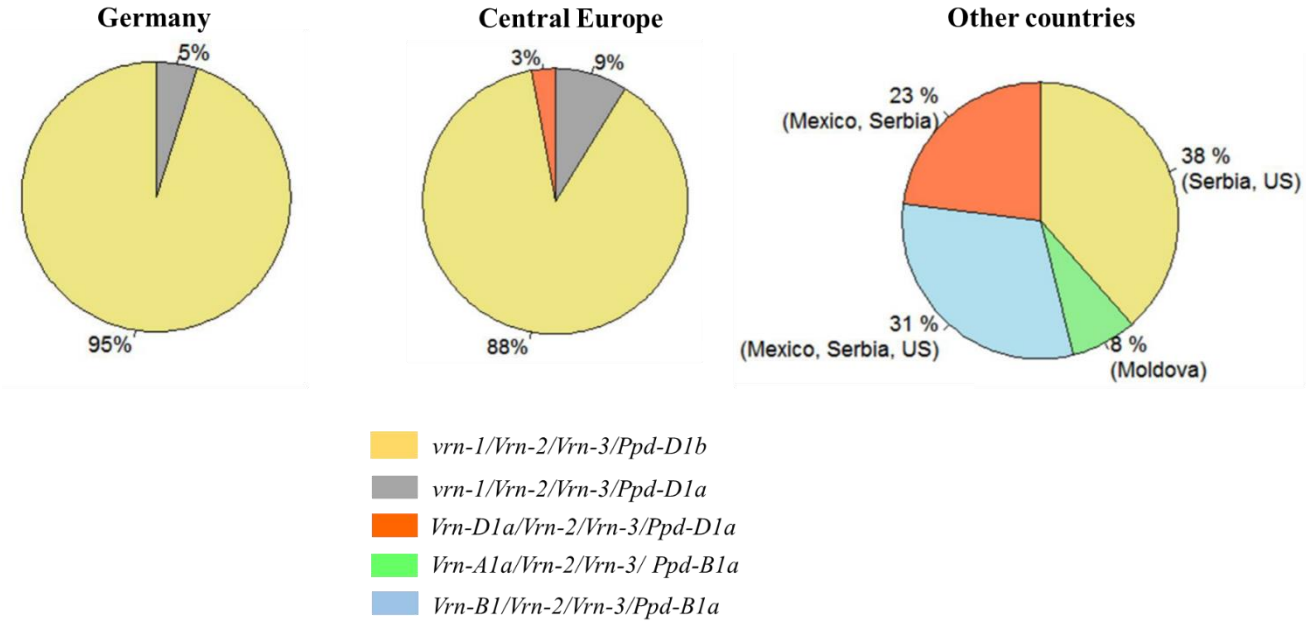

Germany
5%
95%
Central Europe
3%
9%
88%
Other countries
23 %
(Mexico, Serbia)
38 %
(Serbia, US)
31 %
(Mexico, Serbia, US)
8 %
(Moldova)
vrn-1/Vrn-2/Vrn-3/Ppd-D1b
vrn-1/Vrn-2/Vrn-3/Ppd-D1a
Vrn-D1a/Vrn-2/Vrn-3/Ppd-D1a
Vrn-A1a/Vrn-2/Vrn-3/ Ppd-B1a
Vrn-B1/Vrn-2/Vrn-3/Ppd-B1a

Figure 3

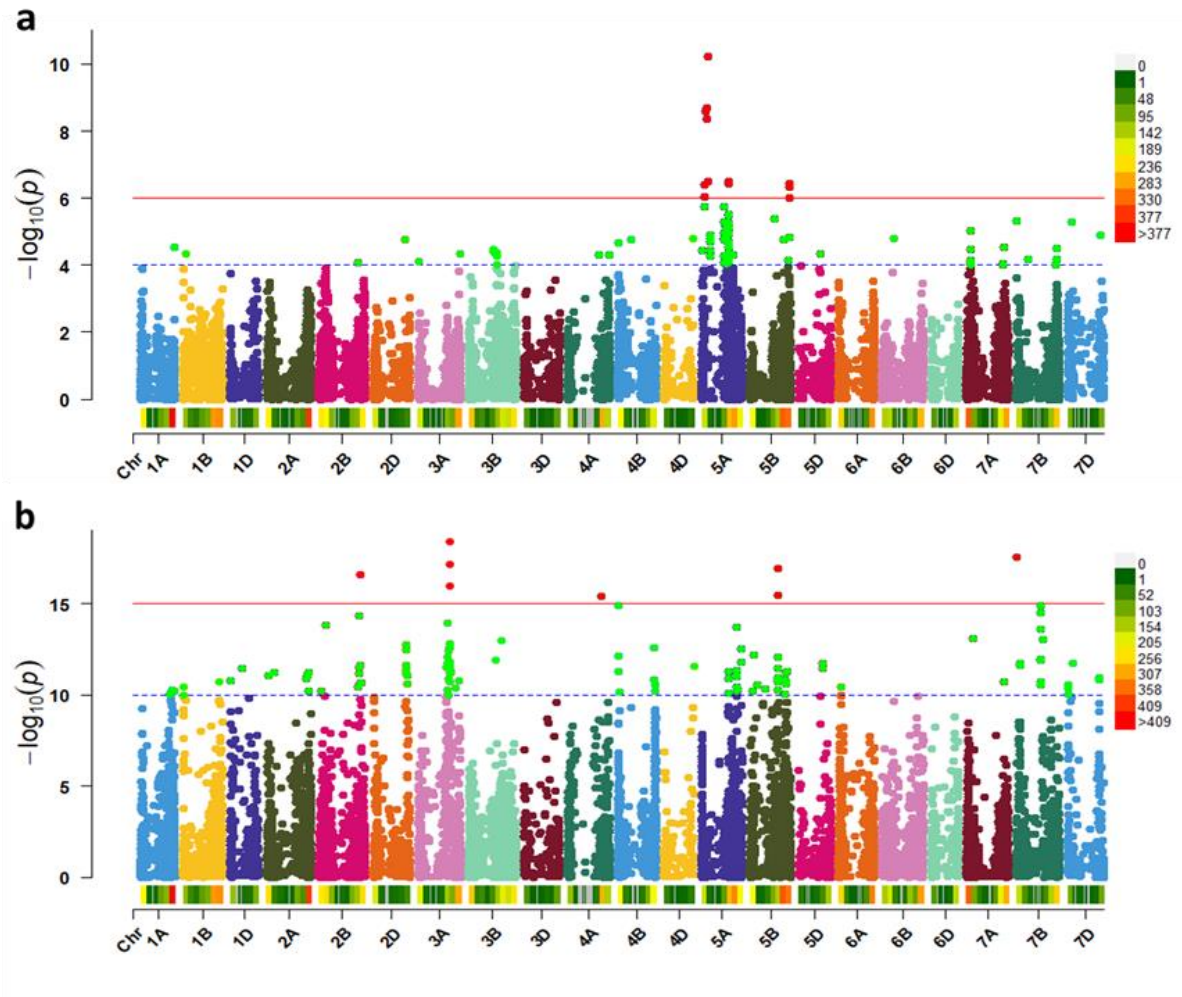
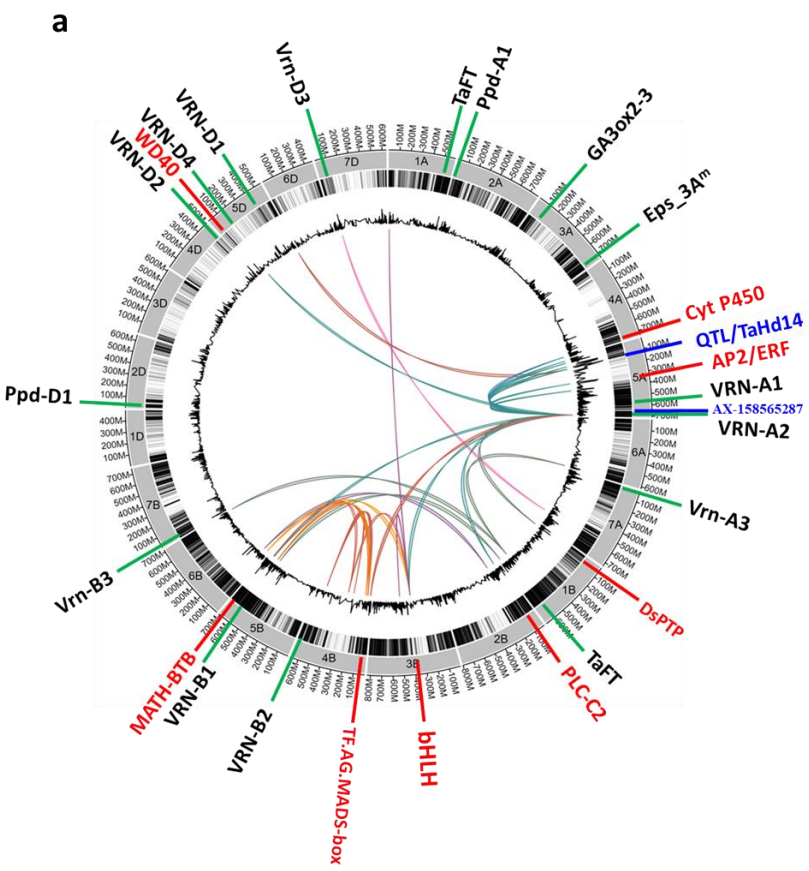
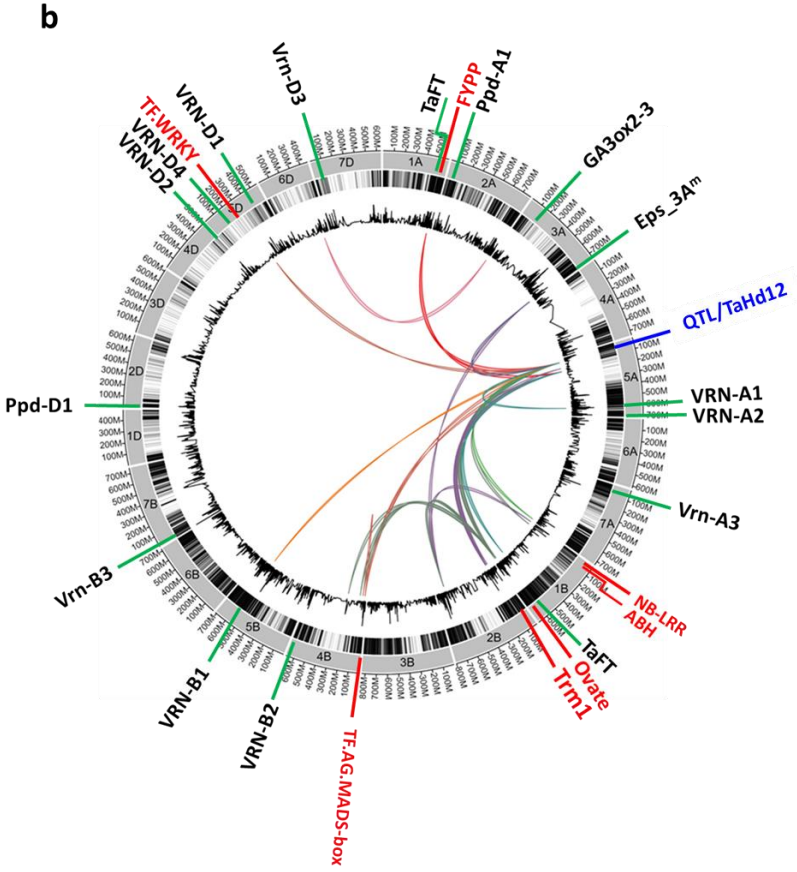

a
$-\log_{10}(p)$
10
8
6
4
2
0
0
1
48
95
142
189
236
283
330
377
>377
Chr
1A
1B
1D
2A
2B
2D
3A
3B
3D
4A
4B
4D
5A
5B
5D
6A
6B
6D
7A
7B
7D
b
$-\log_{10}(p)$
15
10
5
0
0
1
52
103
154
205
256
307
358
409
>409
Chr
1A
1B
1D
2A
2B
2D
3A
3B
3D
4A
4B
4D
5A
5B
5D
6A
6B
6D
7A
7B
7D

Figure 4





47 Figure 5

48

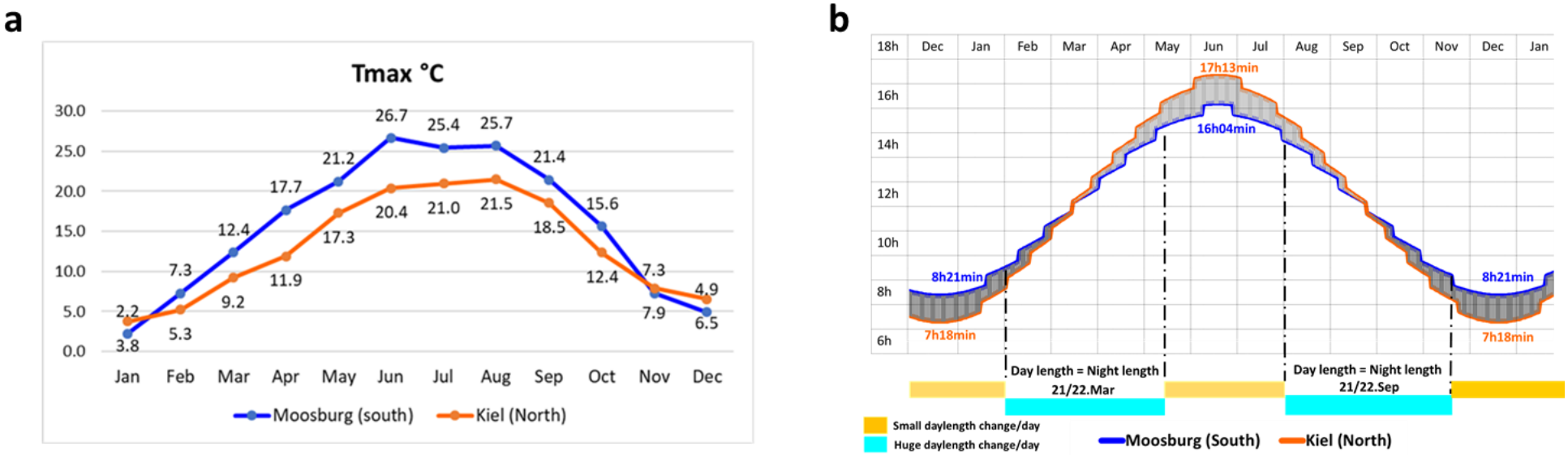

a
Tmax °C
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3.8 7.3 12.4 17.7 21.2 26.7 25.4 25.7 21.4 15.6 7.3 6.5
2.2 5.3 9.2 11.9 17.3 20.4 21.0 21.5 18.5 12.4 7.9 4.9
Moosburg (south)
Kiel (North)
b
18h 16h 14h 12h 10h 8h 6h
Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
17h13min
16h04min
8h21min
7h18min
8h21min
7h18min
Day length = Night length
21/22.Mar
Day length = Night length
21/22.Sep
Small daylength change/day
Huge daylength change/day
Moosburg (South)
Kiel (North)

Figure 6