

YEDA-0110 PCT_ST25.txt
SEQUENCE LISTING

<110> YEDA RESEARCH AND DEVELOPMENT CO. LTD.

<120> ORGANISMS WITH ALTERED STEROIDAL SAPONIN AND STEROIDAL ALKALOID LEVELS AND MEANS AND METHOD FOR PRODUCING SAME

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<170> PatentIn version 3.5

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 <213> Solanum pimpinellifolium

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tgggtttgcc atattttgtt aacacacttt ctacttcaa agcttcaatg tgtggtgatc	240
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<400> 6

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Ile Phe Thr Phe Tyr Ala Ile Leu Met Arg Ile Asn Gly Trp Tyr Tyr
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Ala Ile Lys Phe Cys Ser Asn Lys Tyr Asn Ile Pro Asn Gly Tyr Met
 35 40 45

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Gly Leu Pro Tyr Phe Gly Asn Thr Leu Ser Tyr Phe Lys Ala Ser Met
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Cys Gly Asp Pro Lys Ser Phe Ile Asp Phe Phe Ala Thr Arg Phe Gly
 65 70 75 80

Glu Gly Gly Met Tyr Arg Ala Tyr Ile Phe Gly Lys Pro Thr Ile Met
 85 90 95

Val Thr Lys Pro Glu Ile Ile Arg Lys Val Leu Met Asp Glu Glu Tyr
 100 105 110

Leu Glu Arg Gly Leu Pro Asn Tyr Met Lys Lys Leu Ile Gly Leu Thr
 115 120 125

Thr Ser Ile Glu Glu Asp Lys Tyr Phe Arg Arg Leu Thr Ala Pro Val
 130 135 140

Lys Ser His Gly Leu Leu Ser Asp Tyr Phe Asp Tyr Ile Asp Lys Thr
 145 150 155 160

Val Ser Ser Thr Leu Glu Lys Tyr Ala Thr Thr Glu Glu Pro Val Glu
 165 170 175

Phe Leu His Lys Met His Lys Leu Thr Phe Glu Val Phe Met Arg Leu
 180 185 190

Leu Ile Gly Asp Glu Val Asn Gln Glu Leu Phe Asp Glu Met Phe Glu
 195 200 205

Glu Ile Thr Ala Val Ile Ser Gly Val His Asn Leu Pro Ile Asn Leu
 210 215 220

Pro Gly Phe Ala Tyr His Lys Gly Leu Lys Ala Arg Lys Val Leu Gly
 225 230 235 240

Glu Val Phe Lys Lys Leu Ile Asp Glu Arg Arg Glu Ala Met Lys Asp
 245 250 255

Gly Lys Ser Met Pro Lys Ala Asn Ile Ile Asp Met Leu Leu Ser Asn
 260 265 270

Asn Asn Gln Asp Tyr Glu Ala Asn Met Leu Ser Asp Lys Lys Ile Ile
 275 280 285

Glu Ile Leu Val Leu Phe Ser Phe Ala Gly Phe Glu Pro Val Ala Leu
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Met Ser Val Lys Ala Ile Phe His Leu Gln Lys His Pro His Phe Leu
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325 330 335

Ser Asn Ala Gly Leu Ser Phe Asp Glu Ile Arg Gln Met Thr Phe Val
340 345 350

Ser Lys Ile Ile Asn Glu Thr Leu Arg Ile Ala Thr Asp Gln Ser Val
355 360 365

Phe Leu Arg Asp Thr Ser Thr Thr Phe Asn Ile Asn Gly Tyr Thr Ile
370 375 380

Pro Lys Gly Trp Lys Phe Phe Ala Val Val Trp Asn Ile His Met Asn
385 390 395 400

Pro Asp Val Tyr Val Gln Pro Lys Glu Phe Asn Pro Ser Arg Trp Asp
405 410 415

Asp Ile Glu Thr Lys Pro Gly Ile Phe Leu Pro Phe Ser Met Gly Pro
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Lys Ser Cys Pro Gly Ser Asn Leu Ala Lys Leu Gln Ile Ser Val Ile
435 440 445

Leu His Tyr Tyr Leu Leu His Tyr Arg Val Glu Gln Ile Asn Pro Glu
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Ala Arg Cys Tyr Pro Pro Glu Asn Cys Leu Val Lys Phe Lys Lys Leu
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Ser Ile Ser Ser Asn Gly Asn
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<212> DNA

<213> Solanum pineliiv

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aataaatggt tggattatg caatcaaatt ttgttcaaag aaatataaca tcccaaatgg 180

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<400> 8

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Ala Ile Lys Phe Cys Ser Lys Lys Tyr Asn Ile Pro Asn Gly Tyr Met
35 40 45

Gly Leu Pro Tyr Phe Gly Asn Thr Leu Ser Tyr Phe Lys Ser Ser Met
50 55 60

Cys Ala Asp Pro Asn Ser Phe Leu Asp Phe Phe Ala Thr Arg Phe Gly
65 70 75 80

Glu Gly Gly Met Tyr Arg Ala Tyr Ile Phe Gly Lys Pro Thr Ile Met
85 90 95

Val Thr Lys Pro Glu Ile Ile Arg Lys Val Leu Met Asp Glu Glu Tyr
100 105 110

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Leu Glu Arg Gly Leu Pro Asn Tyr Met Lys Lys Leu Ile Gly Leu Thr
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Thr Ser Ile Glu Glu Asp Lys Tyr Phe Arg Arg Leu Thr Ala Pro Val
 130 135 140

Lys Ser His Gly Leu Leu Ser Asp Tyr Phe Asp Tyr Ile Asp Lys Thr
 145 150 155 160

Val Ser Ser Thr Leu Glu Lys Tyr Ala Phe Met Arg Leu Leu Ile Gly
 165 170 175

Asp Glu Val Asn Gln Glu Phe Phe Asp Gln Met Phe Glu Glu Ile Thr
 180 185 190

Ala Val Ile Ser Gly Val His Asn Leu Pro Ile Asn Leu Pro Gly Phe
 195 200 205

Pro Tyr His Lys Gly Leu Lys Ala Arg Lys Val Leu Gly Gly Ile Phe
 210 215 220

Gln Lys Leu Ile Asp Glu Arg Arg Glu Ala Met Lys Asp Gly Lys Ser
 225 230 235 240

Met Pro Arg Ala Asn Ile Ile Asp Met Leu Leu Ser Asn Thr Asn Gln
 245 250 255

Asp Tyr Glu Ala Asn Ile Leu Ser Asp Lys Lys Ile Ile Glu Ile Leu
 260 265 270

Val Leu Phe Ser Phe Ala Gly Phe Glu Pro Val Ala Leu Met Ser Val
 275 280 285

Lys Ala Ile Phe His Leu Gln Lys His Pro His Phe Leu Glu Lys Ala
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Gly Leu Ser Phe Asp Glu Ile Arg Gln Met Thr
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<210> 9

<211> 1496

<212> DNA

<213> Solanum tuberosum (allele #1)

<400> 9

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 <213> Solanum tuberosum (allele #1)

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Ile	Phe	Thr	Phe	Tyr	Ala	Ile	Leu	Met	Arg	Ile	Asn	Gly	Trp	Tyr	Tyr
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20

25

30

Ala Ile Lys Phe Cys Ser Lys Lys Tyr Asn Ile Pro Leu Gly Tyr Met
 35 40 45

Gly Leu Pro Tyr Phe Gly Asn Thr Leu Ser Tyr Phe Lys Ser Thr Ile
 50 55 60

Cys Gly Asp Pro Asn Ser Phe Leu Asp Phe Phe Ala Thr Arg Phe Gly
 65 70 75 80

Thr Gly Gly Met Tyr Arg Ala Tyr Ile Phe Gly Lys Pro Thr Ile Met
 85 90 95

Val Thr Lys Pro Glu Ile Ile Arg Lys Val Leu Met Asp Glu Glu Tyr
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Leu Glu Arg Gly Leu Pro Asn Tyr Met Lys Lys Leu Ile Gly Leu Thr
 115 120 125

Thr Ser Ile Glu Glu Asp Lys Tyr Phe Arg Arg Val Thr Ala Pro Val
 130 135 140

Lys Ser His Gly Leu Leu Ser Asp Tyr Phe Asp Tyr Ile Asp Lys Thr
 145 150 155 160

Val Arg Thr Thr Leu Glu Lys Tyr Ala Thr Thr Glu Glu Pro Ile Glu
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Phe Leu His Lys Met His Arg Leu Ala Phe Glu Val Phe Met Arg Leu
 180 185 190

Leu Ile Gly Asp Glu Val Asn Gln Glu Phe Phe Asp Gln Met Phe Glu
 195 200 205

Glu Ile Thr Ala Val Ile Ser Gly Val His Asn Leu Pro Ile Asn Leu
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Pro Gly Phe Pro Tyr His Lys Gly Leu Lys Ala Arg Lys Val Leu Gly
 225 230 235 240

Gly Ile Phe Gln Lys Leu Ile Asp Glu Arg Arg Glu Ala Met Lys Asp
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Gly Lys Ser Met Pro Arg Ala Asn Ile Ile Asp Met Leu Leu Ser Asn
 260 265 270

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Thr Asn Gln Asp Tyr Glu Ala Asn Ile Leu Ser Asp Lys Lys Ile Ile
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Glu Ile Leu Val Leu Phe Ser Phe Ala Gly Phe Glu Pro Val Ala Leu
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Met Ser Val Lys Ala Ile Phe His Leu Gln Lys His Pro His Phe Leu
 305 310 315 320

Glu Lys Ala Lys Glu Glu Gln Glu Glu Ile Val Lys Arg Arg Ala Ser
 325 330 335

Ser Asn Val Gly Leu Ser Phe Asp Gly Ile Arg Gln Met Thr Phe Val
 340 345 350

Ser Lys Val Ile Asn Glu Thr Leu Arg Ile Ala Thr Asp Gln Thr Val
 355 360 365

Phe Leu Arg Asp Thr Ser Thr Thr Phe Asn Ile Asn Gly Tyr Thr Ile
 370 375 380

Pro Lys Gly Trp Lys Phe Phe Ala Val Val Trp Asn Ile His Met Asn
 385 390 395 400

Pro Asp Val Tyr Val Gln Pro Lys Glu Phe Asn Pro Ser Arg Trp Asp
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Asp Ile Glu Thr Lys Pro Gly Ile Phe Leu Pro Phe Ser Met Gly Pro
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Lys Ser Cys Pro Gly Ser Asn Leu Ala Lys Leu Gln Ile Ser Val Ile
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Leu His Tyr Tyr Leu Leu His Tyr Arg Val Glu Gln Ile Asn Pro Glu
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<210> 11

<211> 1490

<212> DNA

<213> Solanum tuberosum (allele #2)

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<210> 12
 <211> 487
 <212> PRT
 <213> Solanum tuberosum (allele #2)

<400> 12

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			20					25					30		

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 Gly Leu Pro Tyr Phe Gly Asn Thr Leu Ser Tyr Phe Lys Ser Thr Ile
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 Cys Gly Asp Pro Asn Ser Phe Leu Asp Phe Phe Ala Thr Arg Phe Gly
 65 70 75 80
 Thr Gly Gly Met Tyr Arg Ala Tyr Ile Phe Gly Lys Pro Thr Ile Met
 85 90 95
 Val Thr Lys Pro Glu Ile Ile Arg Lys Val Leu Met Asp Glu Glu Tyr
 100 105 110
 Leu Glu Arg Gly Leu Pro Asn Tyr Met Lys Lys Leu Ile Gly Leu Thr
 115 120 125
 Thr Ser Ile Glu Glu Asp Lys Tyr Phe Arg Arg Leu Thr Ser Pro Val
 130 135 140
 Lys Ser His Gly Leu Leu Ser Asp Tyr Phe Asp Tyr Ile Asp Lys Thr
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 Val Ser Thr Thr Leu Glu Lys Tyr Ala Thr Thr Glu Glu Pro Ile Glu
 165 170 175
 Phe Leu His Lys Met His Arg Leu Ala Phe Glu Val Phe Met Arg Leu
 180 185 190
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Ser Asn Ala Gly Leu Ser Phe Asp Glu Ile Arg Gln Met Ala Phe Val
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Ser Lys Val Ile Asn Glu Thr Leu Arg Ile Ala Thr Asp Gln Thr Val
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Phe Leu Arg Asp Thr Ser Thr Thr Phe Asn Ile Asn Gly Tyr Thr Ile
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Pro Asp Val Tyr Val Gln Pro Lys Glu Phe Asn Pro Ser Arg Trp Asp
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Lys Ser Cys Pro Gly Ser Asn Leu Ala Lys Leu Gln Ile Ser Val Ile
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Phe Phe Thr Lys Lys Cys Asn Leu Pro Pro Gly Asp Met Gly Trp Pro
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 Met Tyr Lys Ala Phe Leu Phe Gly Lys Pro Ser Ile Ile Met Thr Lys
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 Val Glu Ile Ser Arg Lys Ile Phe Met Asp Asp Glu Asn Tyr Asp Arg
 100 105 110
 Gly Gln Ala Gln Val Gly Gly Phe Thr Arg Glu Glu Ser Lys Thr Leu
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 His Arg Ile Thr Thr Leu Ile Lys Ser Asp Ile Ser Leu Leu Ser Asn
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 Tyr Phe Asp Phe Ala Asn Glu Ile Val Lys Lys Ser Phe Val Lys Leu
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 Ala Phe Glu Val Leu Met Arg Ile Leu Ile Gly Asp Gly Val Asp Asn
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 Asp Met Val Asn Ile Leu Phe Glu Glu Thr Ile Tyr Leu Ile His Gly
 195 200 205
 Cys His Gly Leu Pro Phe Asn Ile Pro Gly Ser Ala Tyr Asn Arg Gly
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 245 250 255
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Glu Lys His Pro His Phe Leu Asp Lys Ala Lys Glu Glu Gln Glu Asp
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340 345 350

Ile Ala Thr Ala Lys Thr Ile Phe Phe Arg Glu Ala Arg Thr Thr Ile
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Asn Ile Asn Gly Tyr Thr Ile Pro Lys Gly Trp Lys Phe Leu Ser Phe
370 375 380

Ser Trp Asn Tyr His Phe Asp Pro His Thr Tyr Val Arg Pro Lys Glu
385 390 395 400

Phe Asn Pro Ser Arg Trp Asp Asp Leu Lys Thr Lys Pro Ala Ser Phe
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Leu Pro Phe Gly Val Gly Pro Lys Met Cys Pro Gly Ala Asn Leu Ala
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<211> 482

<212> PRT

<213> Petunia x hybrida

<400> 22

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Phe Lys Phe Ser Ser Asn Lys Cys Arg Leu Pro Pro Gly Asp Met Gly
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 Thr Ser Pro Glu Leu Cys Arg Lys Val Val Met Asp Asp Glu Asn Phe
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435 440 445

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<213> Vitis vinifera

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ctccgccggt taacagcaac tccagtcaat gggcatgaag cattgtccat ttacatgcaa      480
tatattgaag acaacgttat atctgccttg aacaaatggg ctgcatggg agaatttgag      540
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gagagcgagc atgtaatgga agctctggag agggaaatata cttcactcaa ctatggagtt      660
aggtccatgg caatcaatct cccgggtttt gcttaccata aagcactcaa ggctcggaag      720
aatcttgtga acatttttca atctatagtg aatgagcgaa gggataggaa gaaaggcaat      780
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 <211> 492
 <212> PRT
 <213> Vitis vinifra

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Val Leu Gly Val Lys Trp Val Leu Arg Arg Ala Asn Ser Trp Val Tyr
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Glu Val Lys Leu Gly Glu Lys Arg Tyr Ser Leu Pro Pro Gly Asp Leu
 35 40 45

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Gly Trp Pro Leu Ile Gly Asn Met Trp Ser Phe Leu Arg Ala Phe Lys
 50 55 60
 Ser Thr Asp Pro Asp Ser Phe Ile Ser Ser Phe Ile Thr Arg Phe Gly
 65 70 75 80
 Gln Thr Gly Met Tyr Lys Val Leu Met Phe Gly Asn Pro Ser Ile Ile
 85 90 95
 Val Thr Ile Pro Glu Ala Cys Lys Arg Val Leu Thr Asp Asp Gln Asn
 100 105 110
 Phe Lys Pro Gly Trp Pro Thr Ser Thr Met Glu Leu Ile Gly Arg Lys
 115 120 125
 Ser Phe Ile Gly Ile Thr Asn Glu Glu His Lys Arg Leu Arg Arg Leu
 130 135 140
 Thr Ala Thr Pro Val Asn Gly His Glu Ala Leu Ser Ile Tyr Met Gln
 145 150 155 160
 Tyr Ile Glu Asp Asn Val Ile Ser Ala Leu Asn Lys Trp Ala Ala Met
 165 170 175
 Gly Glu Phe Glu Phe Leu Thr Ala Leu Arg Lys Leu Thr Phe Lys Ile
 180 185 190
 Ile Met Tyr Ile Phe Leu Ser Ser Glu Ser Glu His Val Met Glu Ala
 195 200 205
 Leu Glu Arg Glu Tyr Thr Ser Leu Asn Tyr Gly Val Arg Ser Met Ala
 210 215 220
 Ile Asn Leu Pro Gly Phe Ala Tyr His Lys Ala Leu Lys Ala Arg Lys
 225 230 235 240
 Asn Leu Val Asn Ile Phe Gln Ser Ile Val Asn Glu Arg Arg Asp Arg
 245 250 255
 Lys Lys Gly Asn Ser Gln Thr Met Lys Lys Asp Met Met Asp Ala Leu
 260 265 270
 Leu Asp Ile Glu Asp Glu Asn Gly Arg Lys Leu Ser Asp Glu Glu Ile
 275 280 285
 Ile Asp Ile Leu Val Met Tyr Leu Asn Ala Gly His Glu Ser Ser Ala
 290 295 300

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His Val Thr Met Trp Ala Thr Val Lys Leu Gln Glu Asn Pro Glu Phe
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Phe Gln Arg Ala Lys Ala Glu Gln Glu Glu Ile Ile Arg Lys Arg Pro
325 330 335

Pro Asn Gln Lys Arg Leu Thr Leu Lys Glu Ile Arg Glu Met Glu Tyr
340 345 350

Leu Pro Lys Val Ile Asp Glu Thr Leu Arg Trp Ile Thr Phe Ser Phe
355 360 365

Val Val Phe Arg Glu Ala Lys Ala Asp Ile Asn Ile Cys Gly Tyr Thr
370 375 380

Ile Pro Lys Gly Trp Lys Val Leu Val Trp Phe Arg Ser Leu His Phe
385 390 395 400

Asp Pro Glu Thr Tyr Pro Asp Pro Lys Glu Phe Asn Pro Cys Arg Trp
405 410 415

Asp Asp Tyr Thr Ala Lys Pro Gly Thr Phe Leu Pro Phe Gly Leu Gly
420 425 430

Ser Arg Leu Cys Pro Gly Asn Asp Leu Ala Lys Leu Glu Ile Ser Val
435 440 445

Phe Leu His His Phe Leu Leu Asn Tyr Gln Leu Glu Arg Leu Asn Pro
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Gly Cys Pro Arg Met Tyr Leu Pro His Ser Arg Pro Arg Asp Asn Cys
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Leu Ala Ile Val Arg Lys Val Ala Ala Glu Ser Glu
485 490

<210> 25
<211> 1482
<212> DNA
<213> Populus trichocarpa

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tactcactac ctccagggga tttgggctgg ctttcattg gcaatatgtg gtcctttctc 180
agagctttca aatccagcga tcctgattct ttcattgcga cttcatcaa caaatatgga 240

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 aactgaagc ttatcggaag gaaatccttc attgatattt cttacgaaga gcacaagcgc 420
 cttcgccgtc tgacgtccgc tcctgtcaat ggtcatgaag cgttgtccgt ttacattcca 480
 tatatagaag aaaatgtgat agctatgttg gaaaaatgga ccacaatggg gaagatcgag 540
 ttcttgactc aagtgagaaa acttaccttc aaaataatca tgtatatatt tcttagctct 600
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 gctcgtaacg caaagaagaa agacatgatg gactctctgt tgggtgttga agatgaaaat 840
 ggtaggaaat tgactgatga agaaatcata gatgtaattt tgatgtactt gaatgcaggc 900
 catgaatcct ctggccatat cacgacatgg gctactattt ttctccagga acatccagaa 960
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 aatggattgt cacttaagga agttcgagaa atggattatc tttccaaggt gattgatgaa 1080
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 <213> Populus trichocarpa

<400> 26

Met Glu Ser Gly Ser Ile Trp Val Val Leu Ala Val Ile Phe Gly Gly
 1 5 10 15

Leu Gly Val Gly Lys Trp Ile Leu Lys Lys Val Asn Trp Trp Leu Tyr
 20 25 30

Glu Ala Gln Leu Gly Glu Lys Gln Tyr Ser Leu Pro Pro Gly Asp Leu
 35 40 45

Gly Trp Pro Phe Ile Gly Asn Met Trp Ser Phe Leu Arg Ala Phe Lys
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50

55

60

Ser Ser Asp Pro Asp Ser Phe Met Arg Thr Phe Ile Asn Lys Tyr Gly
 65 70 75 80
 Asp Asn Gly Ile Tyr Lys Ala Phe Met Phe Gly Asn Pro Ser Val Phe
 85 90 95
 Val Thr Thr Pro Glu Ala Cys Arg Arg Val Leu Ser Asn Asp Asp Ala
 100 105 110
 Phe Lys Pro Gly Trp Pro Ile Ser Thr Leu Lys Leu Ile Gly Arg Lys
 115 120 125
 Ser Phe Ile Asp Ile Ser Tyr Glu Glu His Lys Arg Leu Arg Arg Leu
 130 135 140
 Thr Ser Ala Pro Val Asn Gly His Glu Ala Leu Ser Val Tyr Ile Pro
 145 150 155 160
 Tyr Ile Glu Glu Asn Val Ile Ala Met Leu Glu Lys Trp Thr Thr Met
 165 170 175
 Gly Lys Ile Glu Phe Leu Thr Gln Val Arg Lys Leu Thr Phe Lys Ile
 180 185 190
 Ile Met Tyr Ile Phe Leu Ser Ser Glu Ser Glu Val Val Met Glu Ala
 195 200 205
 Leu Glu Lys Asp Tyr Thr Thr Leu Asn Tyr Gly Val Arg Ala Met Ala
 210 215 220
 Ile Asn Leu Pro Gly Phe Ala Tyr Tyr Lys Ala Leu Lys Ala Arg Lys
 225 230 235 240
 Arg Leu Val Ala Ile Phe Gln Ser Ile Val Asp Glu Arg Arg Asn Leu
 245 250 255
 Arg Lys Asn Ser Ala Arg Asn Ala Lys Lys Lys Asp Met Met Asp Ser
 260 265 270
 Leu Leu Gly Val Glu Asp Glu Asn Gly Arg Lys Leu Thr Asp Glu Glu
 275 280 285
 Ile Ile Asp Val Ile Leu Met Tyr Leu Asn Ala Gly His Glu Ser Ser
 290 295 300

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Gly His Ile Thr Thr Trp Ala Thr Ile Phe Leu Gln Glu His Pro Glu
 305 310 315 320

Phe Leu Gln Lys Ala Lys Glu Glu Gln Glu Gln Ile Val Lys Arg Arg
 325 330 335

Pro Pro Ala Gln Asn Gly Leu Ser Leu Lys Glu Val Arg Glu Met Asp
 340 345 350

Tyr Leu Ser Lys Val Ile Asp Glu Thr Leu Arg Leu Ile Thr Phe Ser
 355 360 365

Leu Thr Val Phe Arg Glu Ala Lys Thr Asp Phe Ser Ile Asn Gly Tyr
 370 375 380

Ile Ile Pro Lys Gly Trp Lys Val Leu Val Trp Phe Arg Thr Val His
 385 390 395 400

Leu Asp Pro Glu Ile Tyr Gln Asn Pro Lys Glu Phe Asn Pro Ser Arg
 405 410 415

Trp Asp Asn Tyr Thr Pro Lys Ala Gly Thr Phe Leu Pro Phe Gly Ala
 420 425 430

Gly Ser Arg Leu Cys Pro Gly Asn Asp Leu Ala Lys Leu Glu Ile Ser
 435 440 445

Ile Phe Leu His Tyr Phe Leu Leu Asp Tyr Arg Leu Glu Arg Glu Asn
 450 455 460

Pro Glu Cys Arg Trp Met Phe Leu Pro His Thr Arg Pro Thr Asp Asn
 465 470 475 480

Cys Val Ala Arg Ile Lys Lys Val Ser Ser Thr Ser Val
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YEDA-0110 PCT_ST25.txt

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<211> 31

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agtacactta ttgttttcg YEDA-0110 PCT_ST25.txt 19

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