Table S1. List of RAPD, ISSR, SCoT and SRAP primers utilized to test variability with a collection of cumin genotypes

Primer	Sequence 5′-3′	Primer	Sequence 5′-3′
RAPD		**ISSR**	
OPA-01	CAGGCCCTTC	A	(GACA)3RT
OPA-02	TGCCGAGCTG	B	YR(GACA)3
OPA-03	AGTCAGCCAC	C	(GACAC)2
OPA-04	AATCGGGCTG	UBC-112	(GACA)4
OPA-05	AGGGGTCTTG	UBC-808	(AG)8C
OPA-06	GGTCCCTGAC	UBC-809	(AG)8G
OPA-09	GGGTAACGCC	UBC-811	(GA)8C
OPA-10	GTGATCGCAG	UBC-818	(CA)8G
OPA-11	CAATCGCCGT	UBC-820	(ACTG)4
OPA-12	TCGGCGATAG	UBC-841	(GACAC)4
OPA-14	TCTGTGCTGG	UBC-854	(TC)8RG
OPA-17	GACCGCTTGT	UBC-855	(AC)8YT
OPA-18	AGGTGACCGT	UBC-856	(ACAC)4YG
OPA-19	CAAACGTCGG	UBC-857	(AC)8T
OPB-02	TGATCCCTGG	UBC-864	(ATG)4
OPB-03	CATCCCCCTG	**SCoT**	
OPB-09	TGGGGGACTC	SCoT-06	CAACAATGGCTACCACGC
OPD-20	ACCCGGTCAC	SCoT-08	CAACAATGGCTACCACGT
OPE-03	CCAGATGCAC	SCoT-12	ACGACATGGCGACCAACG
OPE-07	AGATGCAGCC	SCoT-17	ACCATGGCTACCACCGAG
OPE-14	TGCGGCTGAG	SCoT-25	ACCATGGCTACCACCGGG
OPE-18	GGACTGCAGA	SCoT-30	CCATGGCTACCACCGGCG
OPF-20	GGTCTAGAGG	SCoT-33	CCATGGCTACCACCGCAG
OPG-04	AGCGTGTCTG	**SRAP**	
OPG-18	GGCTCATGTG	Me1	Fw 5'-TGAGTCCAAACCGGATA-3'
OPH-05	AGTCGTCCCC	Me2	Fw 5'-TGAGTCCAAACCGGAGC-3'
OPH-13	GACGCCACAC	Me3	Fw 5′-TGAGTCCAAACCGGAAT-3′
OPH-16	TCTCAGCTGG	Me4	Fw 5'-TGAGTCCAAACCGGACC-3'
OPI-02	GGAGGAGAGG	Me5	Fw 5'-TGAGTCCAAACCGGTGC-3'
OPI-03	CAGAAGCCCA	Em1	Rv 5'-GACTGCGTACGAATTAAT-3'
OPJ-04	CCGAACACGG	Em2	Rv 5'-GACTGCGTACGAATTTGC-3'
OPJ-05	CTCCATGGGG	Em3	Rv 5'-GACTGCGTACGAATTGAC-3'
OPJ-07	CCTCTCGACA	Em4	Rv 5'-GACTGCGTACGAATTTGA-3'
OPJ-10	AAGCCCGAGG	Em5	Rv 5′-GACTGCGTACGAATTAAC-3′
OPJ-14	CACCCGGATG	Em6	Rv 5'-GACTGCGTACGAATTGCA-3'
OPJ-20	AAGCGGCCTC		
OPK-07	AGCGAGCAAG		
OPK-19	CACAGGCGGA		
OPL-07	AGGCGGGAAC		
OPL-12	GGGCGGTACT		
OPL-16	AGGTTGCAGG		
OPM-20	AGGTCTTGGG		

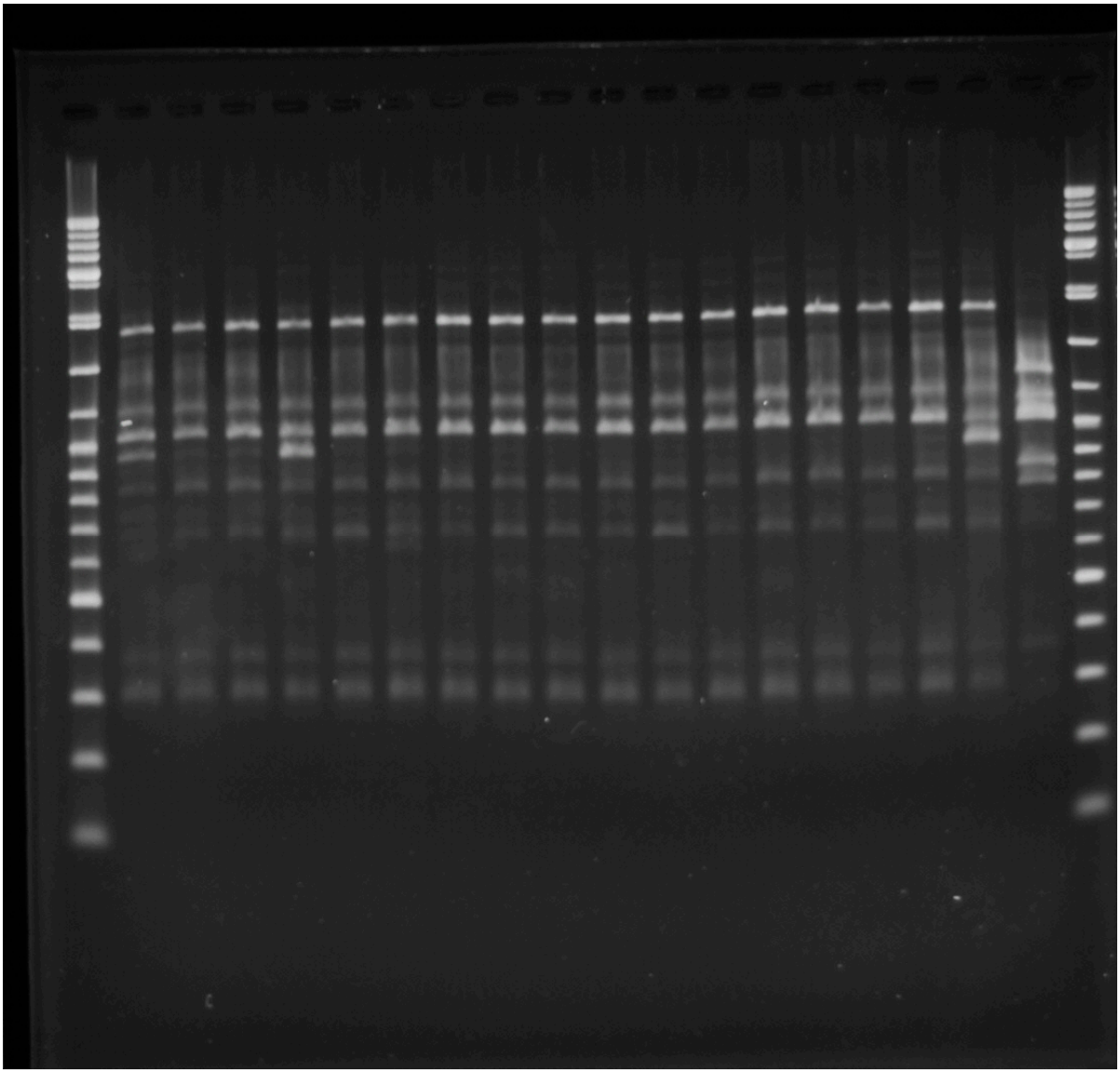

Figure S1. Products of agarose gel electrophoresis of RAPD-PCR amplification with OPA-01 primer for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lanes 1 and 20).

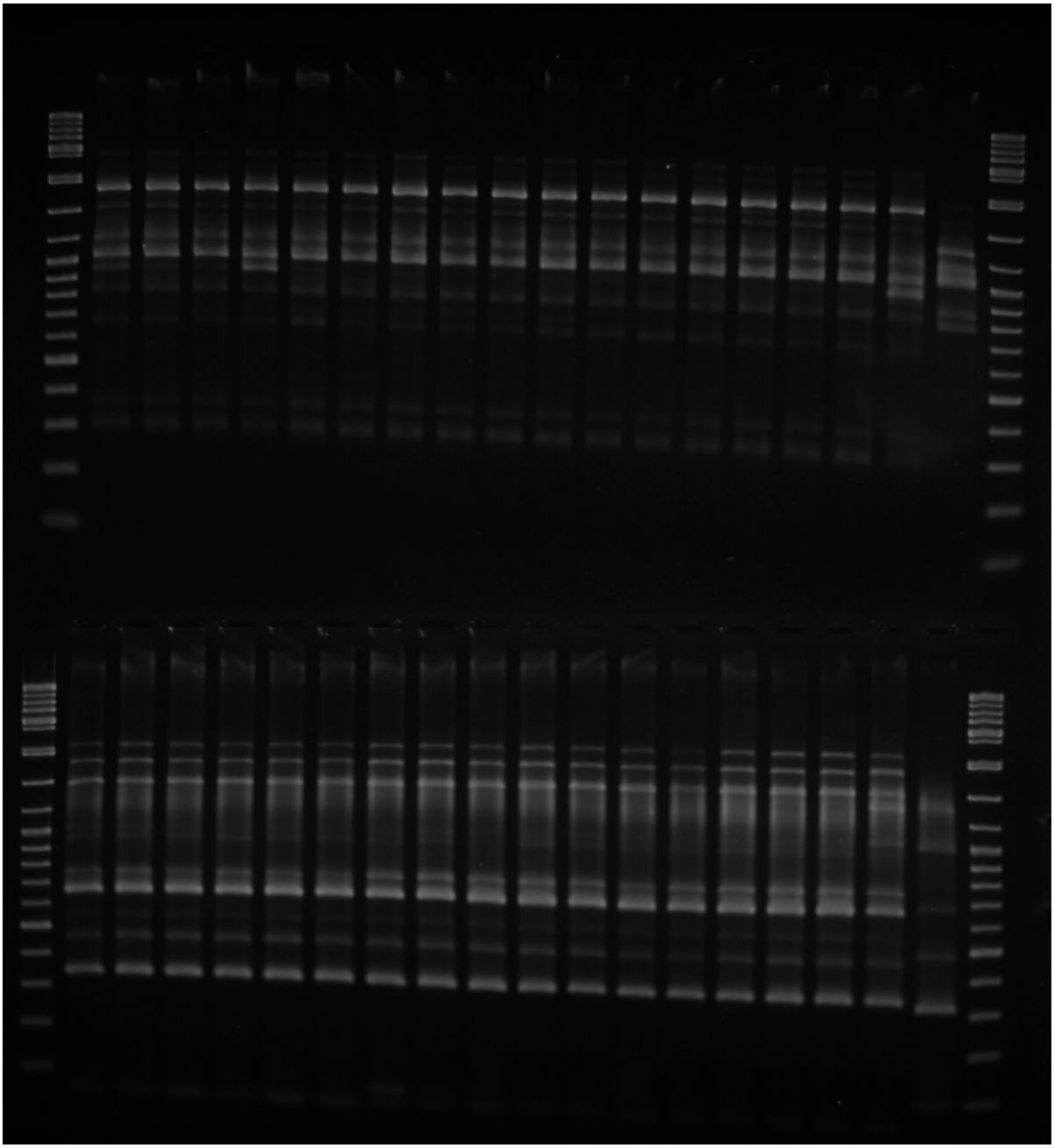

Figure S2. Products of agarose gel electrophoresis of RAPD-PCR amplification with OPA-10 (upper image) and OPA-19 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

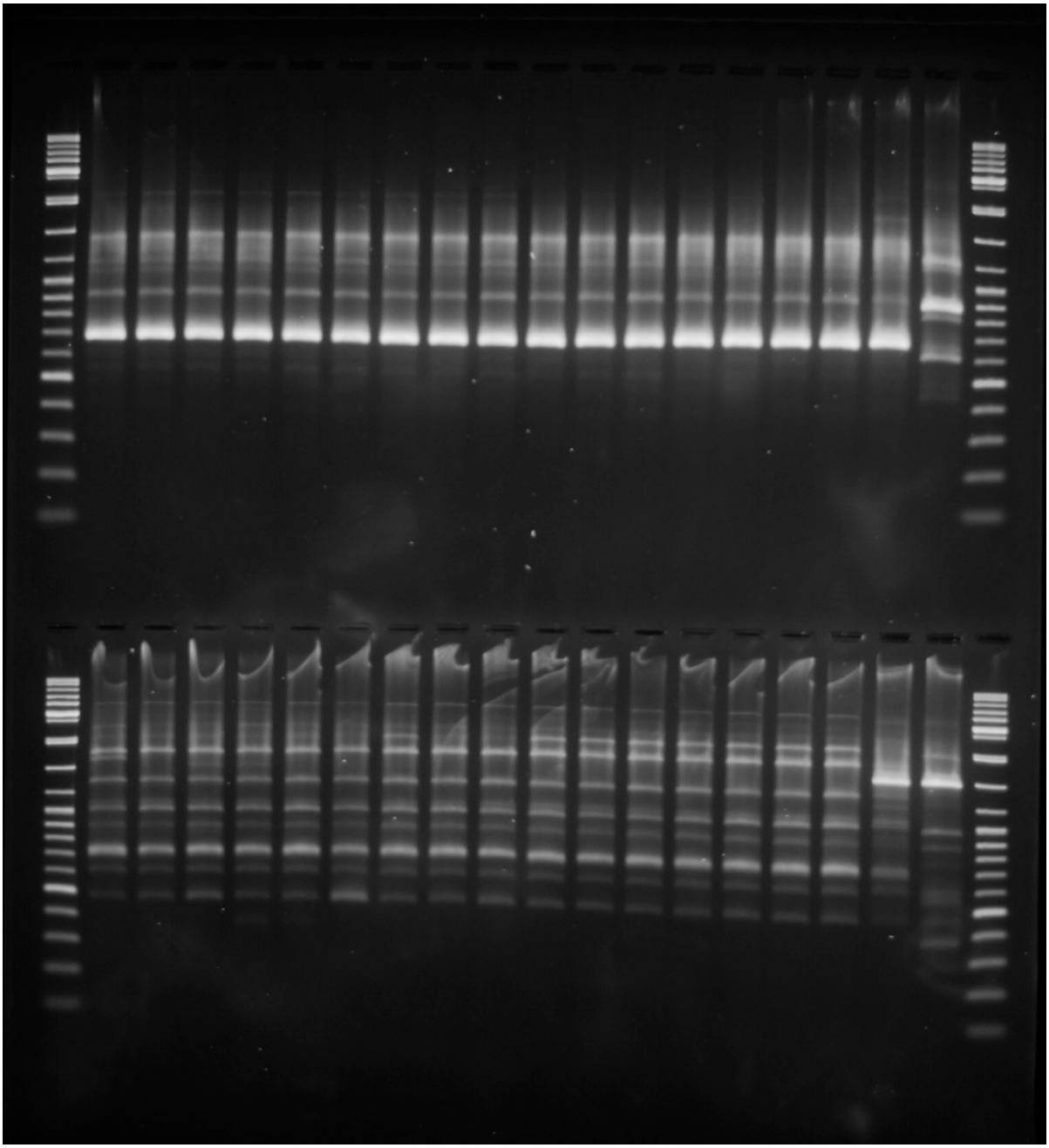

Figure S3. Products of agarose gel electrophoresis of RAPD-PCR amplification with OPA-09 (upper image) and OPA-11 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

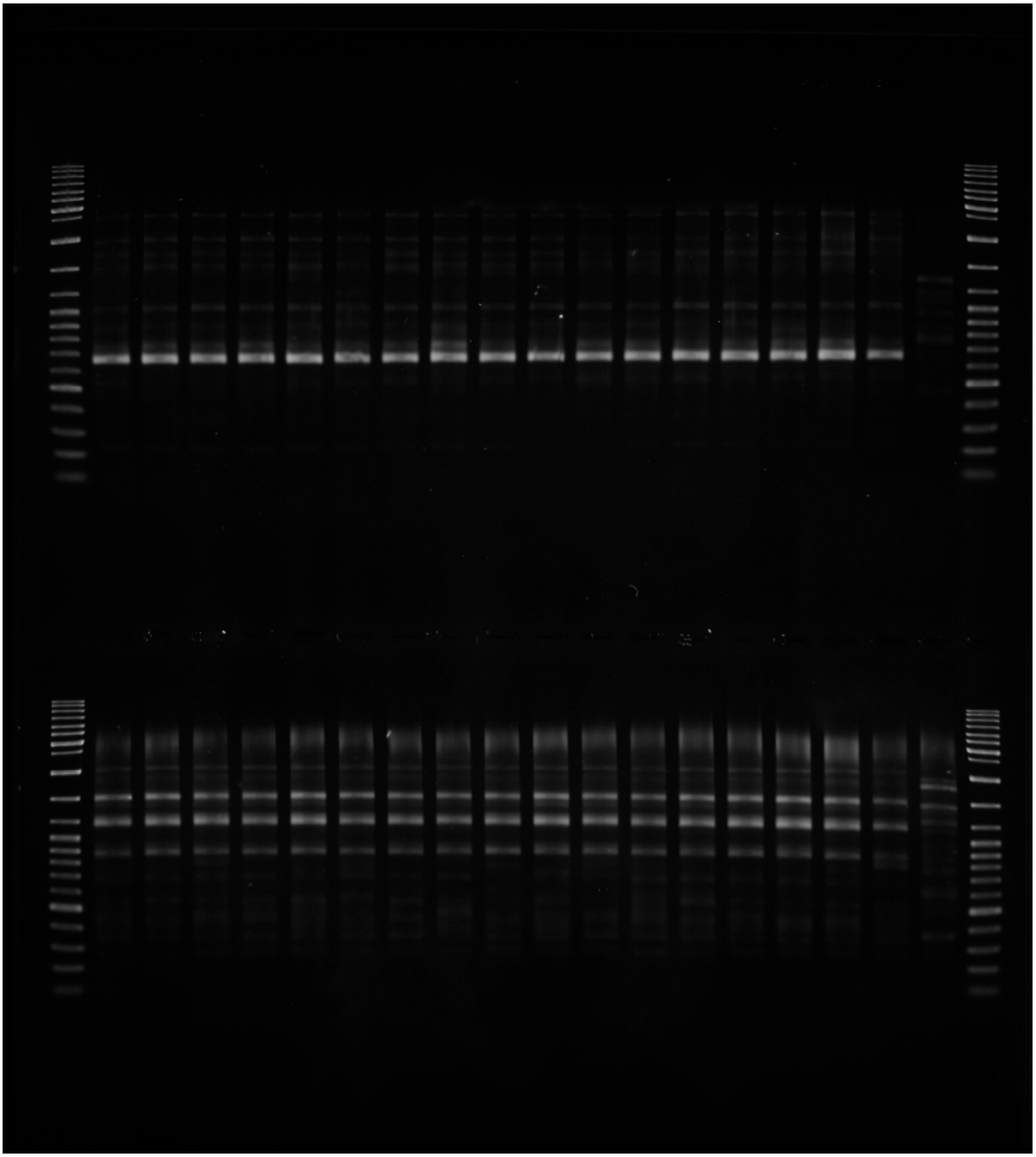

Figure S4. Products of agarose gel electrophoresis of RAPD-PCR amplification with OPB-02 (upper image) and OPB-03 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

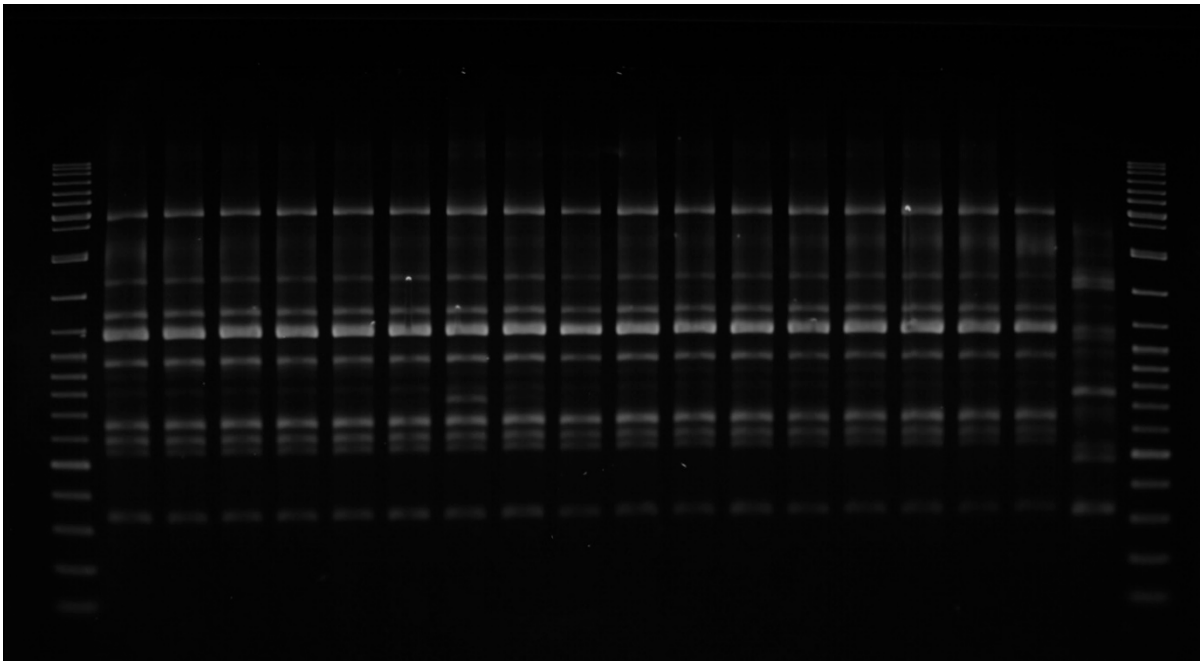

Figure S5. Products of agarose gel electrophoresis of RAPD-PCR amplification with OPG-18 primer for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

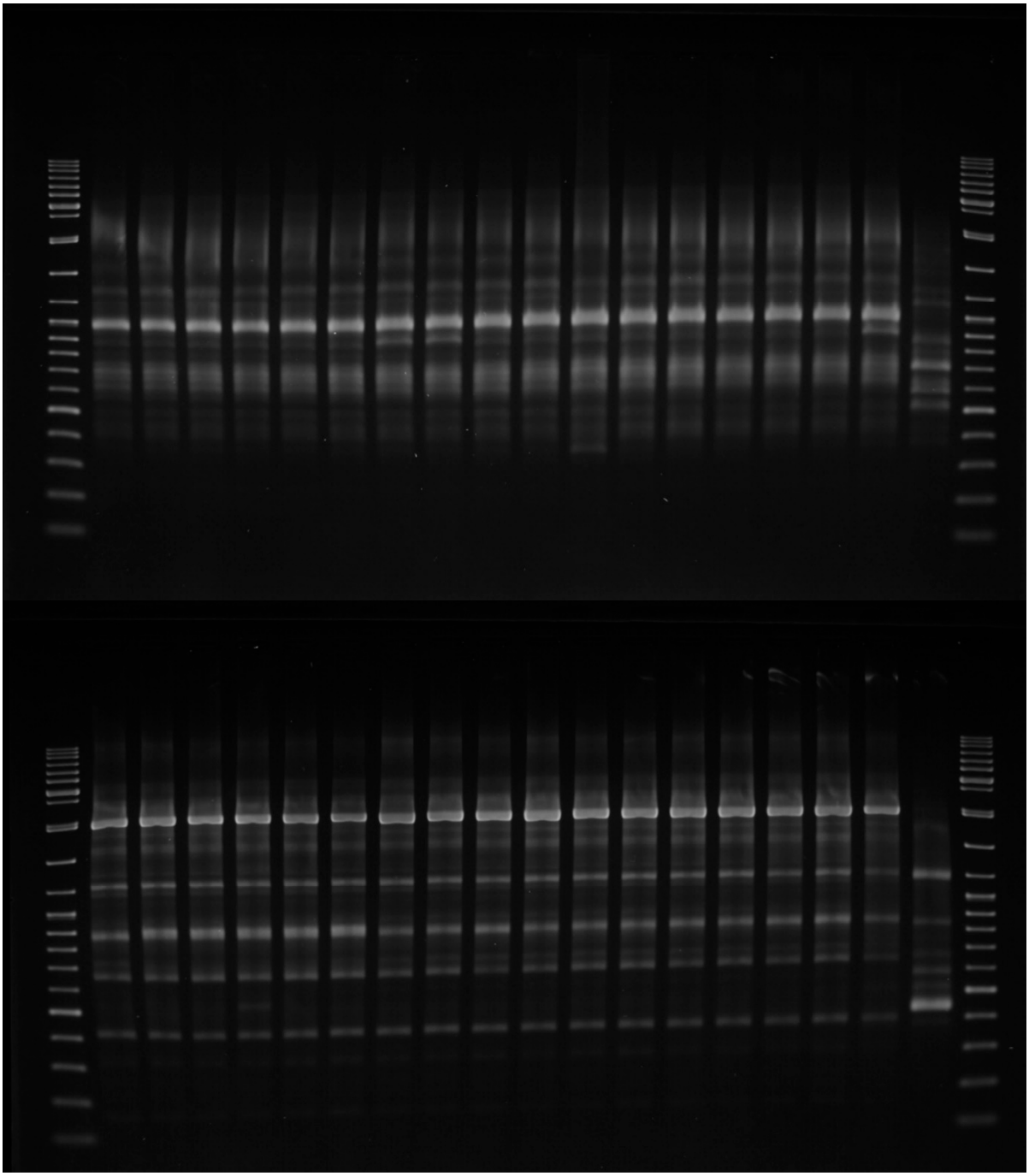

Figure S6. Products of agarose gel electrophoresis of RAPD-PCR amplification with OPL-16 (upper image) and OPL-07 (lower image) primers of 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

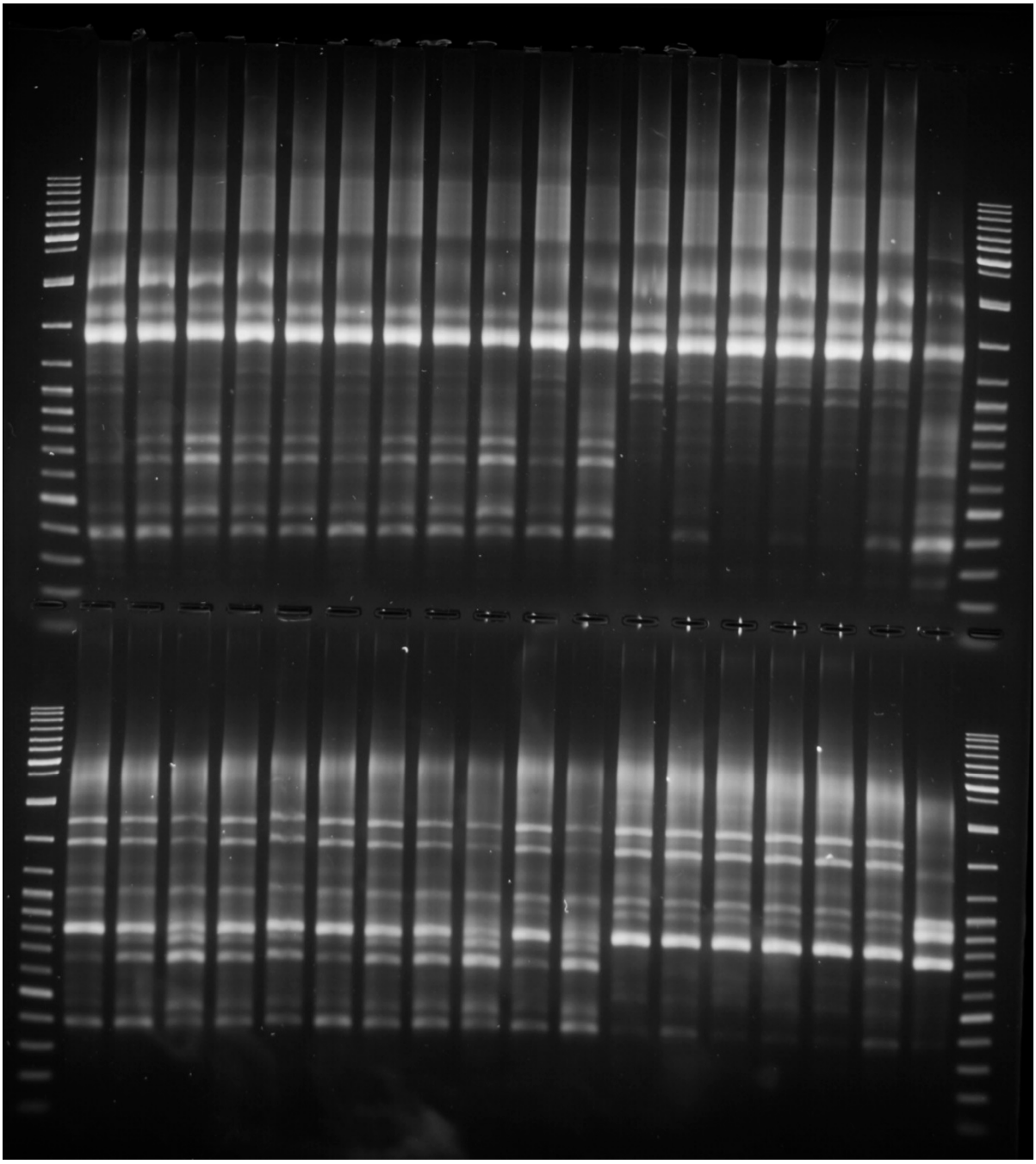

Figure S7. Products of agarose gel electrophoresis of ISSR-PCR amplification with A (upper image) and B (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

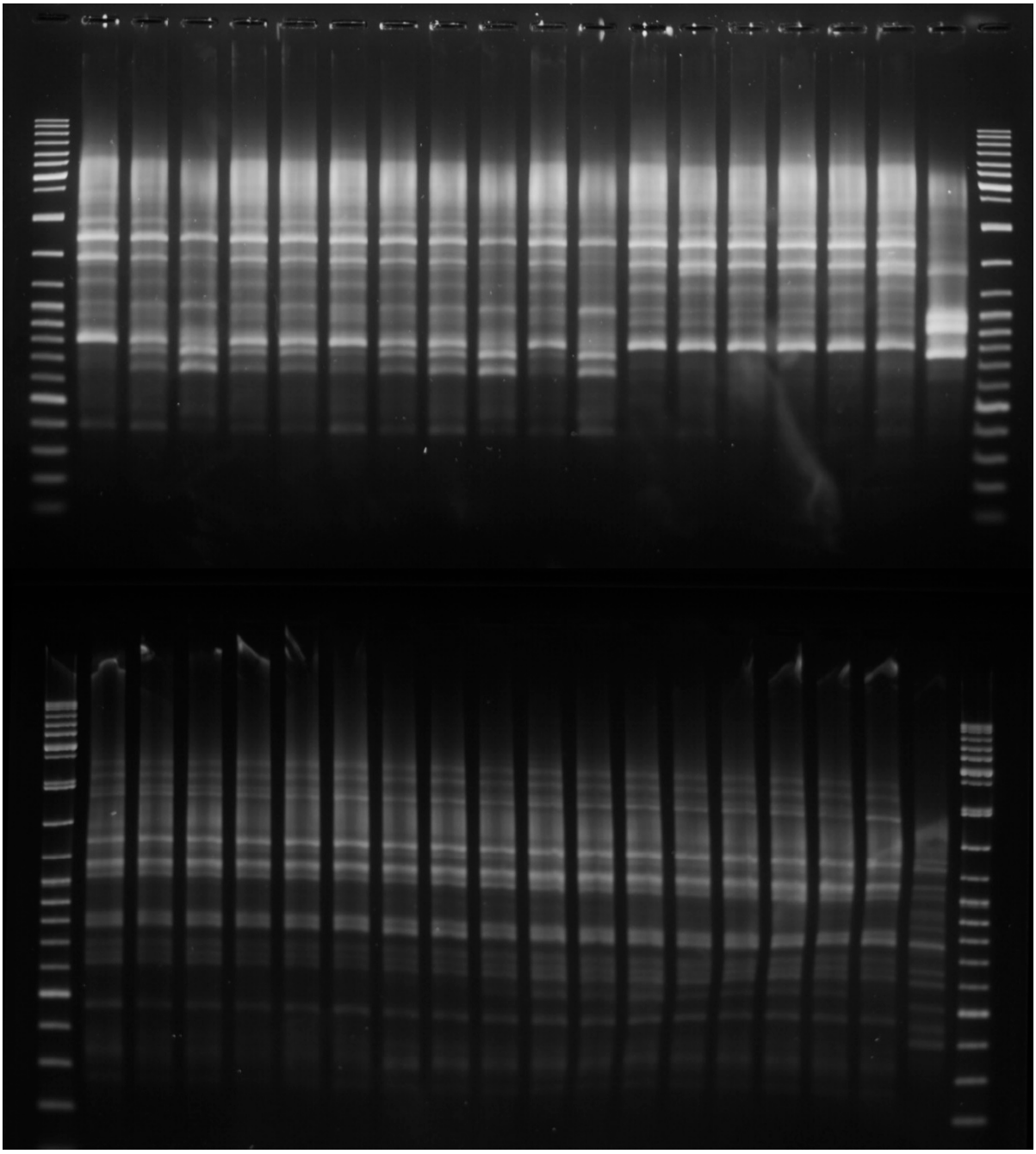

Figure S8. Products of agarose gel electrophoresis of ISSR-PCR amplification UBC-112 (upper image) and UBC -818 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

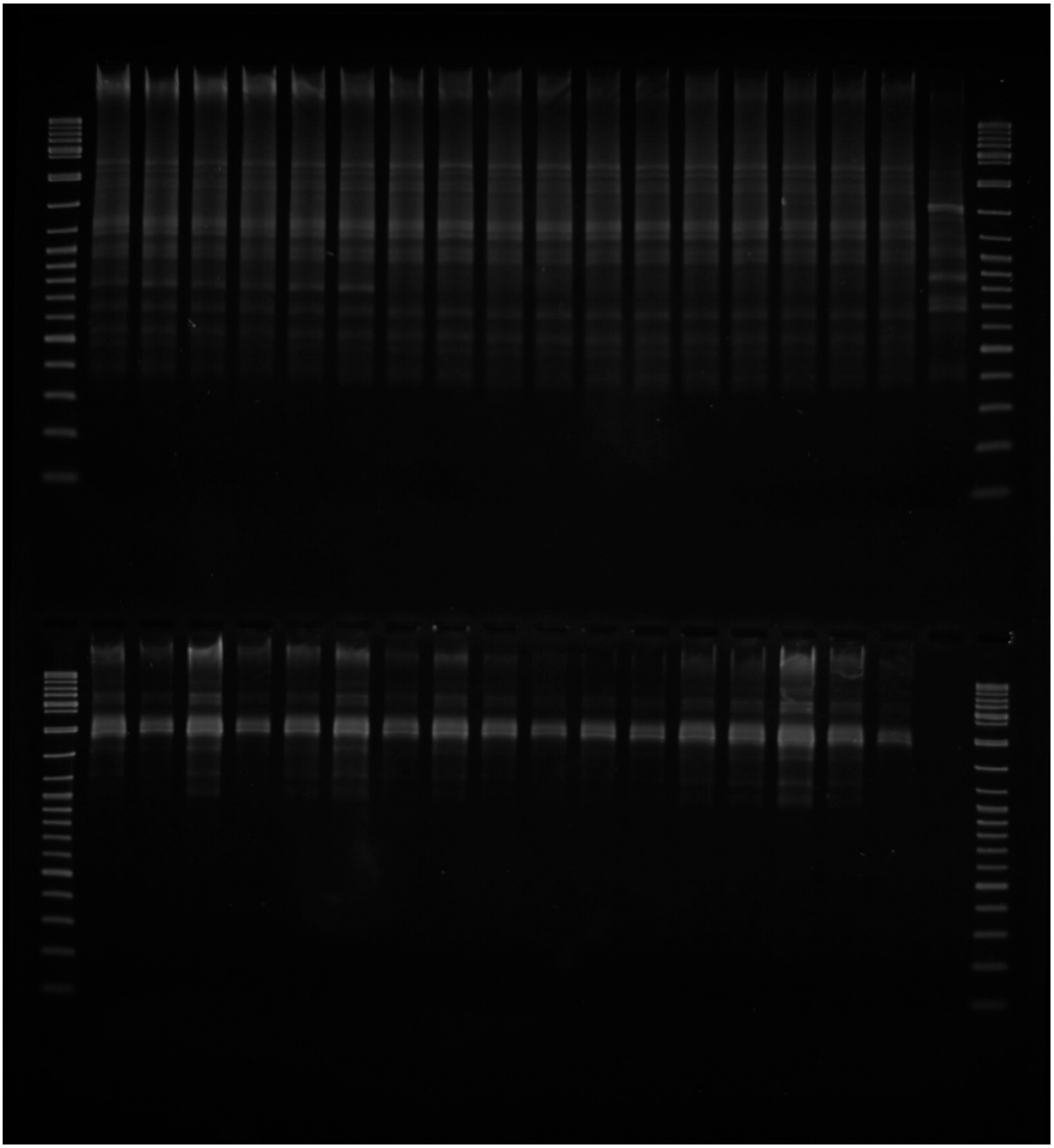

Figure S9. Products of agarose gel electrophoresis of ISSR-PCR amplification UBC-841 (upper image) and UBC -854 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

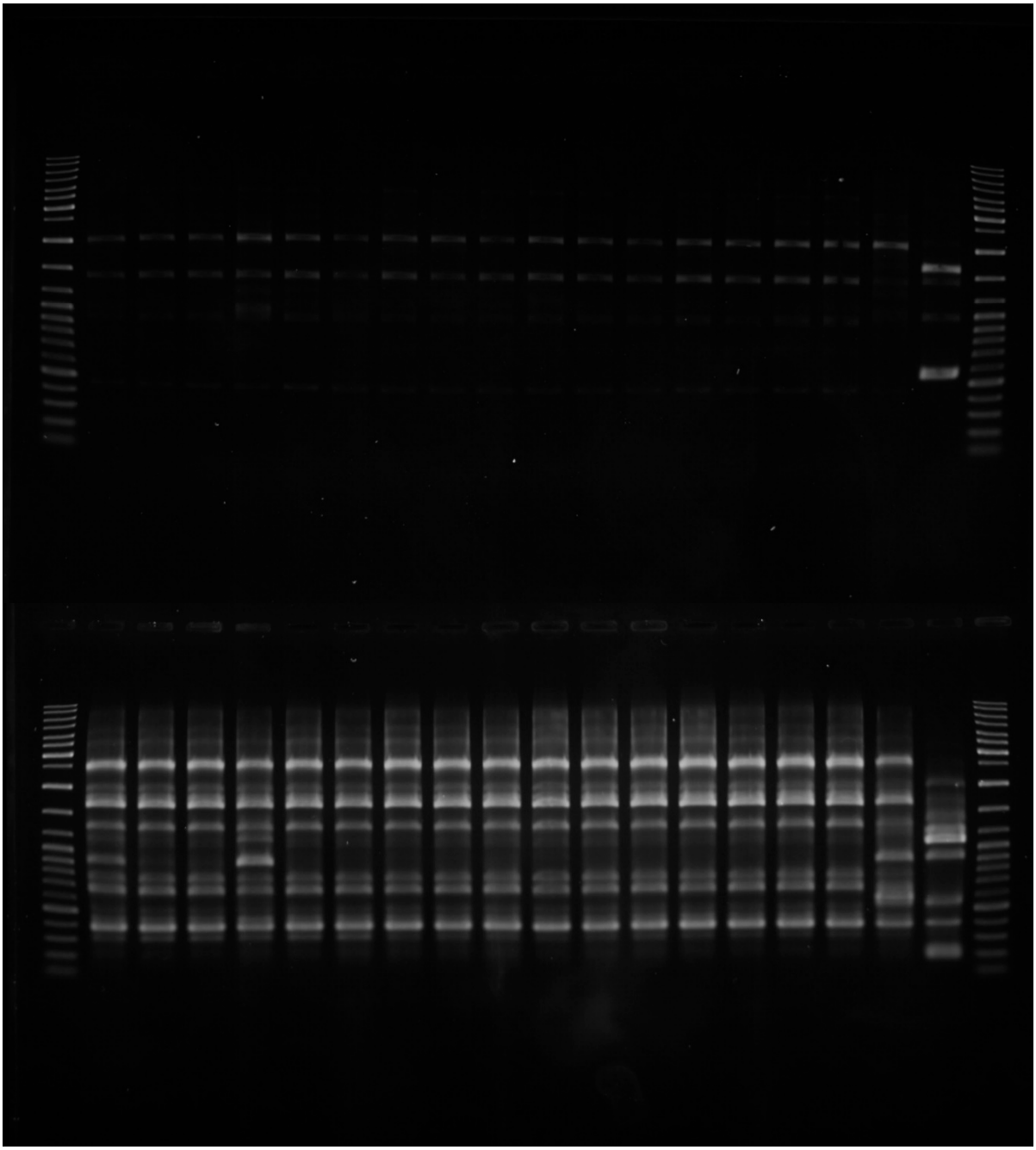

Figure S10. Products of agarose gel electrophoresis of SCOT-PCR amplification with 06 (upper image) and 12 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

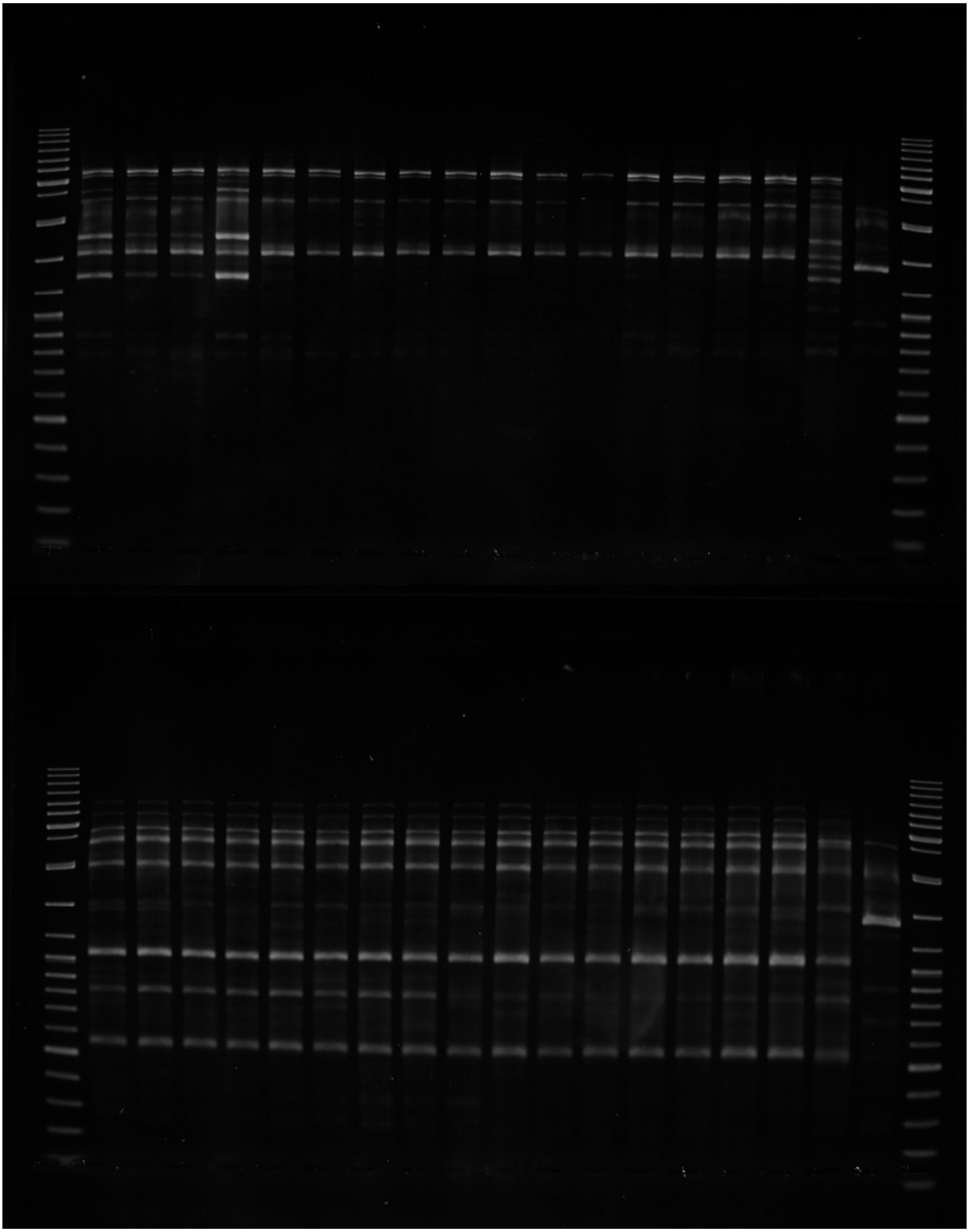

Figure S11. Products of agarose gel electrophoresis of SCOT-PCR amplification with 17 (upper image) and 25 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

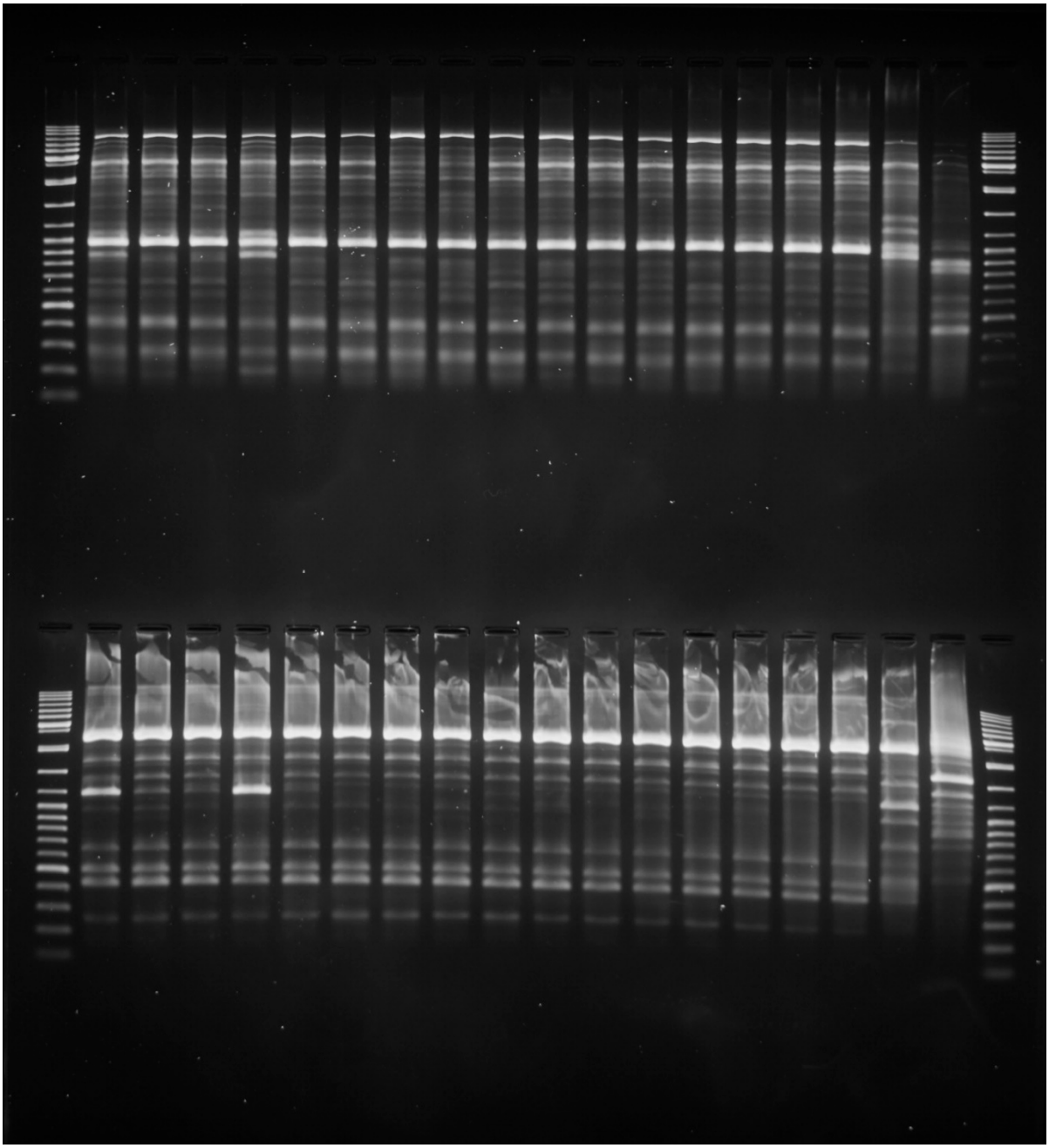

Figure S12. Products of agarose gel electrophoresis of SCOT-PCR amplification with 30 (upper image) and 33 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

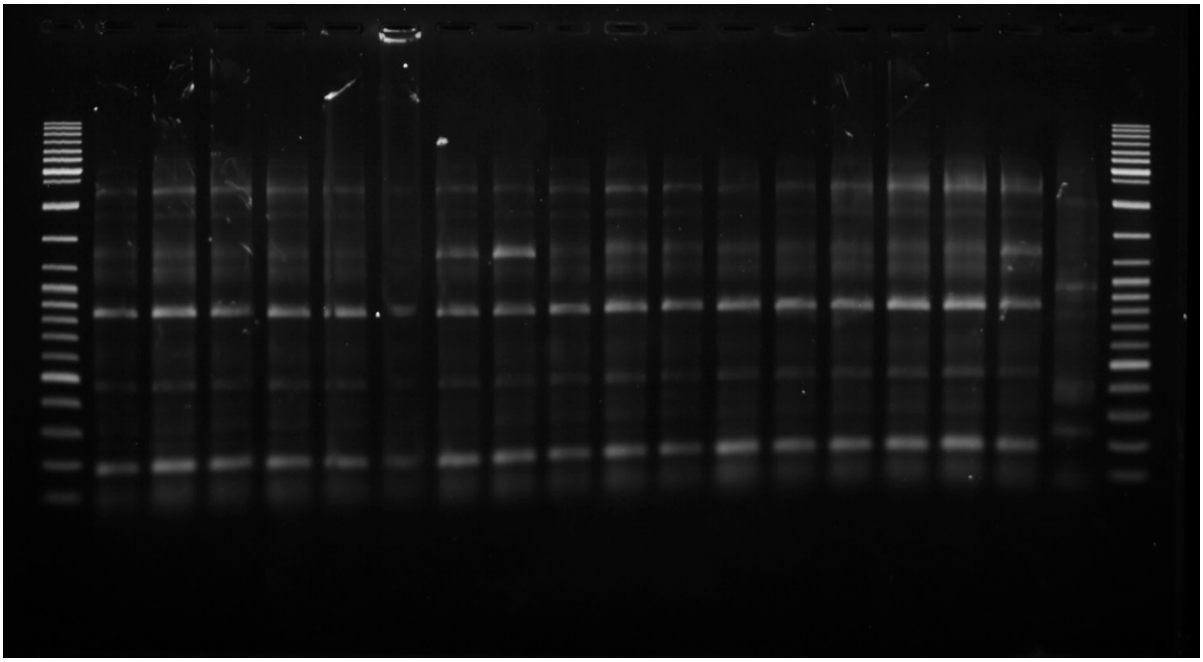

Figure S13. Products of agarose gel electrophoresis of SRAP-PCR amplification with Me3/Em2 primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

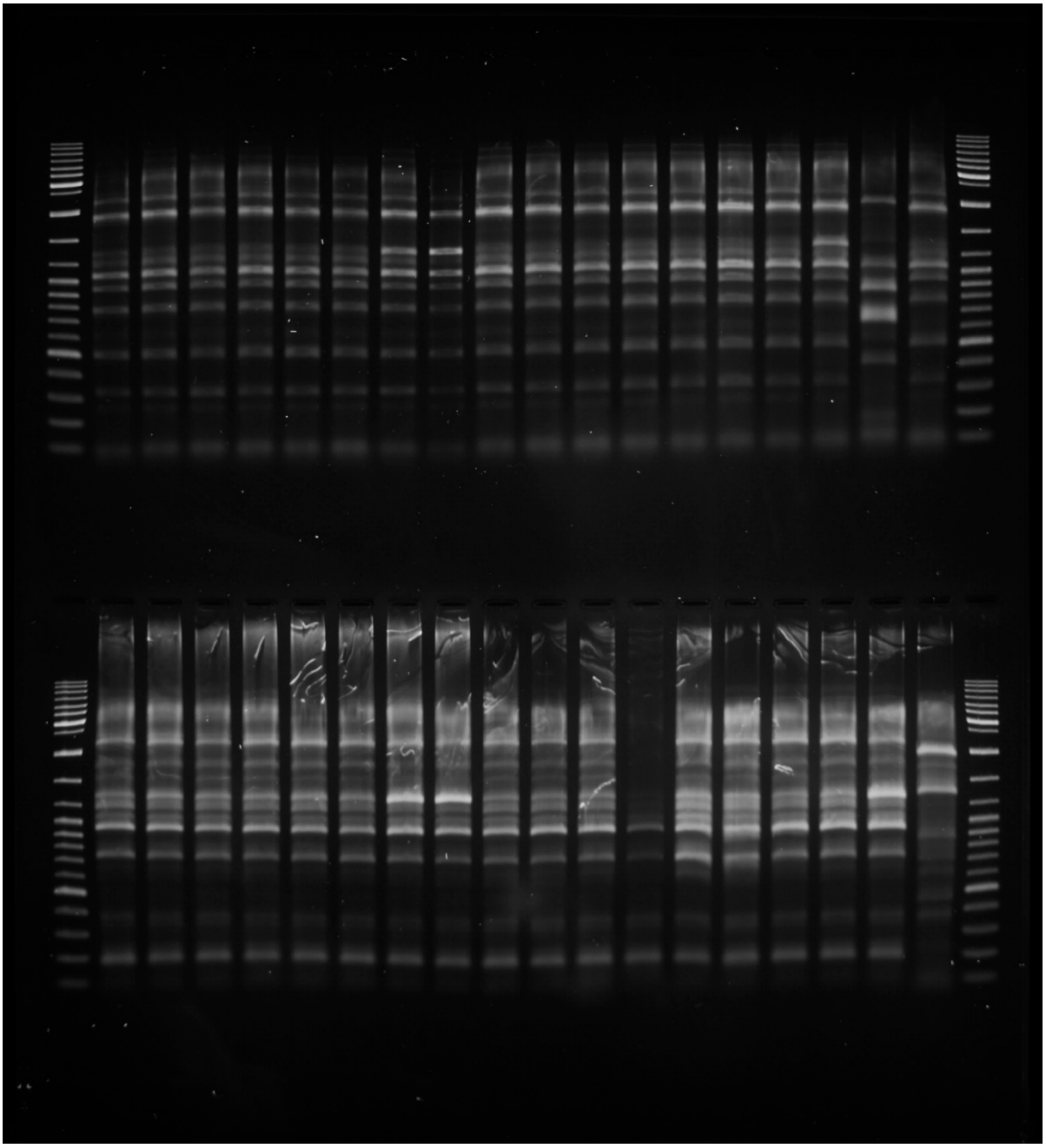

Figure S14. Products of agarose gel electrophoresis of SRAP-PCR amplification with Me3/Em3 (upper image) and Me3/Em4 (lower image) primers for 17 cumin genotypes (lanes 2 to 18, in order from left to right: EG-01, EG-02, EG-03, EG-04, EG-05, EG-06, IPK-07, IPK-08, IPK-09, IPK-10, IPK-11, IPK-12, IPK-13, IPK-14, IPK-15, IPK-16 and GR-17 in addition to lane 19 for sweet fennel as a control) using DNA size marker 100—10000 bp (lane 1).

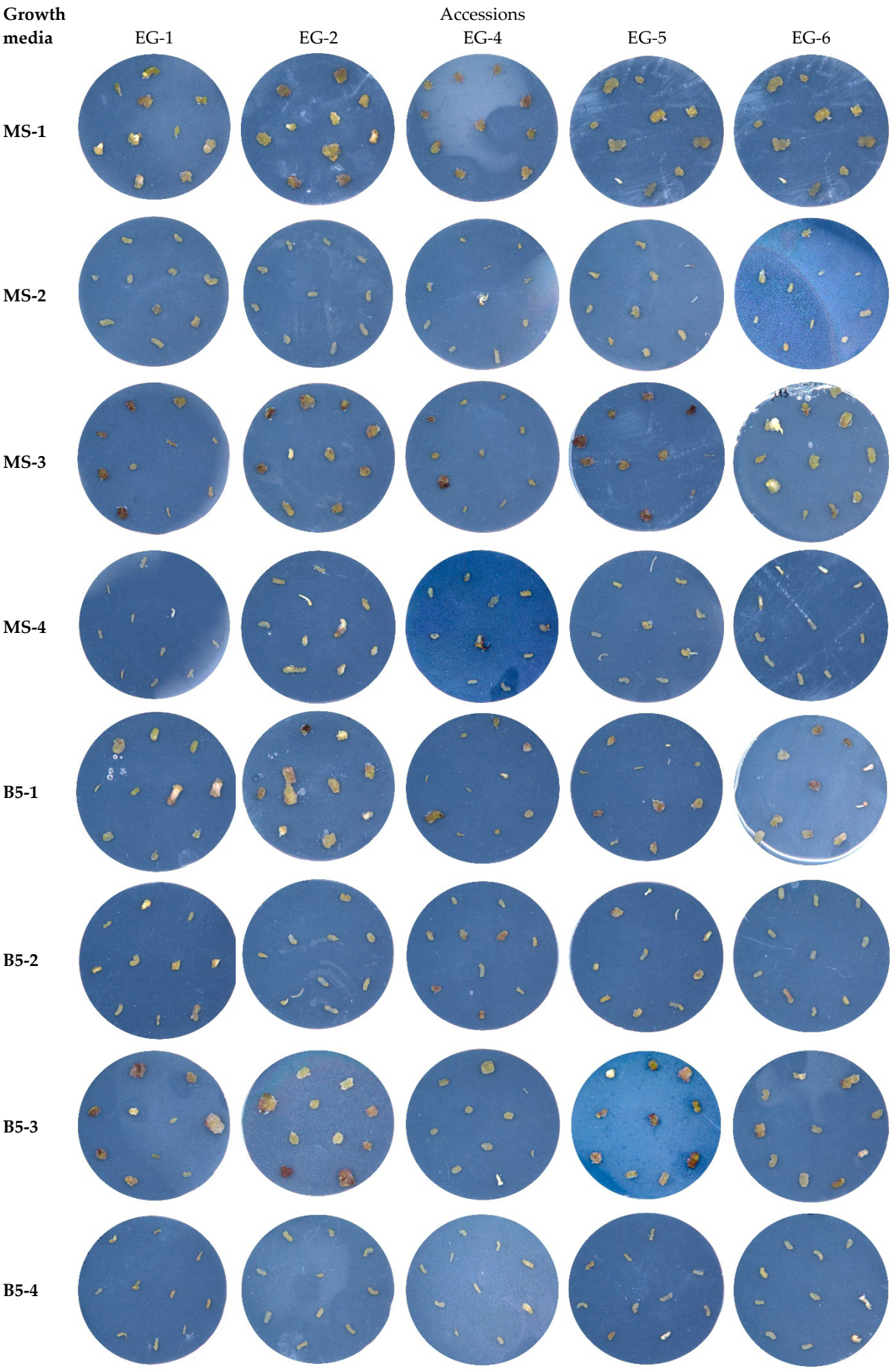

Figure S15. Pictures of induced callus from five cumin genotypes originated from Egypt (EG-1 and EG-2 were collected from Assiut region and EG-4, EG-5 and EG-6 were collected from El-menia region) in response to various medium combinations. MS denotes Murashige and Skoog medium and B5 means Gamborg's B5 medium; each of the two media combined with four hormonal combinations, namely, 2,4-D (4.44), 2,4-D (4.44)+ Kin (0.22), 2,4-D (8.88) and 2,4-D (8.88)+ Kin (0.22), respectively.