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Complete chloroplast genome sequencing of *Vitis vinifera* subsp. *sylvestris* – wild ancestors of cultivated grapevines

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Supplementary material 1

Molecular features of the intravarietal SNPs sites found in *matK*, *clpP*, *rp122* and *ndhF* gene coding regions among representatives of GTA haplotype. The samples are named according to their country source and genome positions are given according to the reference Maxxa (GenBank: DQ424856.1) genome.

matK

3251	tcatttgaga	ataaaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Algeria
3251	tcatttgaga	ataaaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Germany
3251	tcatttgaga	ataaaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Hungary
3251	tcatttgaga	ataaaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Maxxa
3251	tcatttgaga	ataaaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Tunisia
3251	tcatttgaga	ataaaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	France
3251	tcatttgaga	atc ^a aaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Morocco
3251	tcatttgaga	atc ^a aaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Spain
3251	tcatttgaga	ataaaaattc	ttattgtgtc	caaaaaatgg	attttgatta	3300	Greece

clpP

76572	gatacaatat	agtaatcata	tattaccaat	tgggtttttt	ataaacggag	76631	Algeria
76572	gatacaatat	agtaatcata	tattaccaat	tgggtttttt	ataaacggag	76631	Germany
76572	gatacaatat	agtaatcata	tattaccaat	tgggtttttt	ataaacggag	76631	Hungary
76572	gatacaatat	agtaatcata	tattaccaat	tgggtttttt	ataaacggag	76631	Maxxa
76572	gatacaatat	agtaatcata	tattaccaat	tgggtttttt	ataaacggag	76631	Tunisia
76572	gatacaatat	agtaatcata	tattaccaat	tgggtttttt	ataaacggag	76631	France
76572	gatacaatat	agtaatcata	tattaccaat	tggg ^g ttttt	ataaacggag	76631	Morocco
76572	gatacaatat	agtaatcata	tattaccaat	tggg ^g ttttt	ataaacggag	76631	Spain
76570	gatacaatat	agtaatcata	tattaccaat	tgggtttttt	ataaacggag	76609	Greece

rp122

88781	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	Algeria
88781	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	Germany
88781	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	Hungary
88781	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	Maxxa
88781	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	Tunisia
88781	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	France
88781	tctgtttttt ^c	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	Morocco
88781	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88830	Spain
88759	tctgttttta	attttatatc	ttctttttct	cttgtaaata	taaattgggtc	88809	Greece

ndhF

115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	Algeria
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	Germany
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	Hungary
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	Greece
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	Tunisia
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	France
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	Spain
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcattttata	115960	Maxxa
115911	ctaaaaatat	tccaaaataa	gatatactga	ctgaaaaaat	tgcatttt ^t ta	115960	Morocco

Supplementary material 2

Comparative analysis of amino acid sequences of *matK*, *clpP*, *rp12* and *ndhF* genes by MAFFT multiple sequence alignment program. The samples are named according to their country source. Maxxa genome (GenBank: DQ424856.1) was used as a reference.

CLUSTAL format alignment by MAFFT (v7.511)

matK gene

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Maxxa      MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
Algeria    MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
Tunisia    MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
France     MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
Germany    MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
Hungary    MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
Greece     MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
Morocco    MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
Spain      MEGVQRYFKLDRSRQDDFLYPLIFQEYIYALSVDHGLNRSILLENVGYDNKSSLLIVKRL
*****

Maxxa      ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
Algeria    ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
Tunisia    ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
France     ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
Germany    ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
Hungary    ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
Greece     ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
Morocco    ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
Spain      ITRMYQQNHLIFSDSNQNPFFGHKNKFNYSQMISEGFGVIVEIPFSLRLVSSLEGKEIAKS
*****

Maxxa      HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
Algeria    HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
Tunisia    HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
France     HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
Germany    HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
Hungary    HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
Greece     HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
Morocco    HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
Spain      HNLRSIHSIFPFLEDKFPFLKYVSDILIPHPHLEILVQALRYWVKDASSLHLLRFFLHE
*****

Maxxa      YHNWNSMITPKKSISIFSKRNQRFFLFYLNHFVCEYDSIFIFIRNQSYHLRSTSYGALLG
Algeria    YHNWNSMITPKKSISIFSKRNQRFFLFYLNHFVCEYDSIFIFIRNQSYHLRSTSYGALLG

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Tunisia YHNWNSMITPKKSISIFSKRNQRFFFLFLYNFHVCEYDSIFIFIRNQSYHLRSTSYGALLG
 France YHNWNSMITPKKSISIFSKRNQRFFFLFLYNFHVCEYDSIFIFIRNQSYHLRSTSYGALLG
 Germany YHNWNSMITPKKSISIFSKRNQRFFFLFLYNFHVCEYDSIFIFIRNQSYHLRSTSYGALLG
 Hungary YHNWNSMITPKKSISIFSKRNQRFFFLFLYNFHVCEYDSIFIFIRNQSYHLRSTSYGALLG
 Greece YHNWNSMITPKKSISIFSKRNQRFFFLFLYNFHVCEYDSIFIFIRNQSYHLRSTSYGALLG
 Morocco YHNWNSMITPKKSISIFSKRNQRFFFLFLYNFHVCEYDSIFIFIRNQSYHLRSTSYGALLG
 Spain YHNWNSMITPKKSISIFSKRNQRFFFLFLYNFHVCEYDSIFIFIRNQSYHLRSTSYGALLG

Maxxa RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 Algeria RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 Tunisia RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 France RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 Germany RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 Hungary RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 Greece RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 Morocco RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN
 Spain RIFFYGKIEHFVEVFANDFQTI LWLFKNPFMHYVRYQGKSI LASKGAPLLMNKWKYYLVN

Maxxa FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 Algeria FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 Tunisia FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 France FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 Germany FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 Hungary FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 Greece FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 Morocco FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD
 Spain FWQCHFVWSQPVRIHINQLSKHSLDFLGYLSSVRLNPSVVRSQMLENAFIIDNAIKKFD

Maxxa TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 Algeria TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 Tunisia TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 France TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 Germany TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 Hungary TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 Greece TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 Morocco TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK
 Spain TIVPIIPIIGSLAKARFCNALGHPI SKPSWADSSDYDI IDR FVRI CRNISHYHSGSSKKK

Maxxa NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLEEEQALSILPRVSSTSR
 Algeria NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLEEEQALSILPRVSSTSR

Tunisia NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLLTEEEQALSLLILPRVSSTSR
 France NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLLTEEEQALSLLILPRVSSTSR
 Germany NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLLTEEEQALSLLILPRVSSTSR
 Hungary NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLLTEEEQALSLLILPRVSSTSR
 Greece NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLLTEEEQALSLLILPRVSSTSR
 Morocco NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLLTEEEQALSLLILPRVSSTSR
 Spain NLYRIKYILRLSCARTLARKHKSTVRAFLKRLGSEFLEEFLLTEEEQALSLLILPRVSSTSR

Maxxa SLYRGRFWYFDIICINDLANHE
 Algeria SLYRGRFWYFDIICINDLANHE
 Tunisia SLYRGRFWYFDIICINDLANHE
 France SLYRGRFWYFDIICINDLANHE
 Germany SLYRGRFWYFDIICINDLANHE
 Hungary SLYRGRFWYFDIICINDLANHE
 Greece SLYRGRFWYFDIICINDLANHE
 Morocco SLYRGRFWYFDIICINDLANHE
 Spain SLYRGRFWYFDIICINDLANHE

***clpP* gene**

Maxxa MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 Algeria MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 Tunisia MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 Morocco MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 Spain MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 France MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 Germany MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 Hungary MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN
 Greece MPIGVPKVPFRNPGEDDISWIDVYNRLYRERLLFLGQVEVESEISNQLIGLMIYLSIEDEN

Maxxa KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 Algeria KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 Tunisia KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 Morocco KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 Spain KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 France KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 Germany KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 Hungary KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH
 Greece KDLYFFINSPGGWVLPGLAIYDTMQFVPPPEVHTICLGLAASMGSFILVGGTITKRLAFPH

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Maxxa	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
Algeria	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
Tunisia	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
Morocco	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
Spain	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
France	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
Germany	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
Hungary	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS
Greece	ARVMIHQPAAAFYEAQAGEFVMEAEELLKLR E I I TKVYVQRTGKPLWV V SEDLERDV FMS

Maxxa	ATEAQTHGIVDLVAVQ
Algeria	ATEAQTHGIVDLVAVQ
Tunisia	ATEAQTHGIVDLVAVQ
Morocco	ATEAQTHGIVDLVAVQ
Spain	ATEAQTHGIVDLVAVQ
France	ATEAQTHGIVDLVAVQ
Germany	ATEAQTHGIVDLVAVQ
Hungary	ATEAQTHGIVDLVAVQ
Greece	ATEAQTHGIVDLVAVQ

rp122

Maxxa	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
Algeria	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
Tunisia	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
Morocco	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
Spain	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
France	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
Germany	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
Hungary	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY
Greece	EKEDIK LKTEVYALSQ S ISMSAHKARRVLDQ I LGRSYRETLT I LELMPYRACYPIFKLIY

Maxxa	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
Algeria	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
Tunisia	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
Morocco	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
Spain	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
France	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
Germany	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
Hungary	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL
Greece	SAAANAKHNMGLNEEYLV I TKATVNEGT TVKKL KPRARGRSYAIKRPTCHITIVLKDTAL

Maxxa	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
Algeria	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
Tunisia	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
Morocco	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
Spain	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
France	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
Germany	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
Hungary	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK
Greece	YEKYVVENSIRCLKKTGWIYKKKSTDITCHNMYSSGGVWDDK

***ndhF* gene**

Maxxa	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
Algeria	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
Tunisia	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
Spain	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
France	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
Germany	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
Hungary	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
Greece	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL
Morocco	MEHTYQYAWIIPFLPLPIPMLLGVGLLLFPTATKNLRRMWSFTSVLLLSIVMTFSVNL

Maxxa	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
Algeria	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
Tunisia	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
Spain	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
France	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
Germany	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
Hungary	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
Greece	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG
Morocco	HQINSSSIYQYVSWTINNDFSLEFGYLIDPLTSIMSILITTVGIMVLIYSDNYMSHDQG

Maxxa	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV
Algeria	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV
Tunisia	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV
Spain	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV
France	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV
Germany	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV
Hungary	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV

Greece	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV
Morocco	YLRFFAYMSFFNASMLGLVTSSNLIQIYIFWELVGMCSYLLIGFWFTRPIAANACQKAFV

Maxxa	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
Algeria	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
Tunisia	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
Spain	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
France	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
Germany	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
Hungary	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
Greece	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV
Morocco	TNRVGFGLLLGILGLYWITGSFEFRDLFEIFNNLIYNYNNGTNFLFVSLCALFLFVGAV

Maxxa	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
Algeria	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
Tunisia	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
Spain	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
France	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
Germany	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
Hungary	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
Greece	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG
Morocco	AKSAQFPLHVWLPDAMEGPTPISALIHAATMVAAGIFLVARLFPLFIVIPYIMNLISLIG

Maxxa	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
Algeria	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
Tunisia	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
Spain	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
France	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
Germany	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
Hungary	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
Greece	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL
Morocco	IITILLGATLALAQKDIKKSLAYSTMSQLGYTMLALGMGSYRAALFHLI THAYSKALLFL

Maxxa	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD
Algeria	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD
Tunisia	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD
Spain	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD
France	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD
Germany	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD
Hungary	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD
Greece	GSGSIIHSMEAIVGYS PDKSQNMVLMGGLTKHVPITKNTFLLGTL SLCGIPPLACFWSKD

Morocco GSGSIIHSMEAIVGYSPDKSQNMVLMGGLTKHVPITKNTFLLGTLSLCGIPPLACFWSKD

Maxxa EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 Algeria EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 Tunisia EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 Spain EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 France EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 Germany EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 Hungary EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 Greece EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL
 Morocco EILNDSWLYSPIFAIIACLTAGLTAFYMFRIYLLTFEGYFNHCKNYSGKKSSLFYSISL

Maxxa WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 Algeria WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 Tunisia WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 Spain WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 France WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 Germany WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 Hungary WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 Greece WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN
 Morocco WGKEGQKTIKKKIRLLTLLTTNNNEKASFFSKKVYRLDSNVRKMTRPFITINQFDNKN

Maxxa TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 Algeria TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 Tunisia TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 Spain TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 France TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 Germany TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 Hungary TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 Greece TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN
 Morocco TFLYPQESDNTMLFPLFALALEFTLFVGAIGIPFNQERMDFDILSKWLNPNATNLLHKNLNN

Maxxa YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN
 Algeria YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN
 Tunisia YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN
 Spain YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN
 France YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN
 Germany YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN
 Hungary YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN
 Greece YGDWYEFVINAI FSVSISY FGI FLASLLYNPVYSSLQNLDLINSVAKKVPKRI FWDKI IN

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Morocco YGDWYEFVKNAIFSVSISYFGIFLASLLYNPVYSSLQNLDLINSVAKKVPKRIFWDKIIN

Maxxa KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Algeria KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Tunisia KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Spain KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

France KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Germany KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Hungary KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Greece KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Morocco KVYNWSYNRGYIDAFYETSLTKGIRGLAELTHFFDGRVIDGITNGVGVTSFFVGESIKYV

Maxxa GGGRISSYLFLYLSSVSILLLISYFFLNQ

Algeria GGGRISSYLFLYLSSVSILLLISYFFLNQ

Tunisia GGGRISSYLFLYLSSVSILLLISYFFLNQ

Spain GGGRISSYLFLYLSSVSILLLISYFFLNQ

France GGGRISSYLFLYLSSVSILLLISYFFLNQ

Germany GGGRISSYLFLYLSSVSILLLISYFFLNQ

Hungary GGGRISSYLFLYLSSVSILLLISYFFLNQ

Greece GGGRISSYLFLYLSSVSILLLISYFFLNQ

Morocco GGGRISSYLFLYLSSVSILLLISYFFLNQ
