Supplementary Material

Fine-tuning and remodeling of pectins play a key role in the maintenance of cell adhesion

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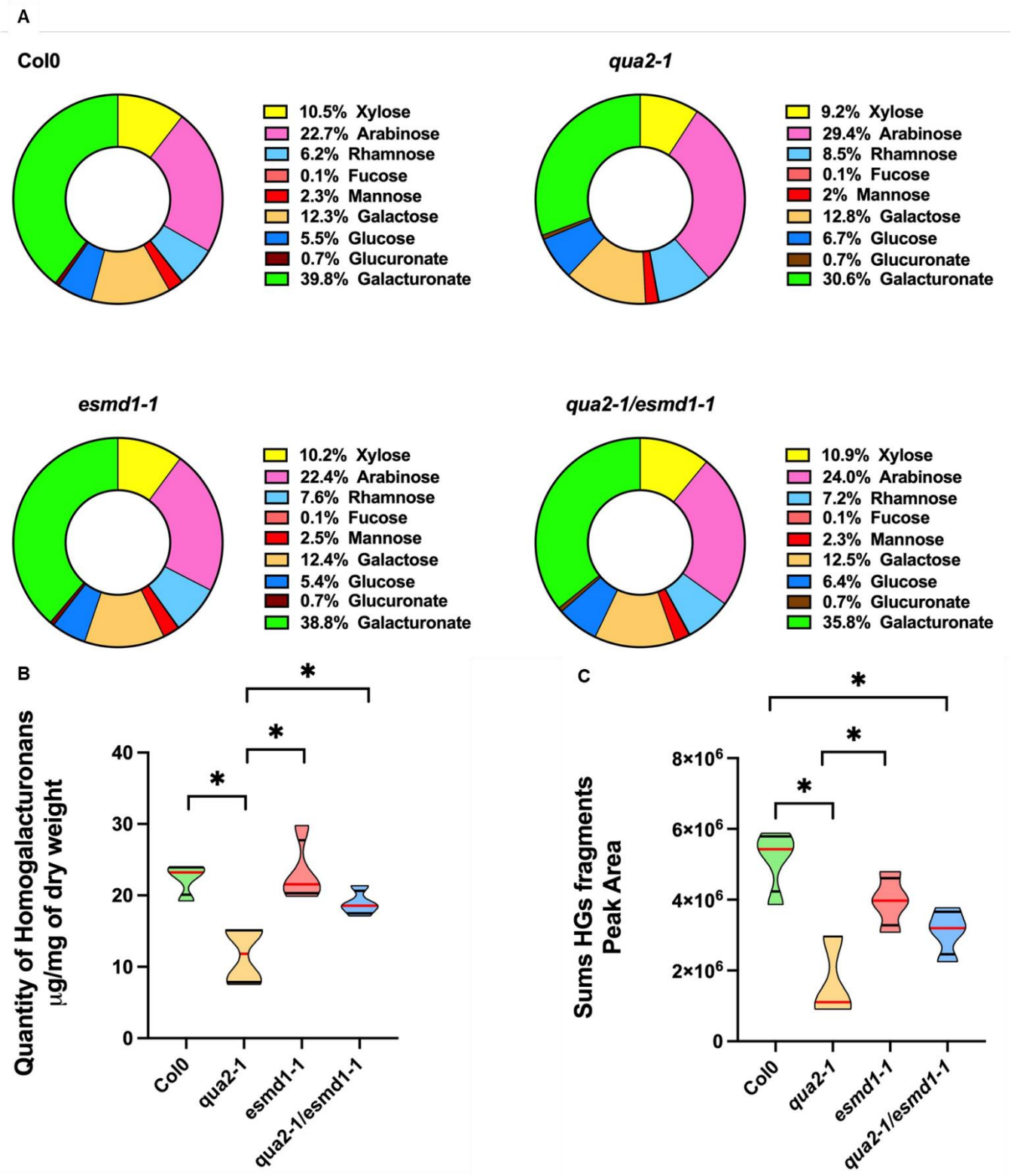
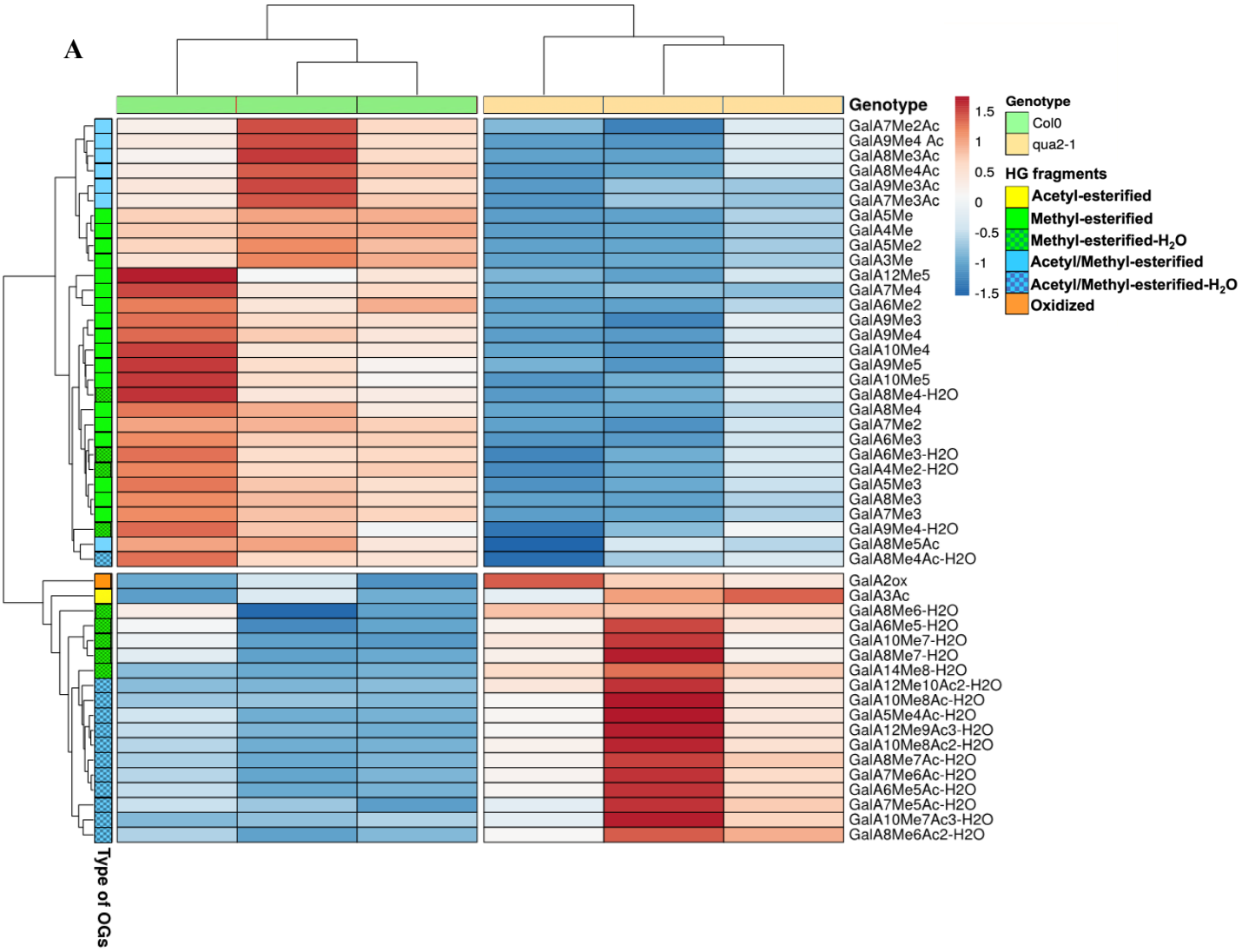
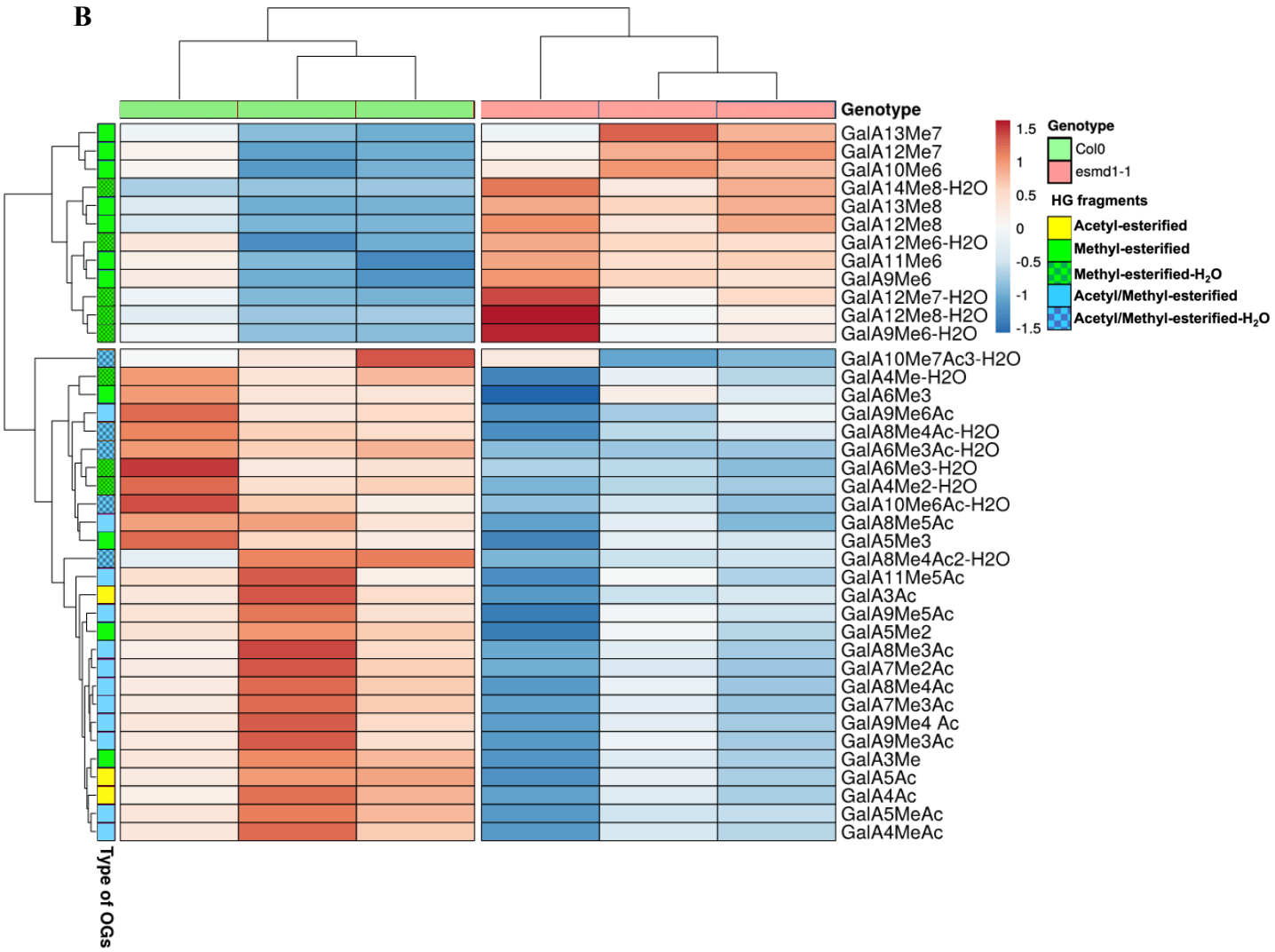
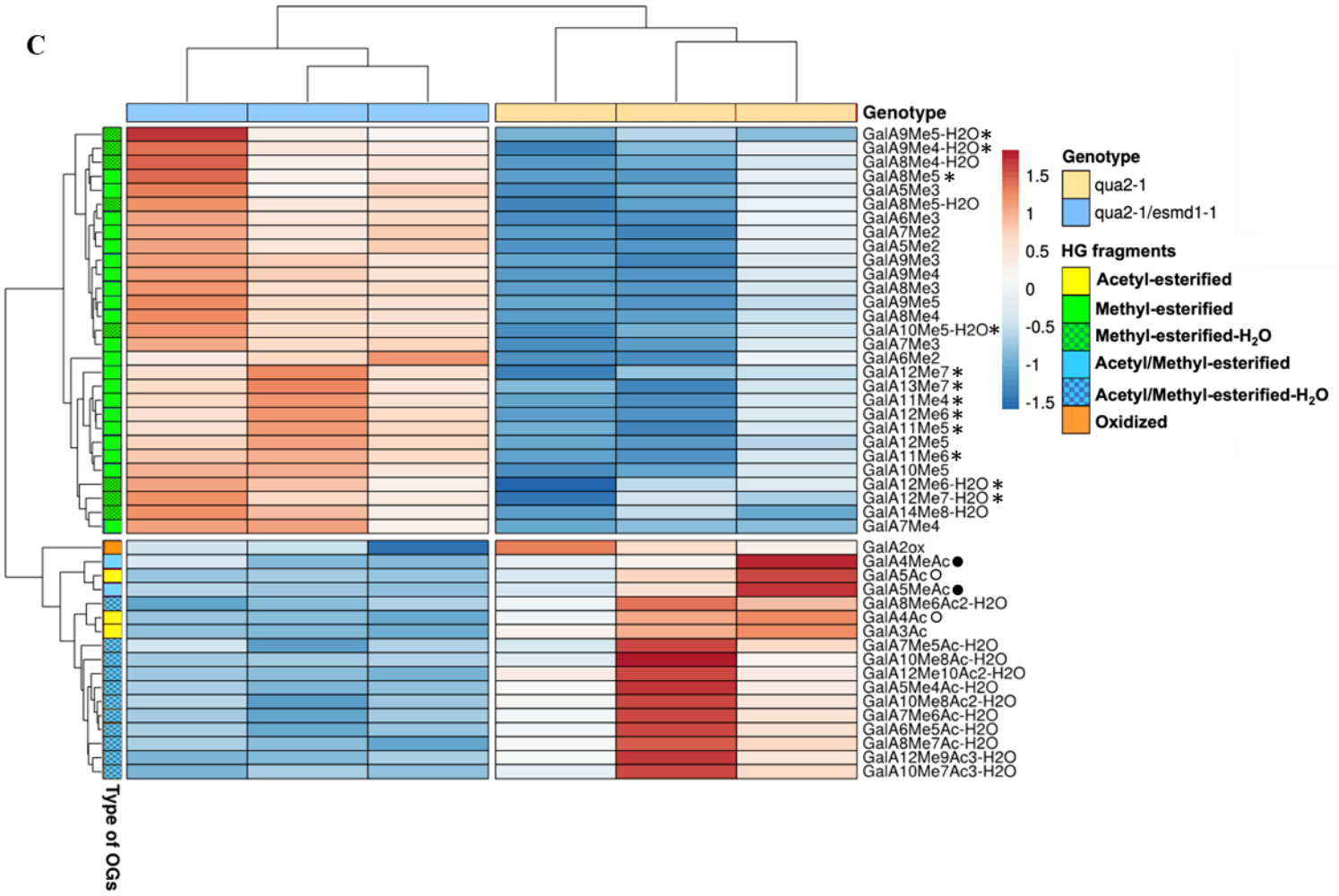


Supplementary Figure 1. Monomers content, HGs quantity and HGs fragments released
(A) Relative content of each monomers hydrolysed by TFA of dried cell wall of 4-days-old dark grown of seedlings Col-0, *qua2-1*, *qua2-1/esmd1-1 and esmd1-1*. (B) Truncated violin plot of homogalacturonan quantity corresponding to galacturonic acid content minus rhamnose content,

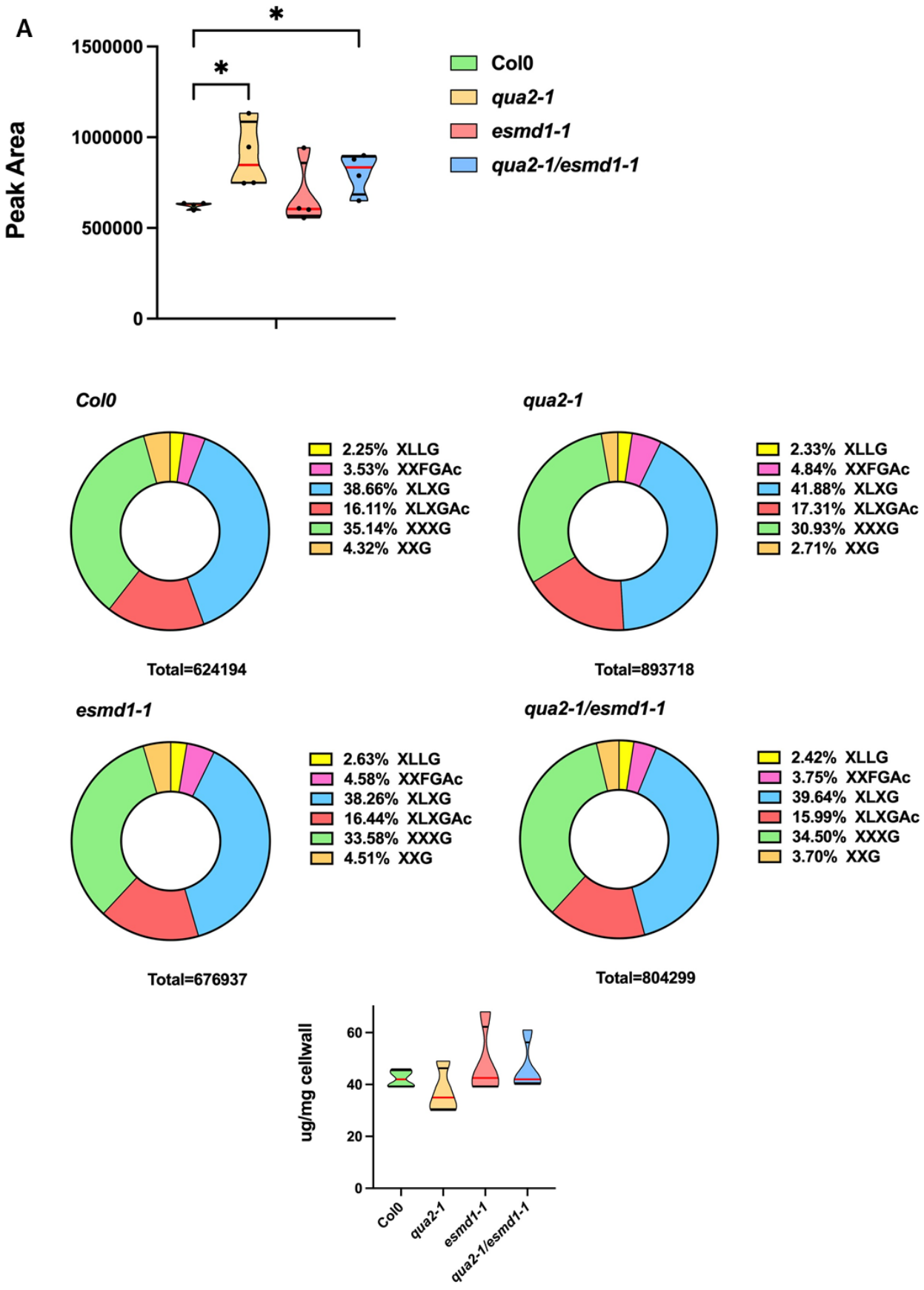
represented in µg/mg of dried cell wall of Col-0, *qua2-1*, *qua2-1/esmd1-1 and esmd1-1*. *Red line represents the median, black line the quartiles (n=4 biological replicates per genotype),* *, P < 0.05, Mann & Whitney test. (C)Truncated violin plot of the quantity of HGs fragments & monomers released by PG *Aspergillus aculeatus* digestion of dried cell wall seedlings 4 days dark grown of Col-0, *qua2-1*, *qua2-1/esmd1-1 and esmd1-1*. *Red line represents the median, black line the quartiles, (n ≤ 4 biological replicates per genotype).* *, P < 0.058, Mann-Whitney test.




B
Genotype
GalA13Me7
GalA12Me7
GalA10Me6
GalA14Me8-H2O
GalA13Me8
GalA12Me8
GalA12Me6-H2O
GalA11Me6
GalA9Me6
GalA12Me7-H2O
GalA12Me8-H2O
GalA9Me6-H2O
GalA10Me7Ac3-H2O
GalA4Me-H2O
GalA6Me3
GalA9Me6Ac
GalA8Me4Ac-H2O
GalA6Me3Ac-H2O
GalA6Me3-H2O
GalA4Me2-H2O
GalA10Me6Ac-H2O
GalA8Me5Ac
GalA5Me3
GalA8Me4Ac2-H2O
GalA11Me5Ac
GalA3Ac
GalA9Me5Ac
GalA5Me2
GalA8Me3Ac
GalA7Me2Ac
GalA8Me4Ac
GalA7Me3Ac
GalA9Me4 Ac
GalA9Me3Ac
GalA3Me
GalA5Ac
GalA4Ac
GalA5MeAc
GalA4MeAc
Type of OGs
1.5
1
0.5
0
-0.5
-1
-1.5
Genotype
Col0
esmd1-1
HG fragments
Acetyl-esterified
Methyl-esterified
Methyl-esterified-H2O
Acetyl/Methyl-esterified
Acetyl/Methyl-esterified-H2O

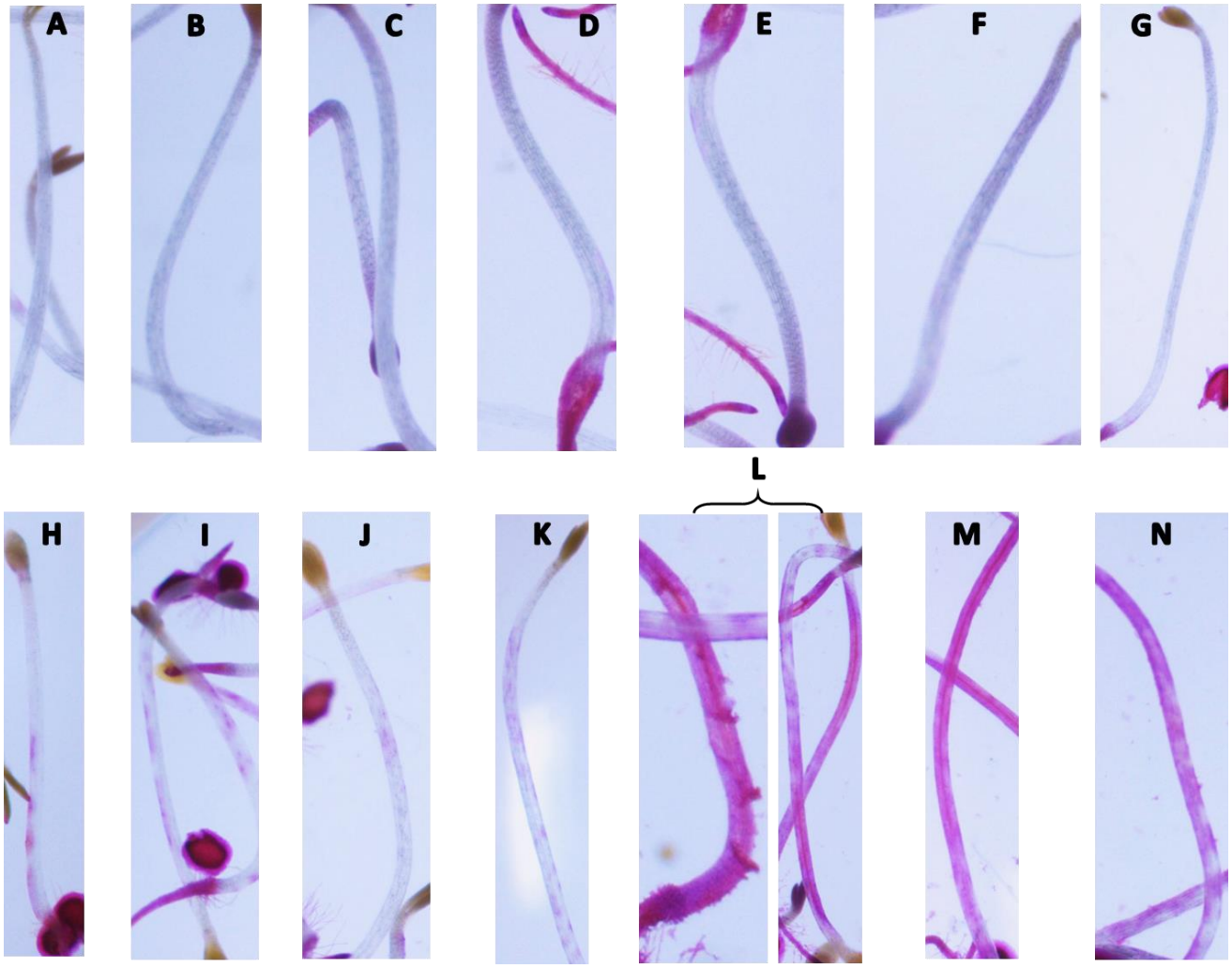


Supplementary Figure 2. HGs fragments released significantly different.
(A) Heatmap of all of the HGs fragments released by *PG Aspergillus aculeatus* significantly different between Col0 and *qua2-1* (48 rows) for 3 samples (columns). Annotation labels refer to HGs fragments structure. Rows are centered; unit variance scaling is applied to rows. Both rows and columns are clustered using McQuitty distance and maximum linkage. (B) Heatmap of all of the HGs fragments released by *PG Aspergillus aculeatus* significantly different between Col0 and *esmd1-1* (39 rows) for 3 samples (columns). (C) Heatmap of all of the HGs fragments released by *PG Aspergillus aculeatus* significantly different between *qua2-1* and *qua2-1/esmd1-1* (46 rows) for 3 samples (columns). -H_20 indicates endogenous pectin lyase action. Methyl-esterified (*), acetyl-esterified (°) and methyl/acetyl-esterified (•) HGs fragments specific *to esmd1-1* are highlighted. For (A), (B), and (C). *n = 3 biological replicates per genotype.* Mann-Whitney test.


A
Peak Area
1500000
1000000
500000
0
*
*
Col0
qua2-1
esmd1-1
qua2-1/esmd1-1
Col0
2.25% XLLG
3.53% XXFGAc
38.66% XLXG
16.11% XLXGAc
35.14% XXXG
4.32% XXG
Total=624194
qua2-1
2.33% XLLG
4.84% XXFGAc
41.88% XLXG
17.31% XLXGAc
30.93% XXXG
2.71% XXG
Total=893718
esmd1-1
2.63% XLLG
4.58% XXFGAc
38.26% XLXG
16.44% XLXGAc
33.58% XXXG
4.51% XXG
Total=676937
qua2-1/esmd1-1
2.42% XLLG
3.75% XXFGAc
39.64% XLXG
15.99% XLXGAc
34.50% XXXG
3.70% XXG
Total=804299
ug/mg cellwall
60
40
20
0
Col0
qua2-1
esmd1-1
qua2-1/esmd1-1

Supplementary Figure 3. Fine structure of xyloglucans and cellulose content

(A) Truncated violin plot of the quantity of xyloglucans fragment digested by *endo-cellulase* applied on dried cell wall seedlings 4 days dark grown of Col-0, *qua2-1*, *qua2-1/esmd1-1 and esmd1-1*. *Red line represents the median, black line the quartiles, black dot represents biological replicate (n = 4 biological replicates per genotype)* *, P < 0.05 Mann-Whitney test. (B) Relative content (%) of xyloglucans fragment digested by *endo-cellulase* applied on dried cell wall seedlings 4 days dark grown of Col-0, *qua2-1, qua2-1/esmd1-1 and esmd1-1*. (C) Truncated violin plot of cellulose content (µg/mg of dried cell wall) of 4-days-old dark grown seedlings of Col-0, *qua2-1*, *qua2-1/esmd1-1* and *esmd1-1 (n = 4 biological replicates per genotype)* Mann-Whitney test.



Supplementary Figure 4. Effect of enzymes on cell adhesion.

Ruthenium red staining of enzyme application on 4 days dark grown seedlings (from day 2) on Col0 : (A) empty vector, (B) PAE7, (C) PAE12, (D) PME41, (E) PME35, (F) PME53 and (G) PMEI4 and *qua2-1/esmd1-1* : (H to N) same order of protein

1.1 Supplementary Table

Gene name	Forward primer sequence	Reverse primer sequence
CLATHRIN **(At5g46630)**	5'-GTTTGGGAGAAGAGCGGTTA-3'	5'-CTGATGTCACTGAACCTGAACTG -3'
APT1 **(At1g27450)**	5'-GAGACATTTTGCGTGGGATT-3'	5'-ATTTTAAGTGGAACA -3'
PME53 **(At5g19730)**	5'-TTTGTATCTTGGGAGGGCATGGG -3'	5'-ACTGCCCATAGAACACCGTCATC -3'
PME41 **(At4g02330)**	5'-TACATCGCCGAACTTCGTTGCC -3'	5'-GCTTCTCTGGTCCAGCGGTATTTC -3'
PME35 **(At3g59010)**	5'-CCGCCATGGGAGATGGATTCATAG -3'	5'-AGTTTGGTCCGGCACTGTTCAC -3'
PMEi4 **(At4g25250)**	5'-AAACGGCATGCAACTCAACAAC -3'	5'-CGGACTTGATGGTGGAGGAATAGG -3'
PAE7 **(At4g19410)**	5'-ATGCGAGCATTGTCACCGGTTC -3'	5'- CCGACTGCTTTCGCAATTCTCG -3'
PAE12 **(At3g05910)**	5'-CTTGGTTTGCCGATGATTCT -3'	5'-ACCAAGTTGTGGCAGCTCTT -3'

Supplementary Table 1. List of primers used for qPCR