

Supplement

Tables

Table S1. Primers used for isoallergen identification at the mRNA level

Primer	Sequence of primer pairs (5' > 3')	localization
Cor a 1.01	fwd: CCTCTTCCCATATTCTTAATTCCTTAGATC rev: GGGCGAAGACACAAGACGAGG	UTR
Cor a 1.02	fwd: CCTCTACTACGTACTCCTCTTCATATTCTTCC rev: GAAGATGATGATCACAATTCACAACCGC	UTR
Cor a 1.03	fwd: CCTCTAGTCCTCATATATCTCCCAACCTC rev: CCTTAACACGTGATGGCGGAAATAAGC	UTR
Cor a 1.03	fwd: ATGGGTGTGTTCACTTATGAAACCG rev: TTAATACTCATTAGGGTGTGCCAAGAGG	Start, stop codon
Cor a 1.04	fwd: ATGGGTGTTTTCTGCTACGAGG rev: CTAACAGTAGGCATCAGGGTGTG	Start, stop codon
Cor a 1.05	fwd: GTTGTGCACCATCCAATCAGTCCTCC rev: GCGCCACAAAGCAAAGACATAGAACCTC	UTR
Cor a 1.06	fwd: CCAACTTTGATCAATCCTACTACTCCTCG rev: CATTACTGGGCGAAGACACAATATATATATAAGAC	UTR
Cor a 1.07	fwd: GGCAAGTACGTTCTCACATCTCCACAAC rev: GAAGGCCTTAAGACAGTTTTGACCAGACAAATC	UTR
Cor a 1.07	fwd: ATGGGTGTTTACACATATGAGAATG rev: TTAGTTGTAGGCTTCAGGATTTG	Start, stop codon
Cor a 1.08	fwd: GCCTAGCTAGTTTCATTAATCCTCAAGAAAGG rev: CACCATCACTATTCACTAGTGATTGAGACTTATTAT	UTR
18S rRNA	fwd: CTGGTCTTAATTGGCCGGGT rev: CAGGCTGAGGTCTCGTTC	

Table S2. Primers used for cloning of Cor a 1 genes into pET-GB1a via Gibson cloning.

	Amplification	Sequence of primer pairs (5' > 3')
Cor a 1.0501	Vector	fwd: CCTGAGGCCTATGCTTGAGGTACCGGATCCGAATTC rev: CACTTAGAGTGTGAACACCCATGCCCTGAAAATAAAGATTCTCAG
	Insert	fwd: CTGAGAATCTTTATTTTCAGGGCATGGGTGTTCACTCTAAGTG rev: GAATTCGGATCCGGTACCTCAAGCATAGGCCTCAGG
Cor a 1.0601	Vector	fwd: CGCATAGTGCTGAGTACAATAAGGTACCGGATCCGAATTC rev: CGTAGTTAAACACGCCCATGCCCTGAAAATAAAGATTCTCAG
	Insert	fwd: CTGAGAATCTTTATTTTCAGGGCATGGGCGTGTTAACTACG rev: GAATTCGGATCCGGTACCTTAGTTGTACTCAGCACTATGCG
Cor a 1.0701	Vector	fwd: CAAATCCTGAAGCCTACAATAAGGTACCGGATCCGAATTC rev: CATTCTCATATGTGTAACACCCATGCCCTGAAAATAAAGATTCTCAG
	Insert	fwd: CTGAGAATCTTTATTTTCAGGGCATGGGTGTTTACACATATGAGAATG rev: GAATTCGGATCCGGTACCTTAGTTGTAGGCTTCAGGATTTG
Cor a 1.0801	Vector	fwd: CTGGCGCCTATGCTTAAGGTACCGGATCCGAATTC rev: TGTGTAAGTGATTACGCCCATGCCCTGAAAATAAAGATTCTCAG
	Insert	fwd: CTGAGAATCTTTATTTTCAGGGCATGGGCGTAATCACTTACACA rev: GAATTCGGATCCGGTACCTTAAGCATAGGCGCCAG

Figures

Figure S1

Cora1.02-Cav01g11820 (<https://www.hardwoodgenomics.org/>)

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cct cta cta cgt act cct ctt cat att ctt cca ttt cca tag atc atc atc atc atc
- - - - - - - - - - - - - - - - - - - - -
atc atc atg ggt gtt ttc aat tac gag gct gag acc acc tcc gtt att cca gca gct agg
- - M G V F N Y E A E T T S V I P A A R
ctg tct aag gcc ttt atc ctt gat ggc aat aac ctc atc cca aag gtt gca cct caa gct
L S K A F I L D G N N L I P K V A P Q A
gtt agc agt gtt gaa aac gtt gaa gga aat gga ggg cca gga aca atc aag aag atc acc
V S S V E N V E G N G G P G T I K K I T
ttt tcc gaa ggc agt cct ttc aag tac gtg aag gag agg gtt gaa gag gtt gac cac aca
F S E G S P F K Y V K E R V E E V D H T
aac ttc aaa tac agc tac acc gtc atc gag ggt ggt ccc gtg gga gac aaa gtg gag aag
N F K Y S Y T V I E G G P V G D K V E K
atc tgt aac gag ata aag att gtg gca gcc cct gat gga gga tcc atc ttg aag atc tcc
I C N E I K I V A A P D G G S I L K I S
aac aag tac cac acc aaa ggt gac cat gag gtg gat gca gag cat att aag ggt ggc aaa
N K Y H T K G D H E V D A E H I K G G K
gaa aag gtt gag ggt ctt ttc agg gcg gtt gag gcc tac ctc ttg gca cac tct gct gaa
E K V E G L F R A V E A Y L L A H S A E
tac aac taa aaa cct taa ttg tct ttt ggc ttt cat ttt gtc ttt aat ttc ggc ttg cta
Y N - - - - - - - - - - - - - - -
... ... ggc gtt gtg aat tgt gat cat cat ctt c
- - - - - - - - - - - - - - -

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Cora1.0302 (GenBank accession number: OQ450370). Cav01g11830, Cav01g11840 (<https://www.hardwoodgenomics.org/>)

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atg ggt gtg ttc act tat gaa acc gag acc act tca gtt atc cct ccg gct agg ctg ttc
M G V F T Y E T E T S V I P P A R L F
aag agc ttt gtc cta gat tcc gac aac ctc atc cca aag gtt gct cca aag gcc atc aag
K S F V L D S D N L I P K V A P K A I K
agc att gaa atc atc gaa gga aat gga ggt ccc gga acc att aag aag atc tgc ttc gat
S I E I I E G N G G P G T I K K I C F D
gaa ggc agc cca ttc aac tac ata aag caa aag gtt gaa gag att gac caa gca aac ttt
E G S P F N Y I K Q K V E E I D Q A N F
tca tat cgc tac agt gtg att gaa ggc gat gct ttg tcc gac aaa ctg gag aaa atc aat
S Y R Y S V I E G D A L S D K L E K I N
tac gag atc aag ata gtg gca tcc cct gat gga gga tct atc ttg aag agc atc agc aag
Y E I K I V A S P D G G S I L K S I S K
tac cac acc ata gga gac cat gaa ctc aag gac gag cag att aag gct gga aaa gag aag
Y H T I G D H E L K D E Q I K A G K E K
gcc tca gga ctt ttc aaa gct gtt gag ggc tac ctc ttg gca cac cct aat gag tat taa
A S G L F K A V E G Y L L A H P N E Y -

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Cora1.0501: (GenBank accession number: OQ230635)

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ttg tgc acc att cca atc agt cct cca ttt tct acc att tct aaa ttc tga ata tat tcg
- - - - - - - - - - - - - - - - -
atc atg ggt gtt cac act cta agt gat gag ttc act agc ccc atc cca gca cca aag ctg
- M G V H T L S D E F T S P I P A P K L
ttc aag gcc ttg atc ctt gat gct gac aac ctc ctt ccc aag ctc ctg cct cag gcc att
F K A L I L D A D N L L P K L L P Q A I
aag agt atc gag acg att gag ggc gat gga ggg cct gga acc atc aag aag atc act atc
K S I E T I E G D G G P G T I K K I T I
gct gaa ggt acc cat atc aag cac ttg aag cat agg att gat gca gta gag gaa gag aaa
A E G T H I K H L K H R I D A V E E E K

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ttg aca tac agt tac aca ctg att gag ggt gat gat ttg ctg gac aag ttt gaa tca att
L   T   Y   S   Y   T   L   I   E   G   D   D   L   L   D   K   F   E   S   I
tct tat gag att aag ttt gag tcc tct cct gat ggg gga gcc aaa tgt aca aat ctt agc
S   Y   E   I   K   F   E   S   S   P   D   G   G   A   K   C   T   N   L   S
aag tac cat cct aaa cca ggg gtc cag atc aat gaa gag gaa atc aag gca agc aag gaa
K   Y   H   P   K   P   G   V   Q   I   N   E   E   E   I   K   A   S   K   E
aag ggc atg gct gtt tac aga gcc gtg gaa gcc ttc ctc ttg gcc aat cct gag gcc tat
K   G   M   A   V   Y   R   A   V   E   A   F   L   L   A   N   P   E   A   Y
gct tga tgc ttc ctt gtt gag aca cta tta tat gta tct cgt gtt cct caa agt tta ttg
A   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -
agg ttc tat gtc ttt gct ttg tgg cgc
-   -   -   -   -   -   -   -   -

```

Cora1.0601: (GenBank accession number: OQ450371)

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-   -   -   -   -   -   -   -   -   -   -   -   -   -   -   M   M   G   V
ttc aat tac gag gct gag agc ccc tgt gtt atc cca gca gct agg ctg ttc aag gcc ttt
F   N   Y   E   A   E   S   P   C   V   I   P   A   A   R   L   F   K   A   F
atc ctt gat ggc gat aac ctc atc cca aag gtt gca cct caa gct att agc agc gtt gaa
I   L   D   G   D   N   L   I   P   K   V   A   P   Q   A   I   S   S   V   E
aac gtt gaa gga aat gga ggg ccc gga acc atc aag aag atc acc ttt gcc gaa ggc agc
N   V   E   G   N   G   G   P   G   T   I   K   K   I   T   F   A   E   G   S
cct ttc aag tac gtg aag gag agg gtt gag gag gtt gac cac gca aac ttc aaa tac aga
P   F   K   Y   V   K   E   R   V   E   E   V   D   H   A   N   F   K   Y   R
tac acc gtg atc gag ggc ggt gtc gtg ggc gat aag ctg gag aag atc tgc aac gag ctg
Y   T   V   I   E   G   G   V   V   G   D   K   L   E   K   I   C   N   E   L
agg ata gtg gca gcc cct ggt gga tcc atc ttg aag atc agc aac aag tac cac acc
R   I   V   A   A   P   G   G   G   S   I   L   K   I   S   N   K   Y   H   T
aaa ggc ggc cat gag atg aat gca gag gat att aag gtt ggc aaa gaa aag gcc gag gca
K   G   G   H   E   M   N   A   E   D   I   K   V   G   K   E   K   A   E   A
ctt tta aag gca gtt gag agc tac ctc ttg gca cac tct gct gaa tac aac taa acc tta
L   L   K   A   V   E   S   Y   L   L   A   H   S   A   E   Y   N   -   -   -
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-   -   -   -   -   -   -   -   -   -   -   -

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Cora1.0701: (GenBank accession number: OQ230636)

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gca agt acg ttc tca cat ctc cac aac ... ... ... ctt ctt ctt cct ttg atc atc ttc
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cta gtc ttc cta gat atc atc atg ggt gtt tac aca tat gag aat gag gtc acc tcc ccc
-   -   -   -   -   -   -   M   G   V   Y   T   Y   E   N   E   V   T   S   P
ctc cct cca tcg agg ttg ttc aag gcc ttc gtc ctt gat gcc gac aac ctt atc ccc aag
L   P   P   S   R   L   F   K   A   F   V   L   D   A   D   N   L   I   P   K
att ttc aag cat gga ccg cac ggt ttt aag gat gtg aac gtg gaa gtc gtt gaa ggc cat
I   F   K   H   G   P   H   G   F   K   D   V   N   V   E   V   V   E   G   H
gga ggg cca gga acc atc aaa aag tat tcg ttt cat gaa ggc agc ggg cac ttg aaa ttt
G   G   P   G   T   I   K   K   Y   S   F   H   E   G   S   G   H   L   K   F
ttg aag cac aag att gat gtg cta gac aag gaa aac ttc aca tac cat tac agc gtg gtt
L   K   H   K   I   D   V   L   D   K   E   N   F   T   Y   H   Y   S   V   V
gaa ggt ggt ccg ttg tcg gag aca ctc gag aaa gtc tca tac gag acc aag ttg gtg gct
E   G   G   P   L   S   E   T   L   E   K   V   S   Y   E   T   K   L   V   A
tcc cct gac gga gga gcc atc ttc aag agc acc ggc aag tat tat aca aaa gat cac gct
S   P   D   G   G   A   I   F   K   S   T   G   K   Y   Y   T   K   D   H   A
gag atc aat gaa gag caa atc aag gct gaa gat gaa aag gcc acg ggg gtg ttc aag gct
E   I   N   E   E   Q   I   K   A   E   D   E   K   A   T   G   V   F   K   A
gtt gaa ggc tac ctc ttg gca aat cct gaa gcc tac aac taa agc aag ttg cta aat tta
V   E   G   Y   L   L   A   N   P   E   A   Y   N   -   -   -   -   -   -
atg ttg cat gtg tac gta att gta tct cat cga ttt gtc tgg tca aaa ctg tct taa ggc
-   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -
ctt c
-

```

Cora1.0801: (GenBank accession number: OQ230637). Cav01g11530
(<https://www.hardwoodgenomics.org/>)

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- - - - - - - - - - - M G V I T Y T D
gag tac acc tct cct atc cca cca gct aga ttg ttc aaa gcc ttg gtc att gat gct cac
E Y T S P I P P A R L F K A L V I D A H
atc ctc atc cca aaa ctc ctc cca cag gct gtt aag agc att gaa atc att caa ggc gat
I L I P K L L P Q A V K S I E I I Q G D
gga ggg gct gga agc atc agg caa atc act ttt gcc gaa ggt agc caa ttt agt act gtc
G G A G S I R Q I T F A E G S Q F S T V
aag aac cga att gat gag ctg aat gaa aaa act tat tac tac aag tac acg gtg atc gaa
K N R I D E L N E K T Y Y Y K Y T V I E
ttc gaa ggt gat gcc ttg gct gac aag ctt gaa ttg att gtt cat gag gtt caa ttt gag
F E G D A L A D K L E L I V H E V Q F E
gca acg gct gaa ggt ggg agt aaa aat aag atg aca acc aag tac cat acc aag gat gac
A T A E G G S K N K M T T K Y H T K D D
gta gtg atc aag gaa gag gaa atc aag gct ggc aag gaa aag gtg ctg ggt atg tac aaa
V V I K E E E I K A G K E K V L G M Y K
gtt gtg gaa ggc tac ctc atc cag aac cct ggc gcc tat gct taa tta atg cta atc tcc
V V E G Y L I Q N P G A Y A - - - - -
aat cag tct ctt ttg tct act gtt taa tgt tgt ggc ttt tac ctt tgt ctt tga ata atc
- - - - - - - - - - - - - - -
gcc tta atg tgg tgt gat aat aag tct caa tca cta gtg aat agt gat ggt g
- - - - - - - - - - - - - - -

```

Figure S1: Coding sequences of Cor a 1 isoallergens and flanking regions used for the selection of PCR primers. The coding sequences and the corresponding amino acid sequences are depicted in bold letters. Underlined sequences represent the primer sequences used for PCR amplification. They are based on the genome sequences of the Turkish cultivar “Tombul” (Lucas u. a. 2021). Dotted sections indicate regions that were not covered by sequencing.

Figure S2

Hazel pollen extract :

	1	19	22	23	30	34	38	41	56	57	65	67	70			
Cor a 1.0101	<u>MGVFNYEVETPSVIPAAAR</u>	<u>LFK</u>	<u>S--YVLDGDK</u>	<u>LIPK</u>	<u>VAPQ-AIT-SVENVEGNGGPGTIK</u>	<u>N--ITFGEGR</u>	<u>YK</u>	<u>YVK</u>	<u>ER</u>							
Cor a 1.0104	<u>MGVFNYEVETPSVISAAR</u>	<u>LFK</u>	<u>S--YVLDGDK</u>	<u>LIPK</u>	<u>VAPQ-AIT-SVENVGGNGGPGTIK</u>	<u>N--ITFGEGR</u>	<u>YK</u>	<u>YVK</u>	<u>ER</u>							
Cor a 1.0301	<u>MGVFNYETETTSVIPPAR</u>	<u>LFK</u>	<u>R</u>	<u>FVLDSN-LIPK</u>	<u>VAPK</u>	<u>AIK</u>	<u>SIEIEGNGGPGTIK</u>	<u>K</u>	<u>ICFDEGSP-FN-YIK</u>	<u>QK</u>						
Cor a 1.0302	<u>MGVFTYETETTSVIPPAR</u>	<u>LFK</u>	<u>S--FVLDSN-LIPK</u>	<u>VAPK</u>	<u>AIK</u>	<u>SIEIEGNGGPGTIK</u>	<u>K</u>	<u>ICFDEGSP-FN-YIK</u>	<u>QK</u>							
	72	82	84	96	99	105	117	121	125	131	133	136	139	141	144	147
Cor a 1.0101	<u>VDEVNTNFT-YS-YTVIEGDVLDGK</u>	<u>LEK</u>	<u>VCHELK</u>	<u>IVAAPGGGSILK</u>	<u>ISSK</u>	<u>FHAK</u>	<u>GDHEIN-AE--EMK</u>	<u>GAK</u>	<u>EM--AEK</u>	<u>LLR</u>	<u>AVETYLLAHSAEYN</u>					
Cor a 1.0104	<u>VDEVNTNFK</u>	<u>YS-YTVIEGDVLDGK</u>	<u>LEK</u>	<u>VCSELK</u>	<u>IVAAPGGGSTLK</u>	<u>ISSK</u>	<u>FHAK</u>	<u>GDHEIN-AE--EMK</u>	<u>GAK</u>	<u>EM--AEK</u>	<u>LLR</u>	<u>AVETYLLAHSAEYN</u>				
Cor a 1.0301	<u>VEEIDQANFS-YR</u>	<u>YSVIEGDALSDK</u>	<u>LEK</u>	<u>INYEIK</u>	<u>IVASPHGGSILK</u>	<u>SISK</u>	<u>YHTI-GDHELK</u>	<u>DE--QIK</u>	<u>AGK</u>	<u>EK</u>	<u>ASG-LFK</u>	<u>AVEGYLLAHSADAYN</u>				
Cor a 1.0302	<u>VEEIDQANFS-YR</u>	<u>YSVIEGDALSDK</u>	<u>LEK</u>	<u>INYEIK</u>	<u>IVASPDGGSILK</u>	<u>SISK</u>	<u>YHTI-GDHELK</u>	<u>DE--QIK</u>	<u>AGK</u>	<u>EK</u>	<u>ASG-LFK</u>	<u>AVEGYLLAHPNEY</u>				

Mature hazel nut (in-gel digestion):

	1	19	22	34	56	57	67	70			
Cor a 1.0403	<u>MGVFCYEDEATSVIPPAR</u>	LFK	<u>SFVLADNLIPK</u>	VAPQHFTGAENLEGNGGPGTIK	K	ITFAEGSEFK	YMK	HK			
	72	82	99	105	118	122	126	137	140	142	148
Cor a 1.0403	VEEIDHANFK	YCYSIIEGGPLGHTLEK	ISYEIK	MAAAPHGGGSILK	ITSK	YHTK	GNASISEEEIK	AGK	EK	AAG-LFK	<u>AVEAYLLAHPDTC</u>

Figure S2: Amino acid sequences of Cor a 1 peptides identified in extracts of hazel pollen and mature hazel nut by LC-MS^E. Corresponding peptides detected by LC-MS^E are underlined. Differing sequence stretches are color coded. Identical colors indicate identical amino acid sequences of peptides, black stretches indicate peptides which were not detected. Underlined stretches indicate unambiguously confirmed peptides. A dashed underline indicates a C-terminal peptide which is indistinguishable due to a possible deamidation N→D. The positions of the amino acids in the sequence were labeled according to the following scheme: e.g., T19 means that the corresponding peptide is released after “T”-(Trypsin) cleavage and starts at amino acid position 19.

Figure S3

Cor a 1.01

Cor a 1.01- Cav01g11790 (flower):

CCTCTTCCCATATTCTTAATTCCTTAGATCATCATCATCATGGGTGTTTTCAATTACGAGGTCGAGACCCCTCCGTT
ATCCAGCGGCAAGGCTGTTCAAGTCCTATGTCCTTGATGGCGATAAGCTCATCCCAAAGGTTGCACCTCAAGCT
ATTACCAGCGTTGAAAACGTTGGAGGAAATGGAGGGCCTGGAACCATCAAGAATATCACCTTTGGCGAAGGCA
GCCGTTACAAGTACGTGAAGGAGAGGGTTGATGAGGTTGACAACACAACTTCAAATATAGCTACACCGTGATC
GAGGGTGATGTCCTGGGTGACAAGCTGGAGAAGGTCTGCAGCGAGCTGAAGATAGTGGCAGCCCTGGTGGG
GGATCCATCTTGAAGATCAGCAGCAAGTTCCACGCCAAAGGCGACCATGAGATTAATGCAGAGGAGATGAAGG
GTGCCAAAGAAATGGCCGAGAACTTTAAGGGCGGTTGAGACCTACCTATTGGCACACTCTGCTGAATACAAC
TAAATATCGTCTTGTGTCTTCGCCC

Cor a 1.01-like variant 1 (GenBank accession number: OQ569792) (pollen):

CCTCTTCCCATATTCTTAATTCCTTAGATCATCATCATCATGGGTGTTTTCAATTACGAGGCTGAGACCACCTCTGTT
ATCCCTGCGGCAAGGCTGTTCAAGTCCTATGTCCTTGATGGCGATAAGCTCATCCCAAAGGTTGCACCTCAAGCTA
TTACCAGCGTTGAAAACGTTGGAGGAAATGGAGGGCCTGGAACCATCAAGAATATCACCTTTGGCGAAGGCAG
CCGTTACAAGTACGTGAAGGAGAGGGTTGATGAGGTTGACAACACAACTTACATACAGCTACACCGTGATCG
AGGGTGATGTCCTGGGTGACAAGCTGGAGAAGGTCTGCCACGAGCTGAAGATAGTGGCAGCCCTGGTGGAG
GATCCATCTTGAAGATCAGCAGCAAGTTCCACGCCAAAGGTGACCATGAGATTAATGCAGAGGAGATGAAGGGT
GCCAAAGAAATGGCCGAGAACTTTAAGGGCGGTTGAGACCTACCTATTGGCACACTCTGCTGAATACAAC
AACCTCGTCTTGTGTCTTCGCCC

Cor a 1.01-like variant 2 (GenBank accession number: OR326622) (mature nut):

CCTCTTCCCATATTCTTAATTCCTTAGATCATCATCATCATGGGTGTTTTCAATTACGAGGCTGAGACCACCTCTGTT
ATCCCTGCGGCAAGGCTGTTCAAGTCCTATGTCCTTGATGGCGATAAGCTCATCCCAAAGGTTGCACCTCAAGCTA
TTACCAGCGTTGAAAACGTTGGAGGAAATGGAGGGCCTGGAACCATCAAGAATATCACCTTTGGCGAAGGCAG
CCGTTACAAGTACGTGAAGGAGAGGGTTGATGAGGTTGACAACACAACTTACATACAGCTACACCGTGATCG
AGGGTGATGTCCTGGGTGACAAGCTGGAGAAGGTCTGCCACGAGCTGAAGATAGTGGCAGCCCTGGTGGAG
GATCCATCTTGAAGATCAGCAGCAAGTTCCACGCCAAAGGTGACCATGAGATTAATGCAGAGGAGATGAAGGGT
GCCAAAGAAATGGCCGAGAACTTTAAGGGCGGTTGAGACCTACCTATTGGCACACTCTGCTGAATACAAC
AACCTCGTCTTGTGTCTTCGCCC

Cor a 1.02

Cor a 1.02-like variant (GenBank accession number: OQ569793) (flower):

ATGGGTGTTTTCAATTACGAGGCTGAGACCACCTCCGTTATTCCAGCAGCTAGGCTGTTAAGGCCTTTATCCTT
GATGGCAATAACCTCATCCCAAAGGTTGCACCTCAAGCTGTTAGCAGTGTTGAAAACGTTGAAGGAAATGGAG
GGCCAGGAACAATCAAGAAGATCACCTTTCCGAAGGCAGTCCTTTCAAGTACGTGAAGGAGAGGGTTGAAG
AGGTTGACCACACAACTTCAAATACAGCTACACCGTCATCGAGGGTGGTCCCGTGGGAGACAAAGTGGAGA
AGATCTGTAACGAGATAAAGATTGTGGCAGCCCTGATGGAGGATCCATCTTGAAGATCTCGAACAAAGTACCA
CACCAAAGGTGACCATGAGGTGGATGCAGAGCATATTAAGGGTGGCAAAGAAAAGGTGAGGGTCTTTTCAG
GGCGGTTGAGGCCTACCTCTTGGCACACTCTGCTGAATACAAC

Cor a 1.03

Cor a 1.03-Cav01g11870 (immature nut):

CTCTAGTCCTCATATATCTCCCAACCTCAAAAACCTCTCCACTTAATTATTATCATTCTCTCTCACATCACTTCCAAA
GTCTTAGCTCATCATGGGTGTGTTCACTTATGAAACCGAGACCACTTCAGTTATCCCTCCCGCTAGGCTGTTCAA
GAGCTTTGTCCTAGATTCCGACAACCTCATCCCAGAGGTTGCTCCAAAGGCCATCAAGAGCATTGAAATCATCG
AAGGAAATGGAGGTCCCGGAACCATTAAGAAGATCTGCTTCGATGAAGGCAGCCCAATCAGCTACATAAAGC
AAAAGGTTGATGAGATTGACCAAGCAAACCTTTTCATATCGCTACAGTGTGATTGATGGCGATGCTTTGTCCGAC
AAACTGGAGAAAATCAATTGCGAGATCAAGATAGTGGCATCCCTGATGGAGGATCTATCATGAAGAGCATCA
GCAAGGACCACACCATAGGAGACCATGAGCTCGAGGAAGAGCAGATTAAGGCTGGAAAAGAGATGGCCTCA
GGACTTTTCAAAGCTGTTGAGGACTACCTCTTGGCACACCCTAATGAGTATTAATTAAGGCTAATTGTGTGGTG
GTTATATTAATTTGCTTATTTCGCCATCACGTGTTAAGG

Cor a 1.03-like variant 1 (GenBank accession number: OQ569794) (immature nut):

CCCAACCTCAAAAACCTCTCCACTTAATTATTATCATTCTCTCTCACATCACTTCCAAAGTCTTAGCTCATCATGGG
TGTGTTCACTTATGAAACCGAGACCACTTCAGTTATCCCTCCCGCTAGGCTGTTCAAGAGCTTTGTCCTAGATT
CGACAACCTCATCCCAGAGGTTGCTCCAAAGGCCATCAAGAGCATTGAAATCATCGAAGGAAATGGAGGTCCC
GGAACCATTAAGAAGATCTGCTTCGATGAAGGCAGCCCAATCAGCTACATAAAGCAAAAGGTTGATGAGATTG
ACCAAGCAAACCTTTTCATATCGCTACAGTGTGATTGATGGCGATGCTTTGTCCGACAAACTGGAGAAAATCAAT
TGCGAGATCAAGATAGTGGCATCCCTGATGGAGGATCTATCATGAAGAGCATCAGCAAGGACCACACCAT
GGAGACCATGAGCTCGAGGAAGAGCAGATTAAGGCTGGAAAAGAGATGGCCTCAGGACTTTTCAAAGCTGTT
GGGGACTACCTCTTGGCACACCCTAATGAGTATTAATTAAGGCTAATTGTGTGGTGTTATATTAATTTGCTTA
TTCCGCCATCACGTGTTAAGG

Cor a 1.03-like variant 2 (GenBank accession number: OR326623) (catkin):

ATGGGTGTGTTCACTTATGAAACCGAGACCACTTCAGTTATCCCTCCGGCTAGGCTGTTCAAGAGCTTTGTCT
AGATTCCGACAACCTCATCCCAAAGGTTGCTCCAAAGGCCATCAAGAGCATTGAAATCATCGAAGGAAATGGA
GGTCCCGGAACCATTAAGAAGATCTGCTTCGATGAAGGCAGCCCAATCACTACATAAAGCAAAAGGTTGAAG
AGATTGACCAAGCAAACCTTTTCATATCGCTACAGTGTGATTGAAGGCGATGCTTTGTCCGACAAACTGGAGAA
AATCAATTACGAGATCAAGATAGTGGCATCCCTGATGGAGGATCTATCATGAAGAGCATCAGCAAGGACCAC
ACCATAGGAGACCATGAGCTCAAGGAAGAGCAGATTAAGGCTGGAAAAGAGATGGCCTCAGGACTTTTCAA
GCTGTTGAGGACTACCTCTTGGCACACCCTAATGAGTATTA

Cor a 1.04

Cor a 1.04-like variant 1 (GenBank accession number: OQ569795) (immature nut):

CCTCTACTACGTACTCCTCTTCATATTCTTCCATTTCCATAGATCATCATCATCATCATCATCATGGGTGTTTT
CTGCTACGAGACTGAGACCACCTCCGTTATCCCTCCGGCTAGGCTGTTCAAGTCCTTTGTCCTAGATGCCGACA
ACCTCATTCCCAAGGTTGCTCCTCAGCACTTACCGGCGCTGAAAACCTCGAAGGAAATGGCGGGCCTGGAAC
CATCAAGAAGATCACCTTCGCCGAAGGCAGCGAATTCAAGTACATGAAGCACAAGGTTGAGGAGATCGACCA
CGCAAACCTTCAAATACTGCTACAGCATCATCGAGGGAGGTCCATTGGGGCACACACTGGAGAAGATCTTTAC
GAGATCAAGATGGCGGCAGCCCTCATGGAGGAGGATCCATCTTGAAGATCACCAGCAAGTACCACACCAAG
GGCAACGCTTCAATCAGTGAGGAGGAGATCAAGGCTGGCAAAGAGAAGGCCCGGACTTTTCAAGGCTGTT
GAGGCTTACCTCTTGGCACACCCTGATACCTACTGTTAGAGTAGCTAACACCCACGTACAATAAAGCTTGTGT
TGTGTTGTGTGGTCCCTCAATAATGAGTTGTTACTGCTTGATTTGGTTTGCTAATAAAGGAGTTTGCAGTTGT
GAATTGTGATCATCATCTTC

Cor a 1.05

Cor a 1.05-like variant 1 (GenBank accession number: OQ569796) (catkin):

GTTGTGCACCATTCCAATCAGTCCTGCATTTTCTACCATCTCTAAATTCTGAATATATTCGATCATGGGTGTTCA
ACTCTAAGTGATGAGGTCACTAGCCCCATCCCAGCACCAAAGCTGTTCAAGGCCTTGATCCTTGATGCTGACAA
CCTCCTTCCCAAGCTCCTGCCTCAGGCCATTAAGAGTATCGAGACAGTTGAGGACAATGGAGGGCCTGGAACC
ATCAAGAAGATCACCATCGCTGAAGGTACCCACATCAAGCACTTGAAGCATAGGATTGATGCAGTAGACGAAG
AGAAATTGACATACAGTTACACACTGATTGAGGGTGATGATTTGCTGGACAAGTTTGAATCAATTTCTTATGAG
ATTAAGTTTGAGTCTTCTCCTGATGGGGGAGCCAAATGTACAAATTTAGCAAGTACCATCCTAAACCAGGGGC
CCAGATCAATGAAGAGGAAATGAAGGCAAGCAAGGAAAAGGGCTTGGCTGTTTACAGAGCTATGGAAGCCTA
CCTCTTGGCCAATCCTGAAGCCTATGCTTGATGTTTCTTATTGAGACACTATATATGTATCCTGTGTTCTCAA
GTGTATTGAGGTTCTATGTCTTTGCTTTGTGGCGC

Cor a 1.05-like variant 2 (GenBank accession number: OR232687) (mature nut)

CTAATTCTGATATATTCGATCATGGGTGTTCACTCTAAGTGATGAGTTCACTAGCCCCATCCCAGCACCAA
GCTGTTCAAGGCCTTGATCCTTGATGCTGACAACCTCCTTCCCAAGCTCCTGCCTCAGGCCATTAAGAGTATCG
AGACGGTTGAGGGCGATGGAGGGCCTGGAACCATCAAGAAGATCACTATCGCTGAAGGTACCCATATCAAGC
ACTTGAAGCATAGGATTGATGCAGTAGAGGAAGAGAAATTGACATACAGTTACACACTGATTGATGGTGATG
ATTTGCTGGACAAGTTTGAATCAATTTCTTATGAGATTAAGTTTGAGTCTCTCCTGATGGGGGAGCCAAATGT
ACAAATCTTAGCAAGTACCATCCTAAACCAGGGGTCCAGATCAATGAAGAGGAAATCAAGGCAAGCAAGGAA
AAGGGCATGGCTGTTTACAGAGCCGTGGAAGCCTTCTCCTTGGCCAATCCTGAGGCCTATGCTTGATGCTTCT
TGTTGAGACACTATTATATGTATCTCGTGTTCTCAAAGTTTATTGAGGTTCTATGTCTTTGCTTKGTGGCGCAA
AA

Cor a 1.05-Cav01g11940 (flower):

GTTGTGCACCATTCCAATCAGTCCTCCATTTTCTACCATTTTCTAAATTCTGAATATATTCGATCATGGGTGTTCA
CACTCTAAGTGATGAGTTCACTAGCCCCATCCCAGCACCAAAGCTGTTCAAGGCCTTGATCCTTGATGCTGACA
ACCTCCTTCCCAAGCTCCTGCCTCAGGCCATTAAGAGTATCGAGACGTTGAGGGCGATGGAGGGCCTGGAAC
CATCAAGAAGATCACTATCGCTGAAGGTACCCACATCAAGCACTTGAAGCATAGGATTGATGCAGTAGAGGAA
GAGAAATTGACATACAGTTACACACTGATTGAGGGTGATGATTTGCTGGACAAGTTTGAATCAATTTCTTATGA
GATTAAGTTTGAGTCTCTCCTGATGGGGGAGCCAAATGTACAAATCTTAGCAAGTACCATCCTAAACCAGGG
GTCCAGATCAATGAAGAGGAAATCAAGGCAAGCAAGGAAAAGGGCATGGCTGTTTACAGAGCCGTGGAAGC
CTTCTCTTGGCCAATCCTGAGGCCTATGCTTGATGCTTCTTGTGAGACACTATTATATATATCTCGTGTTCT
CAAAGTTTATTGAGGTTCTATGTCTTTGCTTTGTGGCGC

Cor a 1.05-Cav01g11520 (immature nut):

AAATTTCCCTCTCTAATTCTGAATATATTCGATCATGGGTGTTCACTCTAAGTGATGAGGTCACTAGCCCCAT
CCCAGCACCAAAGCTGTTCAAGGCCTTGATCCTTGATGCTGACAACCTCCTTCCCAAGCTCCTGCCTCAGGCCAT
TAAGAGTATCGAGACAGTTGAGGGCAATGGAGGGCCTGGAACCATCAAGAAGATCACCATCGCTGAAGGTAC
CCACATCAAGCACTTGAAGCATAGGATTGATGCAGTAGACGAAGAGAAATTGACATACAGTTACACACTGATT
GAGGGTGATGATTTGCTGGACAAGTTTGAATCAATTTCTTATGAGATTAAGTTTGAGTCTTCTCCTGATGGGG
AGCCAAATGTACAAATTTAGCAAGTACCATCCTAAACCAGGGGCCAGATCAATGAAGAGGAAATGAAGGC
AAGCAAGGAAAAGGGCTTGGCTGTTTACAGAGCTATGGAAGCCTACCTCTTGGCCAATCCTGAAGCCTATGCT
TGATGTTTCTTATTGAGACACTATCTATGTATCCTGTGTTCTCAAAGTGTATTGAGGTTCTATGTCTTTGCTTT
GTGGCGC

Cor a 1.07

Cor a 1.07-like variant 1 (GenBank accession number: OR232688) (catkin)

TCCTCTTCTTCTTCTTCTTCTTCTTCTAGTCTTCATAGCTAGATATCATCATGGGTGTTTTACATATGAGAATGAGG
TCACCTCCCCCTCCCTCCATCGAAGTTGTTCAAGGCCTTCGTCCTTGATGCCGACAACCTTGTCCTCAAGATT
ACAAGCACGGCATAAATGACCTGAACGTGAAATCCTTGAAGGCCATGGAGGGCCTGGAACCATCAAAAAGT
TTACGTTTCATGAAGGCGGCCACTTGAAATTTTTGAAGCACAAGGTTGATGTGCTAGACAAGGAACACTTCAC
ATACAATTACAGCGTGTTGAAGTGGTCCTTTGTCGGAGACACTCGAGAAAGTCTCATTGAGACCAAGTTG
GTGGCTTCCCCAGATGGAGGAACCATCTTCAAGAGCACCGGCAAGTATTATACAAAAGATCACGCTGAGATAA
ATGAAGAGAAAATCAAGGCTGAAGATGAAAAGGCCACGGGGGTGTTCAAGGCAGTTGAAGGCTACCTCTTG
GCAAATCCTGAAGCCTACAATAAGCTGCTTGATTGTTGCATGTATATCTGATTTGTCTGGTCAAACTGTCTT
AAGGCCTTC

Cor a 1.07-like variant 2 (GenBank accession number: OR232689) (pollen)

TCTCTTCTTCTTCTTCTTCTTCTTCTGATCATCTTCTAGTACGCCTAGATATCATCATGGGTGTTTTACATATGAGAAT
GAGGTCACCTCCCCCTCCCTCCATCGAAGTTGTTCAAGGCCTTCGTCCTTGATGCCGACAACCTTGTCCTCAAG
ATTTACAAGCACGGCATAAATGACCTGAACGTGAAATCCTTGAAGGCCATGGAGGGCCTGGAACCATCAAA
AAGTTTACGTTTCATGAAGGCGGCCACTTGAAATCTTGAAGCACAAGGTTGATGTGCTAGACAAGGAACACT
TCACATACAATTACAGCGTGTTGAAGTGGTCCTTTGTCGGAGACACTCGAGAAAGTCTCATACGAGACCAA
GTTGGTGGCTTCCCCAGACGGAGGAACCATCTTCAAGAGCACCGGCAAGTATTATACAAAAGATCACGCTGAG
ATCAATGAAGAGCAAATCAAGGCTGAAGATGTAAGGCCACAGGGGTGTTCAAGGCAGTTGAAGGTTACCTC
TTGGCAAATCCTGAAGCCTACAATAAGCTGCTTGATTGTTGCATGTGTATCTGATTTGTCTGGTCAAACTGT
CTTAA

Cor a 1.08

Cor a 1.08-like variant 1 (GenBank accession number: OR232690) (flower)

GCCTAGCTAGTTTCATTAATCCTCAAGAAAGGATATCATGGGCGTAATCACTTACGTAGACGAGTACACCTCCC
CTATCCACCAGCCAGATTGTTCAAAGCCTTGGTCATTGATGCTCACATCCTCATCCCCAACTCCTCCCACAGG
CTGTTAAGAGCATTGAAATCATTCAAGGCGATGGAGGGGCTGGAAGCATCAGGCAAACCACTTTTGCCGAAG
GTAGCCAATTTAGTACTGTCAAGAACCGAATTGATGAGCTGAATGAAAAAACTTATTACTACAAGTACACGGT
GATCGAATTCGAAGGTGATGCCTTGGCTGACAAGCTTGAATTGATTGTTTCATGAGGTTCAATTTGAGGCAACG
GCTGAAGGTGGGAGTAAAAATAAGATGACAACCAAGTACCATAACCAAGGATGACGTAGTGATCAAGGAAGA
GGAAATCAAGGCTGGCAAGGAAAAGGTGCTGGGTATGTACAAAGTTGTGGAAGGCTACCTCATCCAGAACCC
TGCGCCTATGCTTAATTAATGCTAATCTCCAATCAGTCTCTTTTGTCTACTGTTAATGTTGTGGCTTTTACCTT
TGTCTTTGAATAATCGCCTTAATGTGGTGTGATAATAAGTCTCAATCACTAGTGAATAGTGATGGTG

Cor a 1.08-like variant 2 (GenBank accession number: OR232691) (mature nut)

GCCTAGCTAGTTTCATTAATCCTCAAGAAAGGATATCATGGGCGTAATCACTTACACAGATGAGTACACCTCTC
CTATCCACCAGCTAGATTGTTCAAAGCCTTGGTCATTGATGCTCACATCCTCATCCCCAACTCCTCCCACAGG
CTGTTAAGAGCATTGAAATCATTCAAGGCGATGGAGGGGCTGGAAGCATCAGGCAAACCACTTTTGCCGAAG
GTAGCCAATTTAGTACTGTCAAGAACCGAATTGATGAGCTGAATGAAAAAACTTATTACTACAAGTACACGGT
GATCGAATTCGAAGGTGATGCCTTGGCTGACAAGCTTGAATTGATTGTTTCATGAGGTTCAATTTGAGGCAACG
GCTGAAGGTGGGAGTAAAAATAAGATGACAACCAAGTACCATAACCAAGGATGACGTAGTGATCAAGGAAGA
GGAAATCAAGGCTGGCAAGGAAAAGGTGCTGGGTATGTACAAAGTTGTGGAAGGCTACCTCATCCAGAACCC
TGCGCCTATGCTTAATTAATGCTAATCTCCAATCAGTCTCTTTTGTCTACTGTTAATGTTGTGGCTTTTACCTT
TGTCTTTGAATAATCGCCTTAATGTGGTGTGATAATAAGTCTCAATCACTAGTGAATAGTGATGGTG

Figure S3: Sequences of additional putative Cor a 1 variants identified at the mRNA level in different hazel tissues. Sequences labeled with a Cav01 number are present in the “Tombul”

cultivar (Lucas et al. 2021). Variants labeled with a Genbank accession number are genes identified by us which were not found in the “Tombul cultivar”. Grey: coding sequence.

Figure S4

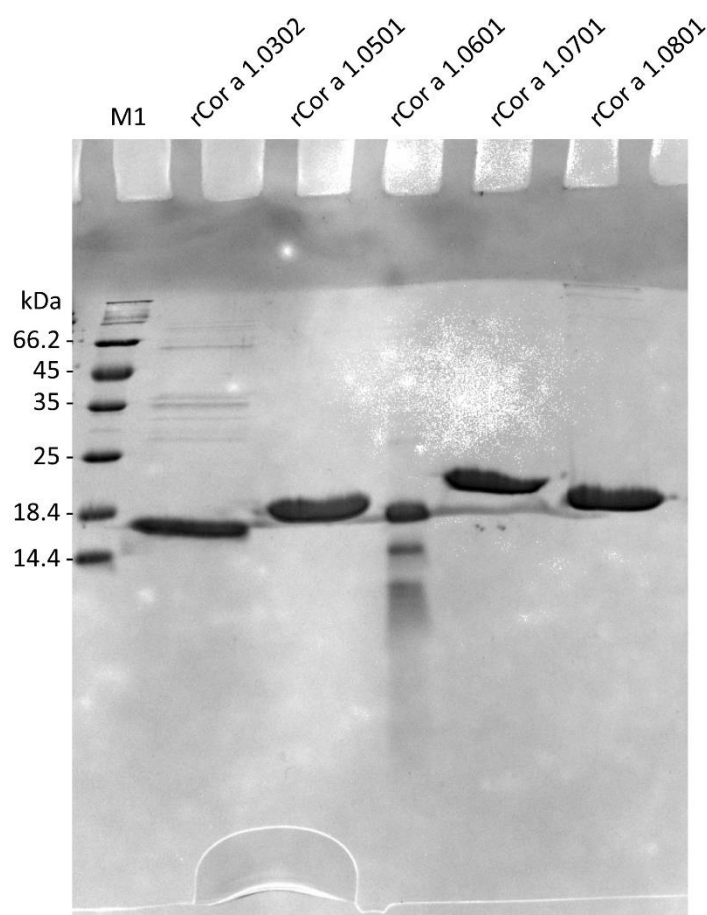
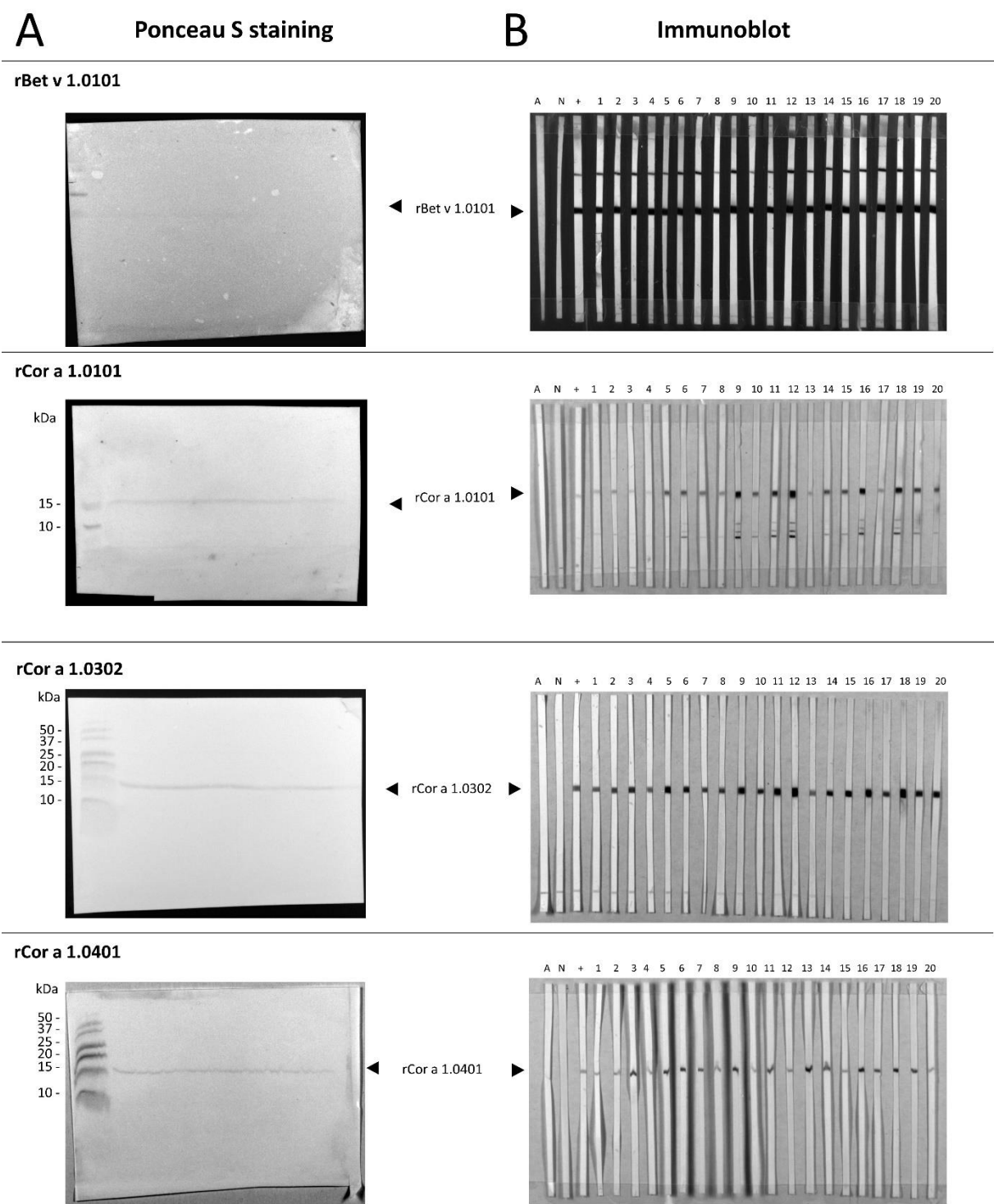


Figure S4. Coomassie stained SDS-polyacrylamide gel showing Cor a 1 proteins purified from *E. coli*. 5 µg of the purified proteins were applied on a 19 % SDS polyacrylamide gel and subjected to electrophoresis, followed by Coomassie staining. M1 molecular weight marker. The sizes of the marker proteins are indicated on the left.

Figure S5



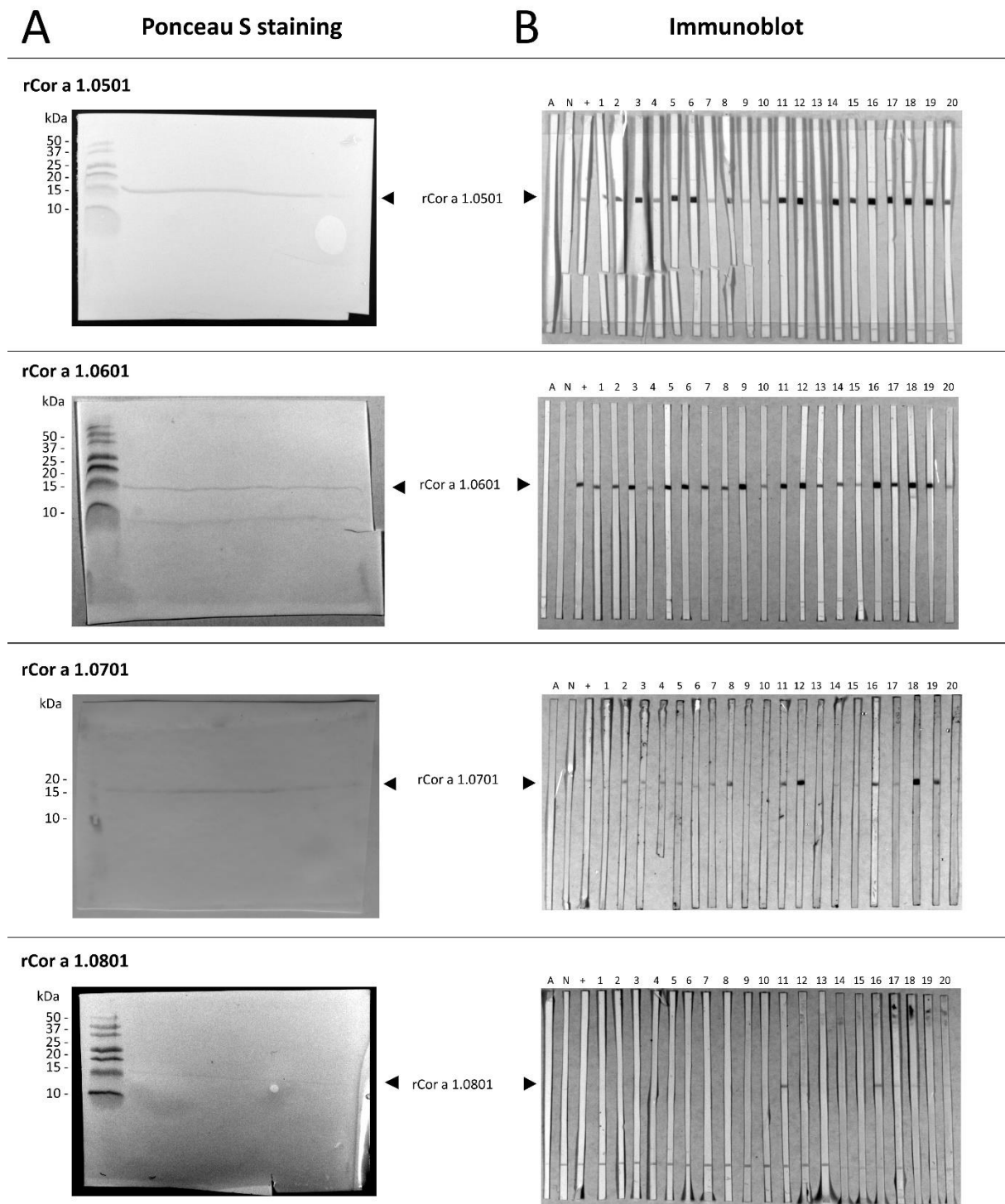
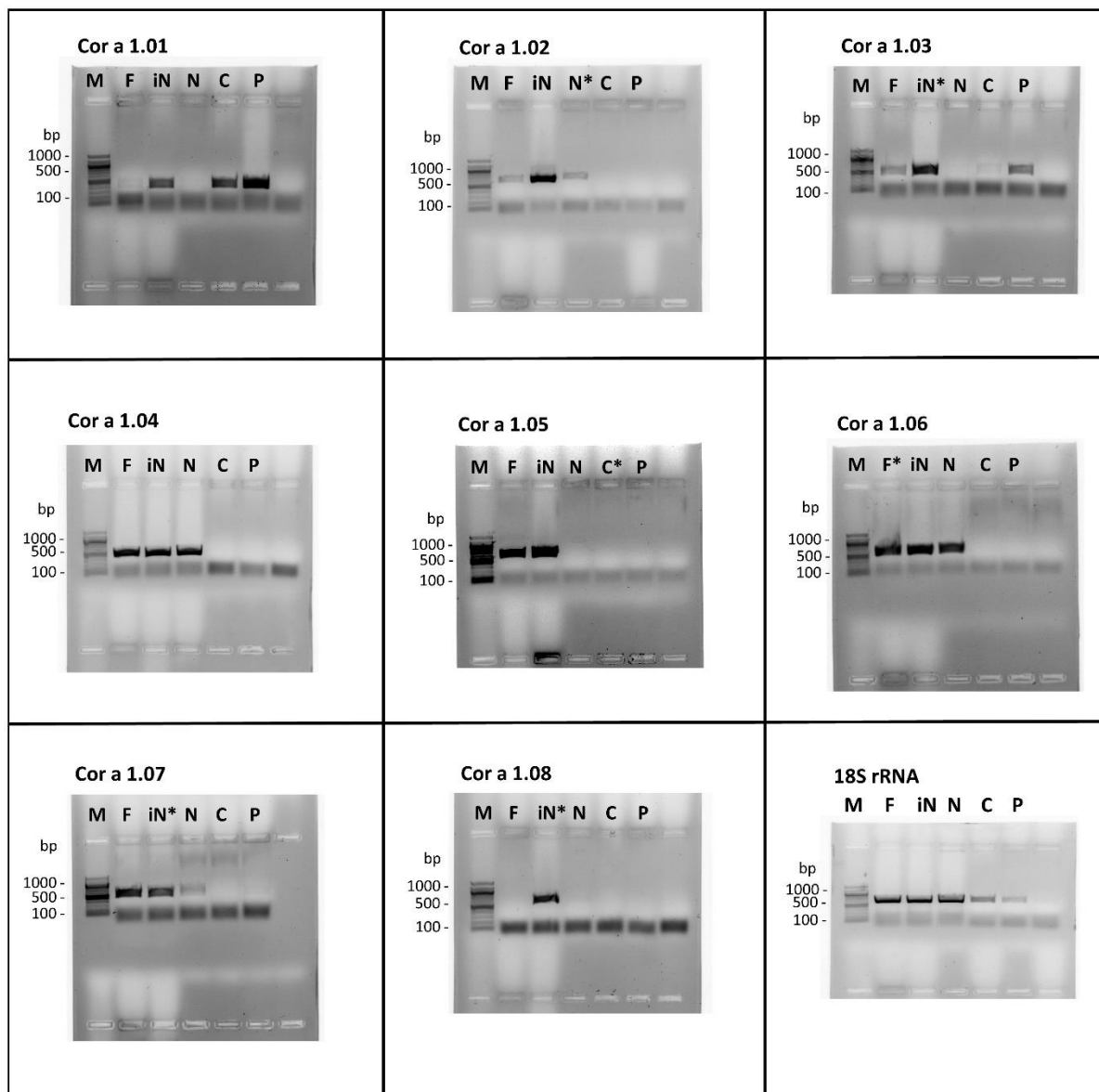


Figure S5: Immunoblots of Cor a 1 isoallergens with sera from tree pollen allergic individuals. A) Ponceau S staining. SDS-PAGE (16 % PA gels) was performed with 1.5 µg/cm or 0.8 µg/cm (Cor a 1.0801) of the Cor a 1 proteins shown, followed by blotting onto 0.2 µm nitrocellulose membranes. Successful protein transfer was visualized by Ponceau S staining. **B) Immunoblots.** The membranes produced in A) were cut into stripes and incubated with patients' sera. Bound specific IgE antibodies were detected using a mouse-anti-human IgE antibody coupled to alkaline phosphatase followed by nitroblue tetrazoliumchloride (NBT) /5- Bromo-4-chloro-3-indolylphosphate (BCIP) staining. Labels on top of the immunoblots: A, secondary antibody control; N, horse serum; +, positive control, mixture of sera from birch pollen and hazel pollen allergic persons (purchased from Gold Standard Diagnostics Kassel GmbH); 1-20, sera of patients allergic to tree pollen.

Figure S6

A



B

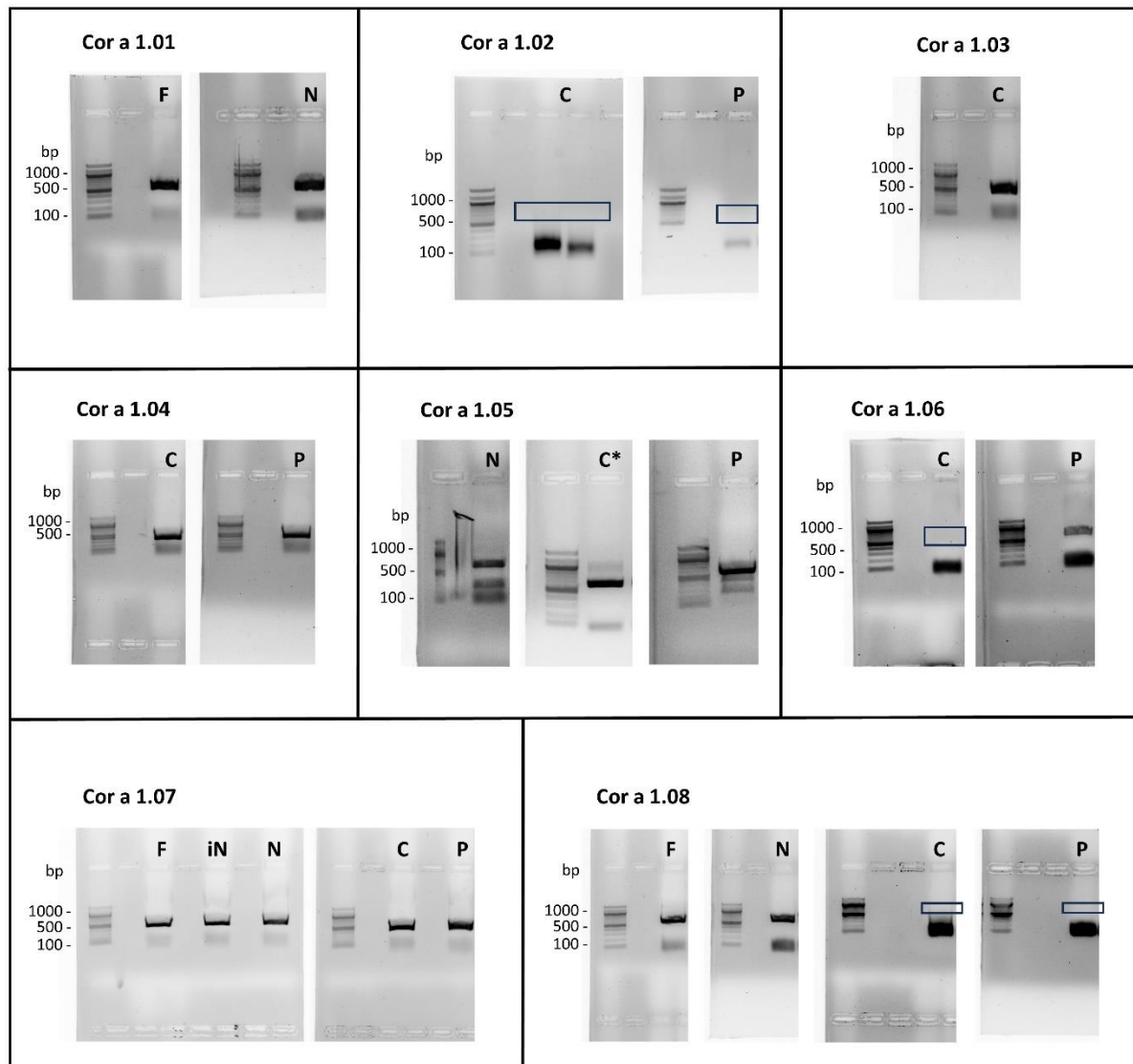


Figure S6: Expression of Cor a 1 genes in different hazel tissues. Full-length gels presented in Figure 1. The results of the 1st PCR assays are shown in A), the gels of the 2nd PCR assays are presented in B. The boxes indicate the regions where DNA products of the corresponding sizes were expected.

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TTHA0849      --MPEVRAERYIPAPPERVYRLAK-DLEGLKP--YLKEVESLEVVAEGARTSRWVAVA      55
Cor a 1.0801  MGVTITYTDEYTSPIPPARLFKALVIDAHILIPKLLPQAVKSIEIIQGDGGAGSIRQITFA      60
               :      *      * ** *:::      * . * *      : *:*:*::: :*:      * ::.*

TTHA0849      MGKKVRWLEEEEWDDENLRNREFFSPEGDFDRYEGTWVFLPEGEGTRVVLTL---TYELTI      112
Cor a 1.0801  EGSQFSTVKNR-IDELNEKTYYY-----KYT---VIEFEGDALADKLELIVHEVQFEA      109
               *:. . ::. . *: * :. : :      :*      *: **:.      * *      : :

TTHA0849      PIFGGLLRKLVQKLMQENV----ESLLKGLEERVLAASS-----              147
Cor a 1.0801  TAEGGSKNKMTTKYHTKDDVVIKEEEIKAGKEKVLGMYKVVEGYLIQNPGAYA          162
               ** .*: . * : :      * . :*. :*:** . .

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Identity matrix	TTHA0849	Cor a 1								
		0101	0201	0301	0302	0401	0501	0601	0701	0801
TTHA0849	100	21.68	23.08	23.78	23.08	22.22	20.42	25.87	22.38	20.98

Figure S7: Sequence comparison and identity matrix of TTHA0849 and Cor a 1 proteins. (*) conserved amino acids; (:) conservative exchanges; (.) semi-conservative exchanges. Numbers in the identity matrix indicate the amino acid sequence identity in %.