Supplementary Information

Genome-wide identification and analysis of Hsp gene superfamily in *Bemisia tabaci* and expression patterns analysis under heat shock

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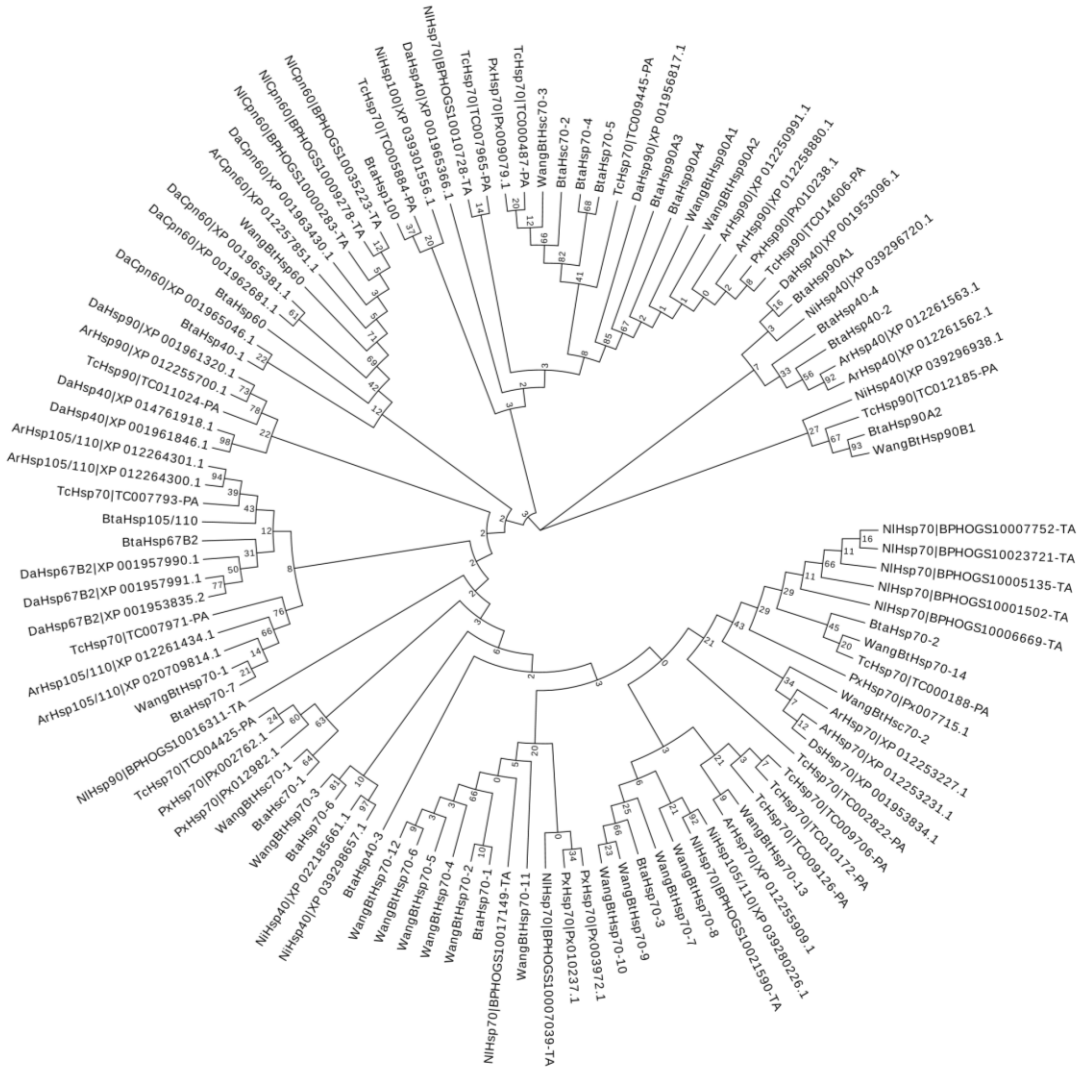
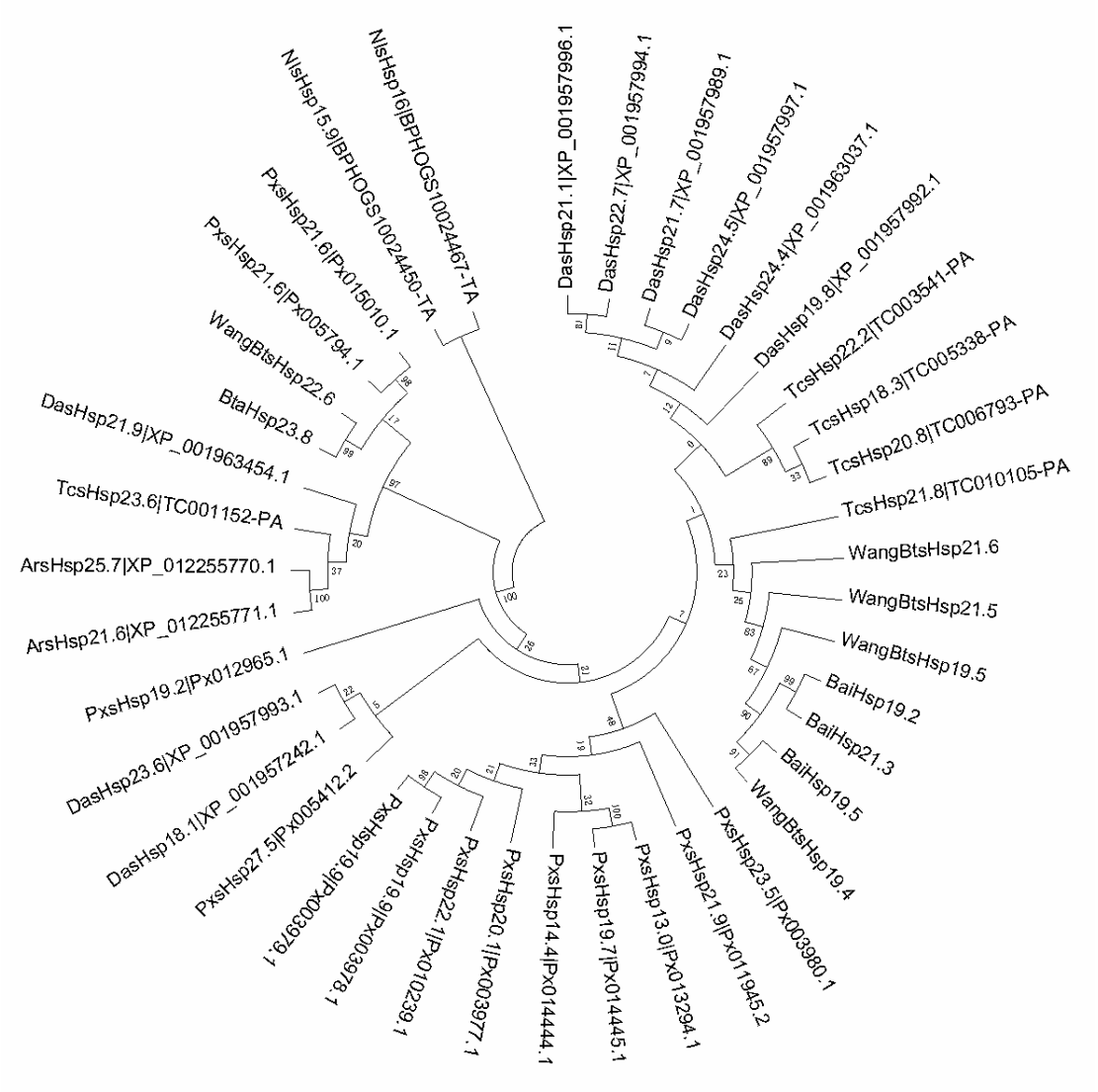
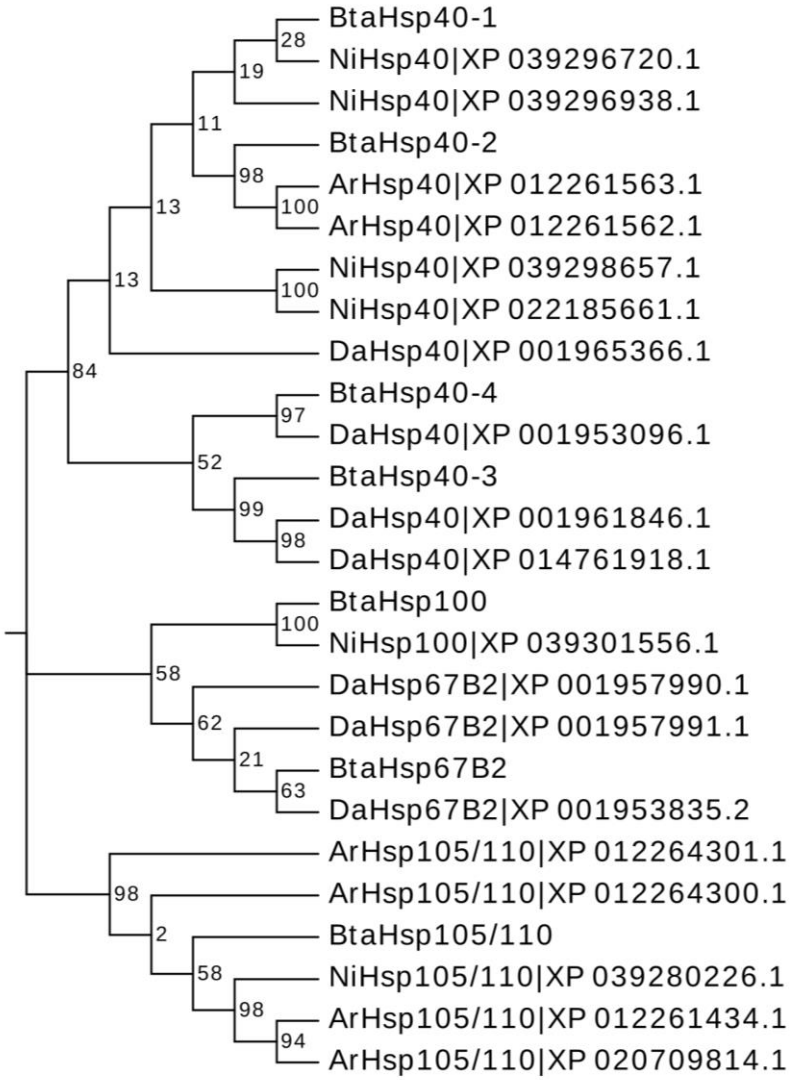
Running title: Identification and analysis of *Bemisia tabaci* HSP genes



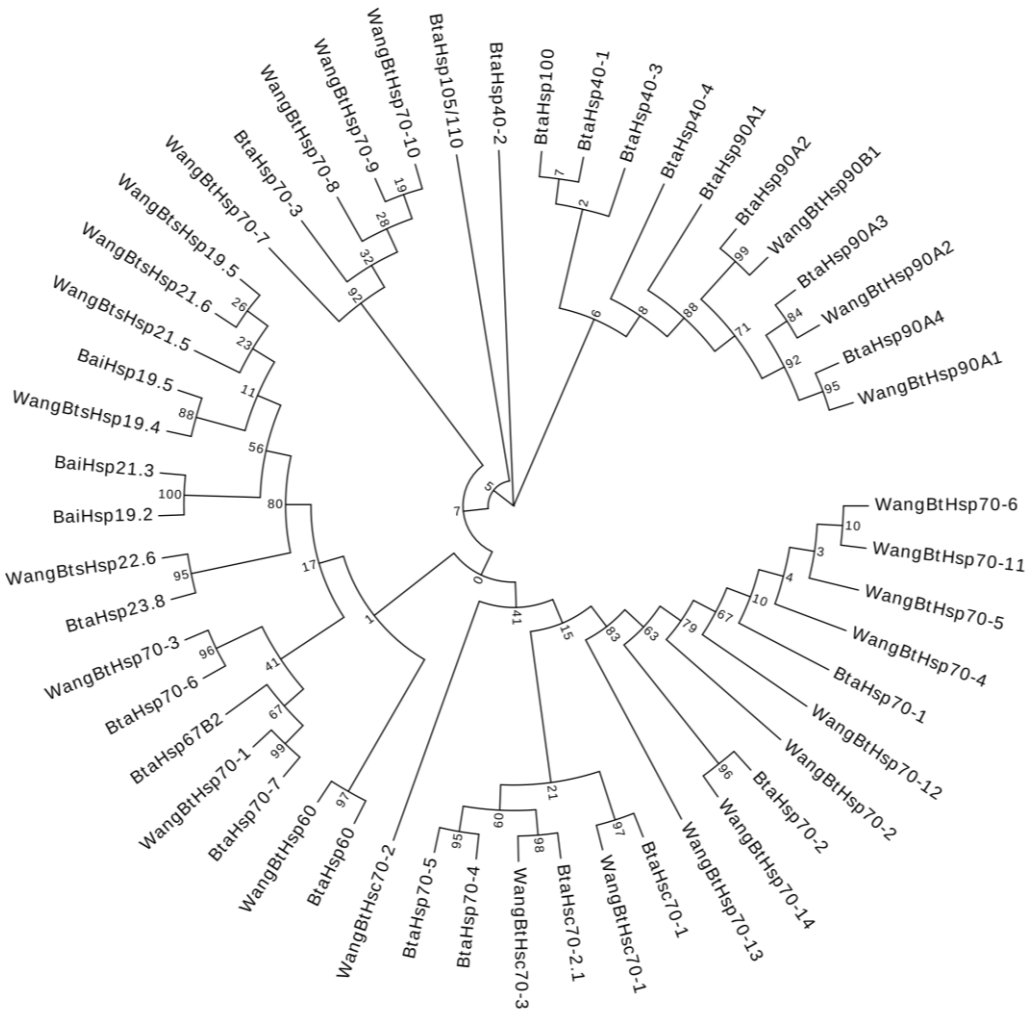
Supplementary Figure S1. Phylogenetic relationships of *Hsp*s from *Bemisia tabaci*, *Plutella xylostella*, *Tribolium castaneum*, *Drosophila ananassae*, *Athalia rosae*, and *Nilaparvata lugens*. The unrooted phylogentic tree was constructed using MEGA7 by Maximum Likelihood method with JTT model. The bootstrap test was set as 1000 replicates.



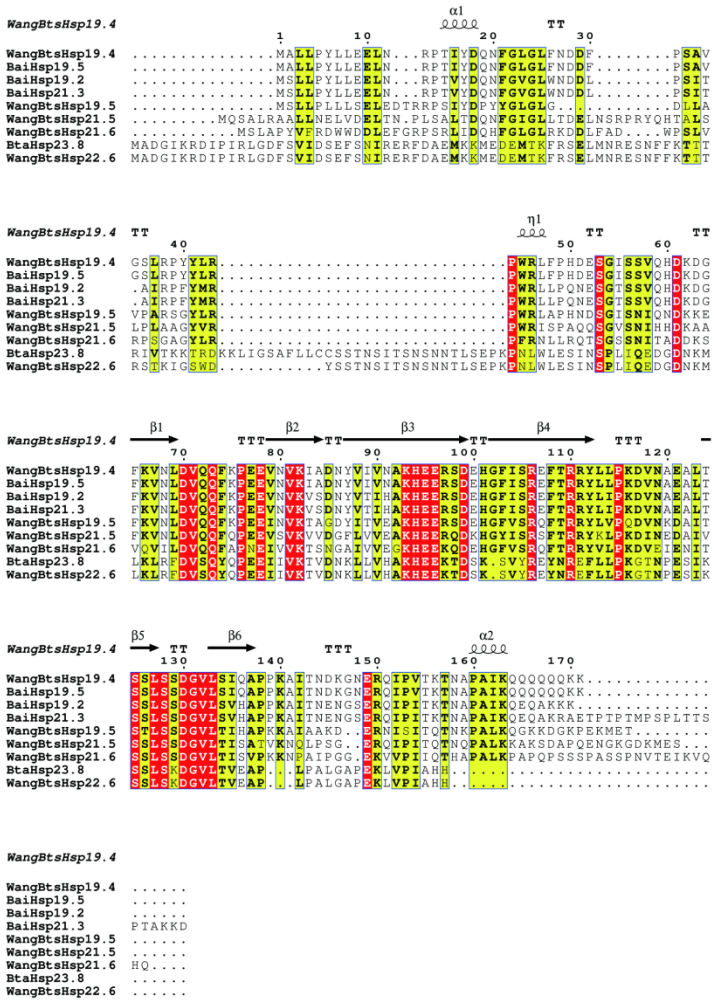
Supplementary Figure S2. Phylogenetic relationships of *sHsp*s from *Bemisia tabaci*, *Plutella xylostella*, *Tribolium castaneum*, *Drosophila ananassae*, *Athalia rosae*, and *Nilaparvata lugens*. The unrooted phylogentic tree was constructed using MEGA7 by Maximum Likelihood method with JTT model. The bootstrap test was set as 1000 replicates.



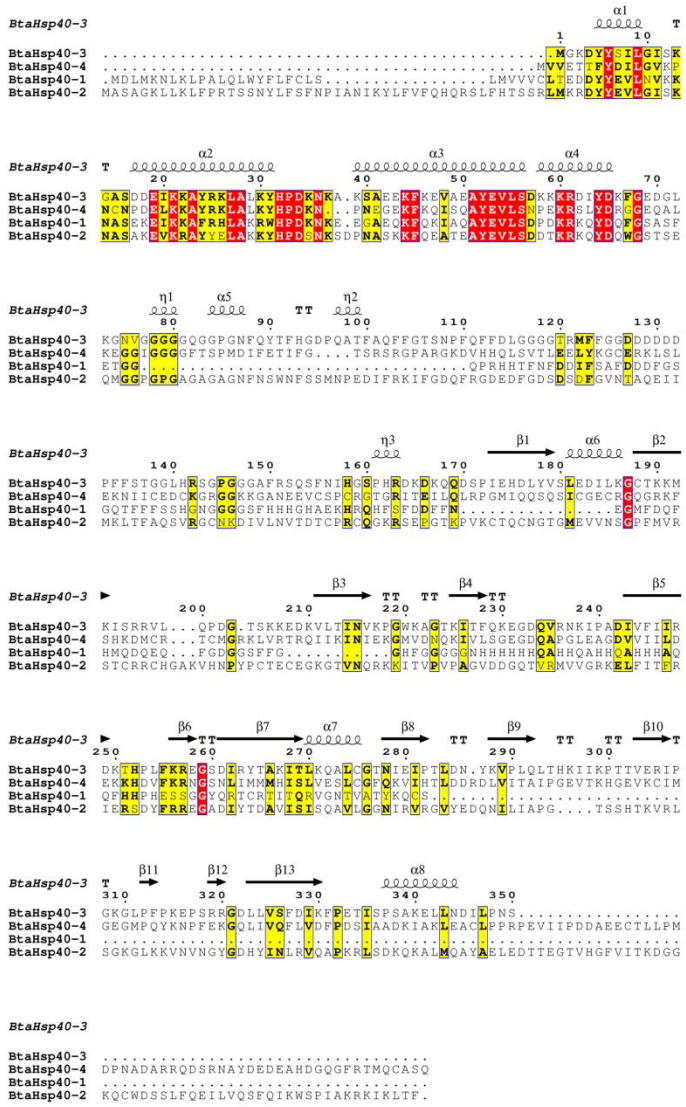
Supplementary Figure S3. Phylogenetic relationships of *Hsp40*, *Hsp100*, *Hsp105/110*, *Hsp67B2* from *Bemisia tabaci*, *Drosophila ananassae*, *Athalia rosae*, and *Nilaparvata lugens*. The unrooted phylogentic tree was constructed using MEGA7 by Maximum Likelihood method with JTT model. The bootstrap test was set as 1000 replicates.



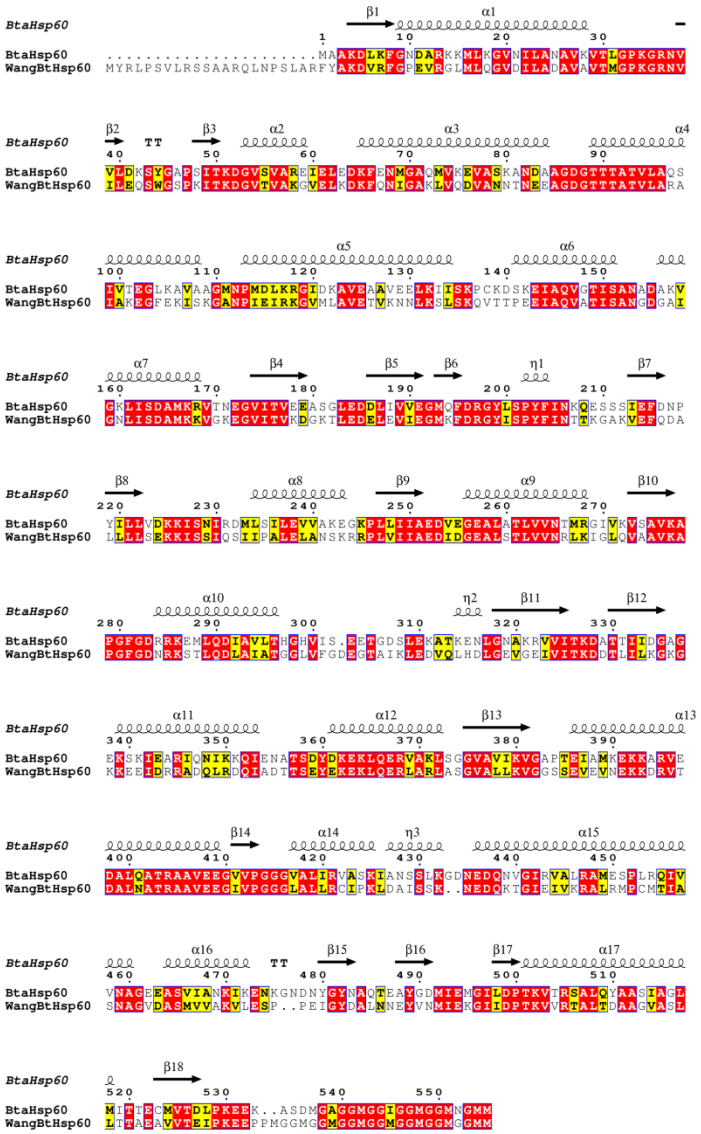
Supplementary Figure S4. Phylogenetic relationships and gene structures analysis of the *Bemisia tabaci* HSP (BtaHSP) gene superfamily. The unrooted phylogentic tree was constructed using MEGA7 by Maximum Likelihood method with JTT model. The bootstrap test was set as 1000 replicates.



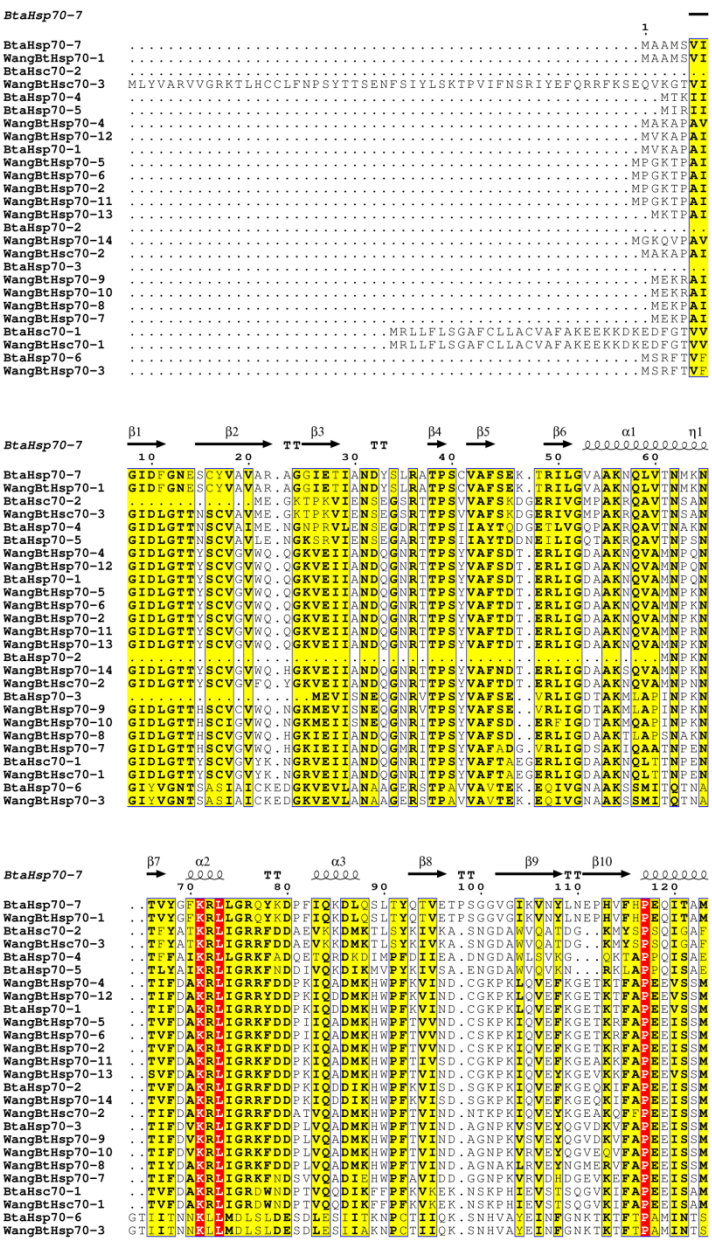
Supplementary Figure S5. The secondary structures of *Bemisia tabaci* sHSPs. α-helices and β-sheets were represented by yellow boxes and blue arrows, respectively. The conserved domain of sHSPs were marked with same color shadow under the sequences.



Supplementary Figure S6. The secondary structures of *Bemisia tabaci* HSP40s. α-helices and β-sheets were represented by yellow boxes and blue arrows shown above the sequence, respectively. The conserved domain of HSP40s were marked with a line under the sequences.



Supplementary Figure S7. The secondary structures of *Bemisia tabaci* HSP60s. α-helices and β-sheets were represented by yellow boxes and blue arrows shown above the sequence, respectively. The conserved domain of Hsp60 proteins were marked with a line under the sequences.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BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
WangBtHsc70-3
BtaHsp70-4
BtaHsp70-5
WangBtHsp70-4
WangBtHsp70-12
BtaHsp70-1
WangBtHsp70-5
WangBtHsp70-6
WangBtHsp70-2
WangBtHsp70-11
WangBtHsp70-13
BtaHsp70-2
WangBtHsp70-14
WangBtHsc70-2
BtaHsp70-3
WangBtHsp70-9
WangBtHsp70-10
WangBtHsp70-8
WangBtHsp70-7
BtaHsc70-1
WangBtHsc70-1
BtaHsp70-6
WangBtHsp70-3
BtaHsp70-7
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WangBtHsp70-1
BtaHsc70-2
WangBtHsc70-3
BtaHsp70-4
BtaHsp70-5
WangBtHsp70-4
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WangBtHsp70-5
WangBtHsp70-6
WangBtHsp70-2
WangBtHsp70-11
WangBtHsp70-13
BtaHsp70-2
WangBtHsp70-14
WangBtHsc70-2
BtaHsp70-3
WangBtHsp70-9
WangBtHsp70-10
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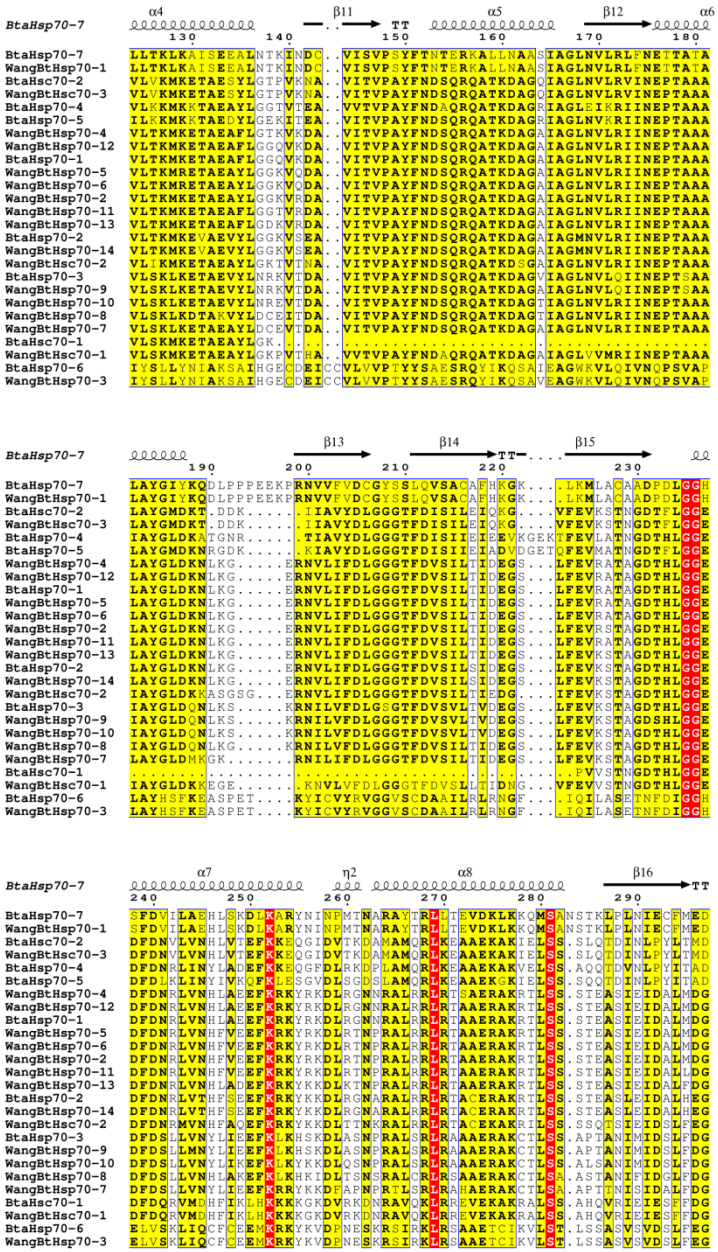
WangBtHsp70-7
BtaHsc70-1
WangBtHsc70-1
BtaHsp70-6
WangBtHsp70-3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α4
β11
α5
β12
α6
130
140
150
160
170
180
BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
WangBtHsc70-3
BtaHsp70-4
BtaHsp70-5
WangBtHsp70-4
WangBtHsp70-12
BtaHsp70-1
WangBtHsp70-5
WangBtHsp70-6
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WangBtHsp70-13
BtaHsp70-2
WangBtHsp70-14
WangBtHsc70-2
BtaHsp70-3
WangBtHsp70-9
WangBtHsp70-10
WangBtHsp70-8
WangBtHsp70-7
BtaHsc70-1
WangBtHsc70-1
BtaHsp70-6
WangBtHsp70-3
BtaHsp70-7
β13
β14
β15
190
200
210
220
230
BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
WangBtHsc70-3
BtaHsp70-4
BtaHsp70-5
WangBtHsp70-4
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BtaHsp70-3
WangBtHsp70-9
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WangBtHsp70-7
BtaHsc70-1
WangBtHsc70-1
BtaHsp70-6
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BtaHsp70-7
α7
η2
α8
β16
240
250
260
270
280
290
BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
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BtaHsp70-4
BtaHsp70-5
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WangBtHsp70-12
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WangBtHsc70-2
BtaHsp70-3
WangBtHsp70-9
WangBtHsp70-10
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WangBtHsc70-1
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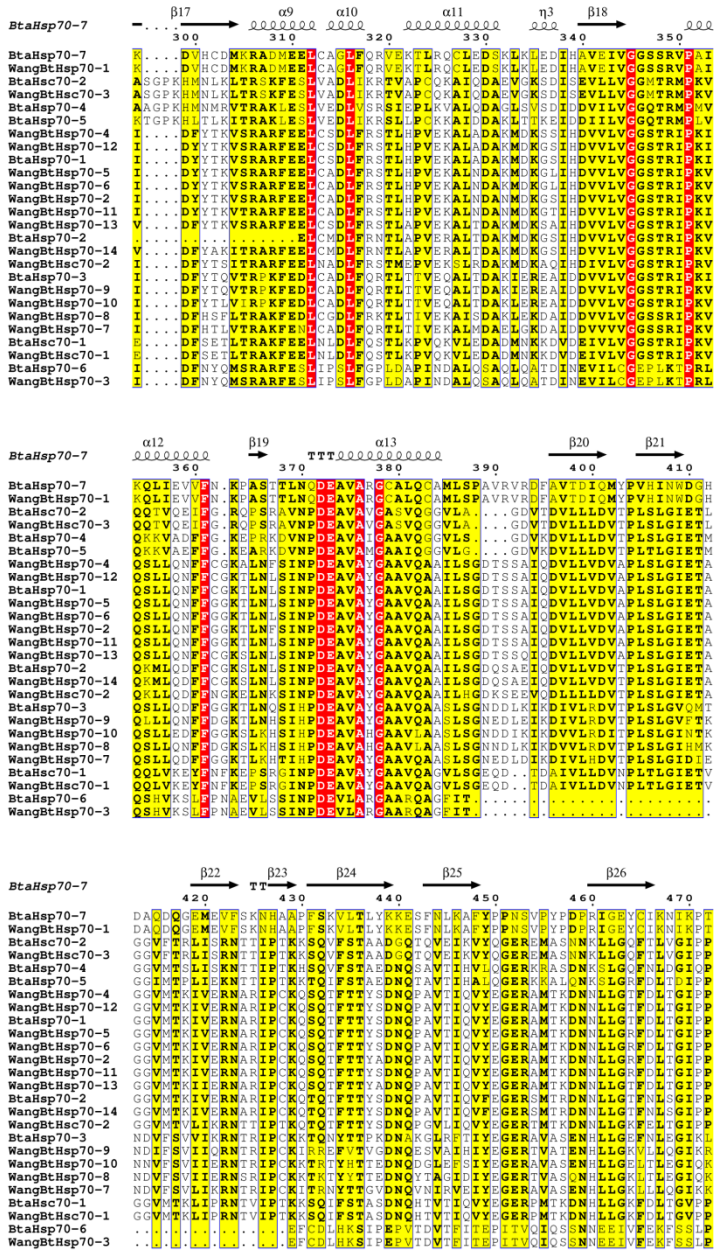
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β17 α9 α10 α11 η3 β18
300 310 320 330 340 350
BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
WangBtHsc70-3
BtaHsp70-4
BtaHsp70-5
WangBtHsp70-4
WangBtHsp70-12
BtaHsp70-1
WangBtHsp70-5
WangBtHsp70-6
WangBtHsp70-2
WangBtHsp70-11
WangBtHsp70-13
BtaHsp70-2
WangBtHsp70-14
WangBtHsc70-2
BtaHsp70-3
WangBtHsp70-9
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WangBtHsp70-8
WangBtHsp70-7
BtaHsc70-1
WangBtHsc70-1
BtaHsp70-6
WangBtHsp70-3
α12 β19 α13 β20 β21
BtaHsp70-7
360 370 380 390 400 410
BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
WangBtHsc70-3
BtaHsp70-4
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WangBtHsp70-11
WangBtHsp70-13
BtaHsp70-2
WangBtHsp70-14
WangBtHsc70-2
BtaHsp70-3
WangBtHsc70-1
BtaHsp70-6
WangBtHsp70-3
β22 β23 β24 β25 β26
BtaHsp70-7
420 430 440 450 460 470
BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
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WangBtHsp70-14
WangBtHsc70-2
BtaHsp70-3
WangBtHsp70-9
WangBtHsp70-10
WangBtHsp70-8
WangBtHsp70-7
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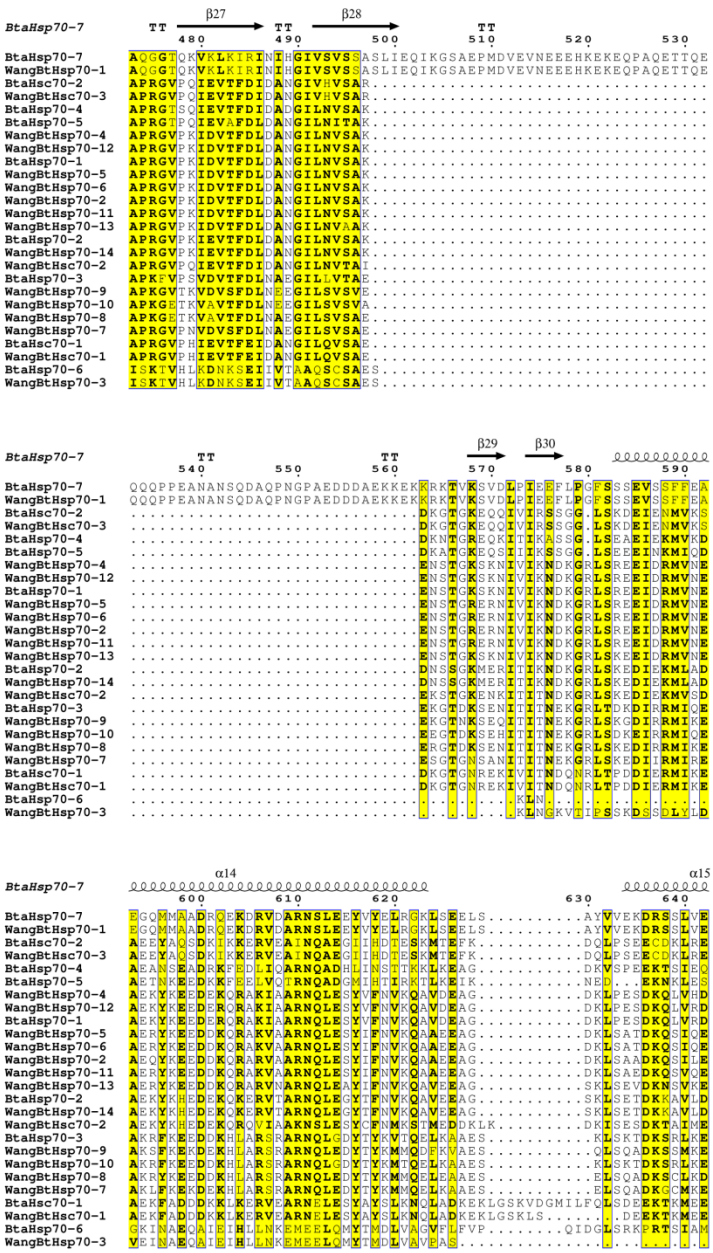
WangBtHsc70-1
BtaHsp70-6
WangBtHsp70-3


BtaHsp70-7
β27
β28
β29
β30
α14
α15
BtaHsp70-7
WangBtHsp70-1
BtaHsc70-2
WangBtHsc70-3
BtaHsp70-4
BtaHsp70-5
WangBtHsp70-4
WangBtHsp70-12
BtaHsp70-1
WangBtHsp70-5
WangBtHsp70-6
WangBtHsp70-2
WangBtHsp70-11
WangBtHsp70-13
BtaHsp70-2
WangBtHsp70-14
WangBtHsc70-2
BtaHsp70-3
WangBtHsp70-9
WangBtHsp70-10
WangBtHsp70-8
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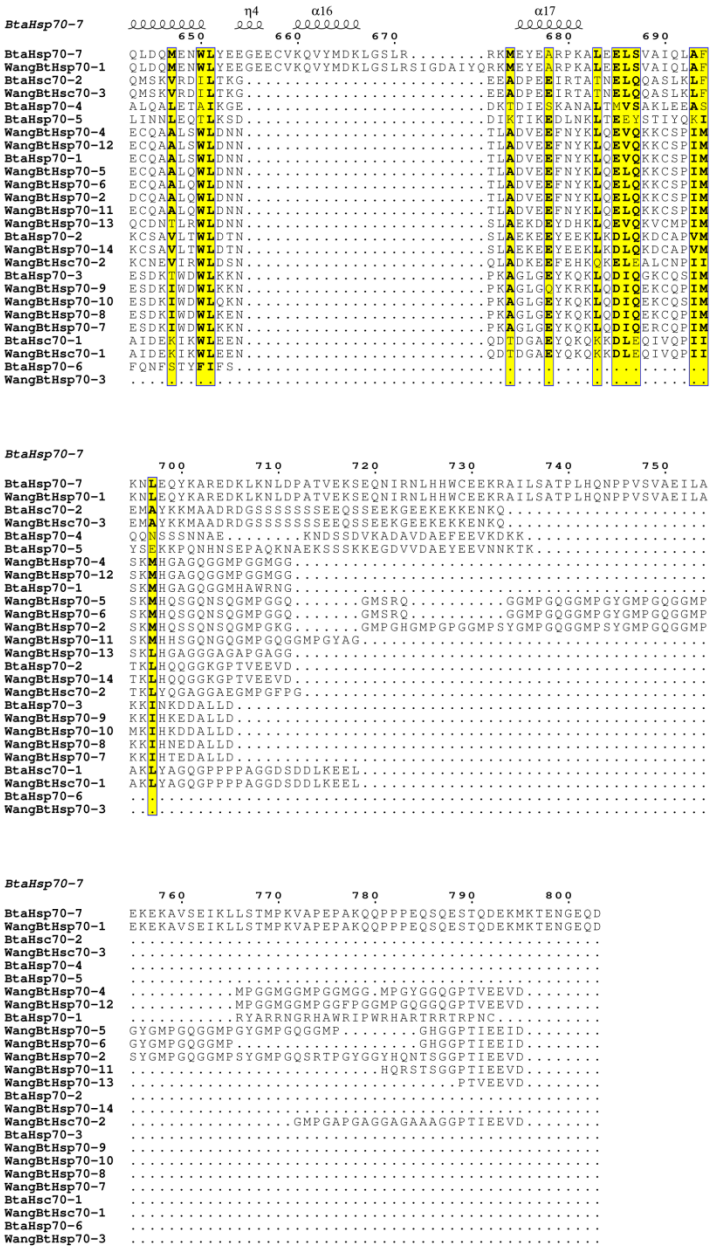
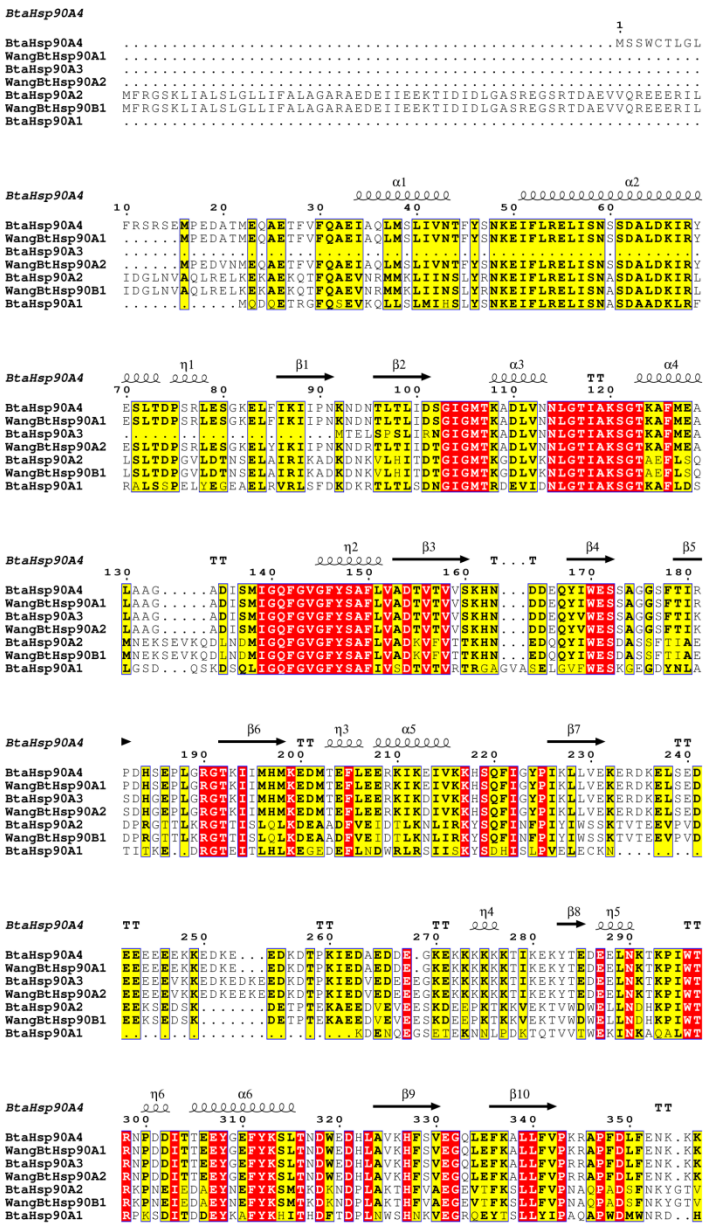
WangBtHsp70-3



Supplementary Figure S8. The secondary structures of *Bemisia tabaci* HSP70s. α-helices and β-sheets were represented by yellow boxes and blue arrows shown above the sequence, respectively. The conserved domain of HSP70s were marked with a line under the sequences.


BtaHsp90A4
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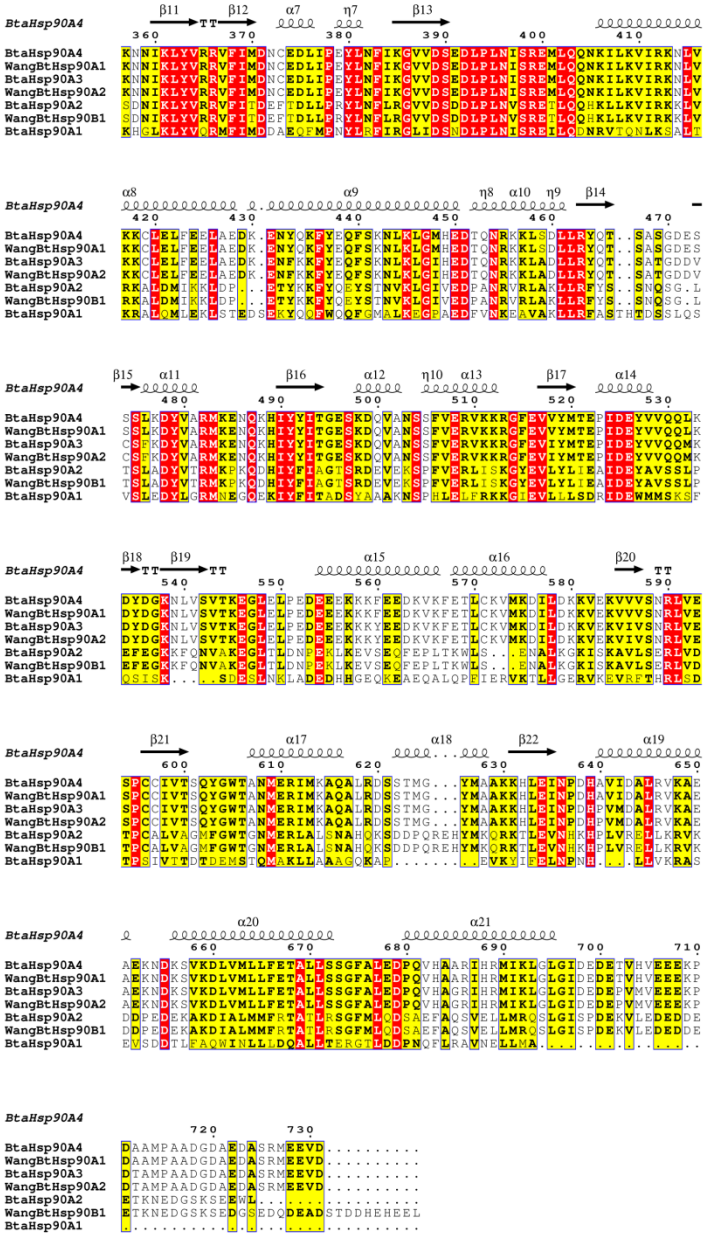
WangBtHsp90A1
BtaHsp90A3
WangBtHsp90A2
BtaHsp90A2
WangBtHsp90B1
BtaHsp90A1



Supplementary Figure S9. The secondary structures of *Bemisia tabaci* HSP90s. α-helices and β-sheets were represented by yellow boxes and blue arrows shown above the sequence, respectively. The conserved domain of HSP90s were marked with a line under the sequences.

Supplementary data sheet 1

1. Sequence logos for the conserved motifs of sHSPs in *Bemisia tabaci*

BtasHsp Motif

Motif 1

E-value 5.2e-138

Width 39

Sites 9

Motif 2

E-value 2.6e-133

Width 39

Sites 9

Motif 3

E-value 9.8e-077

Width 40

Sites 7

Motif 4

E-value 1.5e-041

Width 19

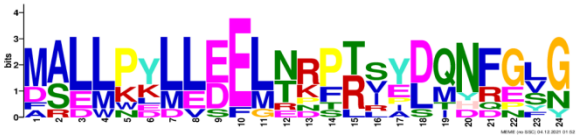
Sites 9

Motif 5

E-value 6.6e-035

Width 24

Sites 9

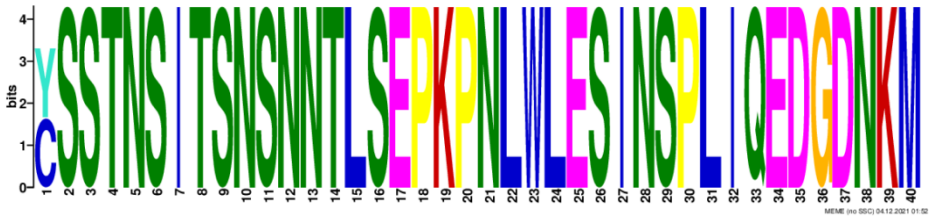


Motif 6

E-value 3.1e-010

Width 40

Sites 2



Motif 7

E-value 7.5e+000

Width 10

Sites 2

Motif 8

E-value 1.0e+002

Width 10

Sites 2

Motif 9

E-value 6.2e+003

Width 10

Sites 2

Motif 10

E-value 5.7e+004

Width 14

Sites 2

Motif 11

E-value 7.8e+005

Width 10

Sites 2

Motif 12

E-value 8.2e+005

Width 10

Sites 2

2. Sequence logos for the conserved motifs of HSP40s in *Bemisia tabaci*

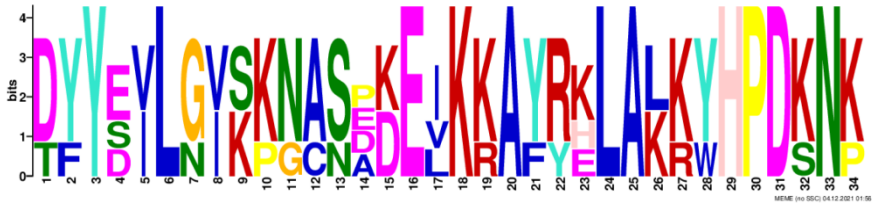
BtaHsp40 Motif

Motif 1

E-value 1.7e-031

Width 34

Sites 4



Motif 2

E-value 2.5e-019

Width 30

Sites 4

Motif 3

E-value 4.3e-002

Width 34

Sites 3

Motif 4

E-value 3.7e+001

Width 30

Sites 2

Motif 5

E-value 6.3e+001

Width 48

Sites 4

Motif 6

E-value 1.3e+002

Width 47

Sites 2

Motif 7

E-value 1.5e+003

Width 30

Sites 2

Motif 8

E-value 2.7e+004

Width 31

Sites 2

Motif 9

E-value 1.1e+004

Width 36

Sites 2

Motif 10

E-value 1.2e+004

Width 30

Sites 2

Motif 11

E-value 1.9e+004

Width 30

Sites 2

Motif 12

E-value 1.0e+005

Width 30

Sites 2

Motif 13

E-value 4.0e+005

Width 30

Sites 2

Motif 14

E-value 9.3e+005

Width 30

Sites 2

3. Sequence logos for the conserved motifs of HSP60s in *Bemisia tabaci*

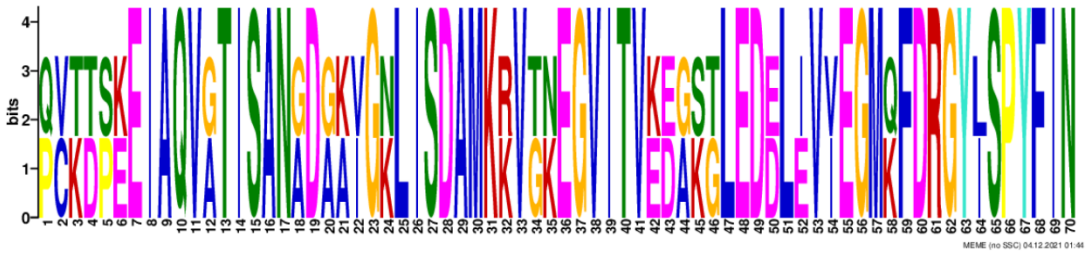
BtaHsp60 Motif

Motif 1

E-value 4.2e-008

Width 70

Sites 2

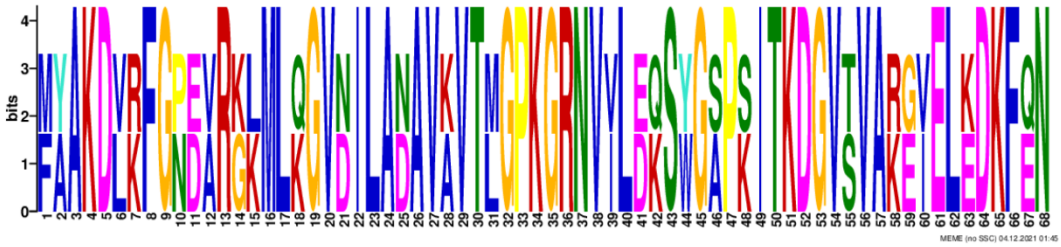


Motif 2

E-value 2.0e-006

Width 68

Sites 2



Motif 3

E-value 1.6e-003

Width 56

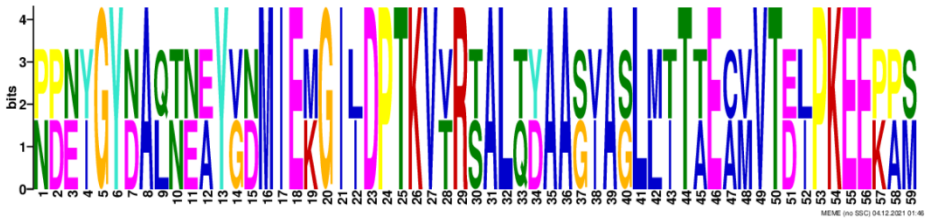
Sites 2

Motif 4

E-value 3.5e-003

Width 59

Sites 2

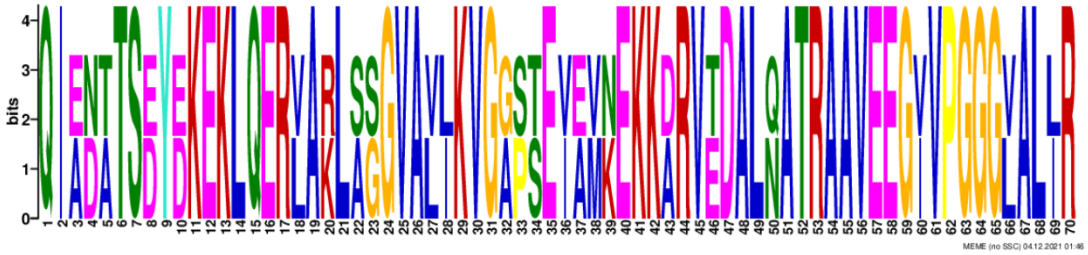


Motif 5

E-value 4.2e-002

Width 70

Sites 2



Motif 6

E-value 2.0e+001

Width 31

Sites 2

Motif 7

E-value 1.5e+002

Width 32

Sites 2

Motif 8

E-value 4.6e+002

Width 30

Sites 2

Motif 9

E-value 3.3e+003

Width 36

Sites 2

4. Sequence logos for the conserved motifs of HSP70s in *Bemisia tabaci*

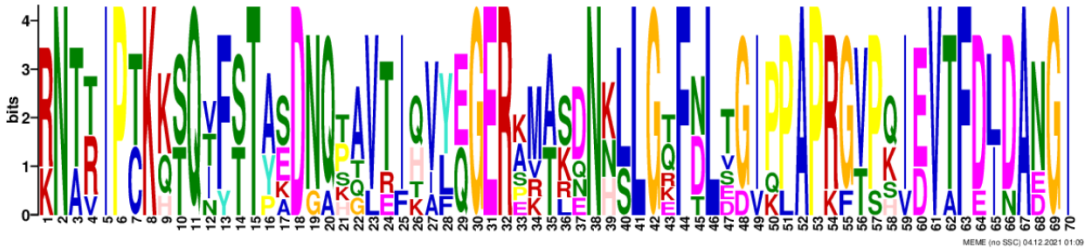
BtaHsp70 Motif

Motif 1

E-value 7.3e-179

Width 70

Sites 7



Motif 2

E-value 5.0e-147

Width 43

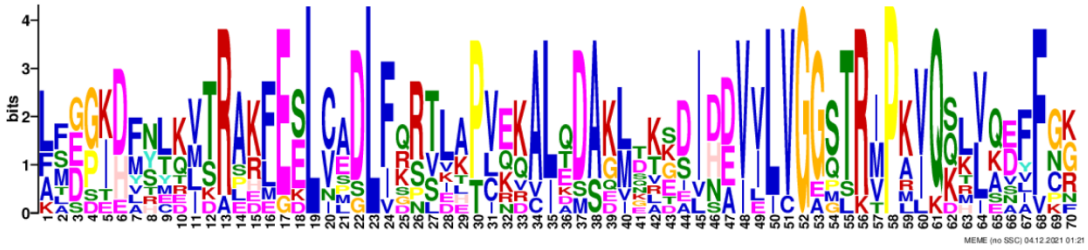
Sites 9

Motif 3

E-value 1.8e-149

Width 70

Sites 10

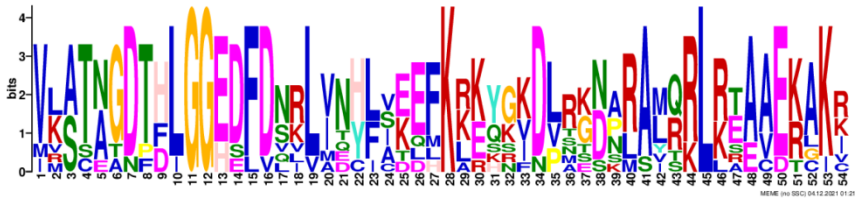


Motif 4

E-value 7.4e-122

Width 54

Sites 9



Motif 5

E-value 9.3e-088

Width 42

Sites 8

Motif 6

E-value 1.2e-064

Width 41

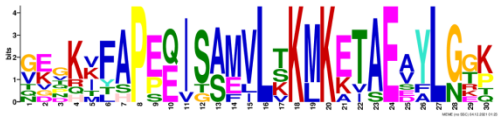
Sites 10

Motif 7

E-value 4.4e-049

Width 30

Sites 8



Motif 8

E-value 1.5e-046

Width 41

Sites 8

Motif 9

E-value 3.8e-046

Width 39

Sites 6

Motif 10

E-value 4.4e-033

Width 30

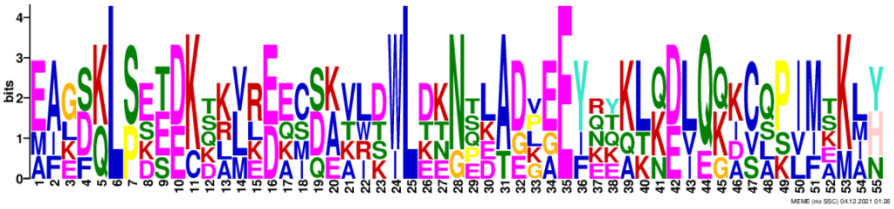
Sites 6

Motif 11

E-value 1.4e-012

Width 55

Sites 5



Motif 12

E-value 8.9e+001

Width 30

Sites 2

Motif 13

E-value 1.3e+003

Width 43

Sites 2

Motif 14

E-value 1.5e+004

Width 30

Sites 2

Motif 15

E-value 4.4e+004

Width 30

Sites 2

Motif 16

E-value 4.6e+004

Width 30

Sites 2

Motif 17

E-value 4.9e+004

Width 38

Sites 2

Motif 18

E-value 2.8e+004

Width 39

Sites 2

Motif 19

E-value 4.1e+004

Width 30

Sites 2

Motif 20

E-value 1.2e+005

Width 34

Sites 2

5. Sequence logos for the conserved motifs of HSP90s in *Bemisia tabaci*

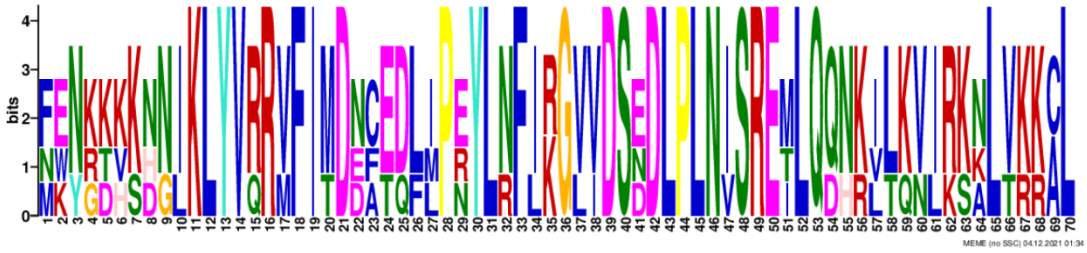
BtaHsp90 Motif

Motif 1

E-value 3.2e-064

Width 70

Sites 4

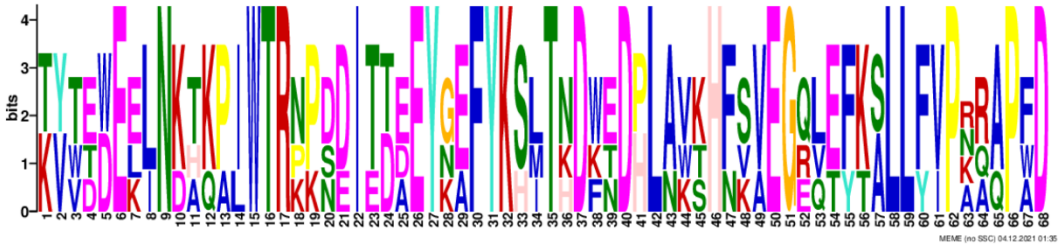


Motif 2

E-value 1.4e-059

Width 68

Sites 4



Motif 3

E-value 4.1e-049

Width 61

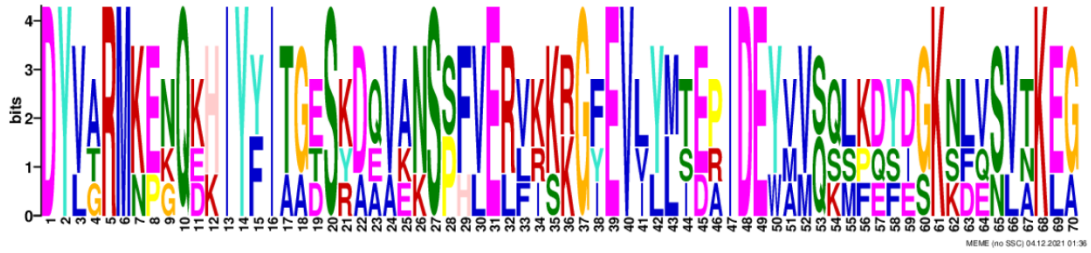
Sites 4

Motif 4

E-value 1.6e-045

Width 70

Sites 4



Motif 5

E-value 2.6e-029

Width 55

Sites 3

Motif 6

E-value 3.8e-027

Width 31

Sites 4

Motif 7

E-value 4.6e-023

Width 41

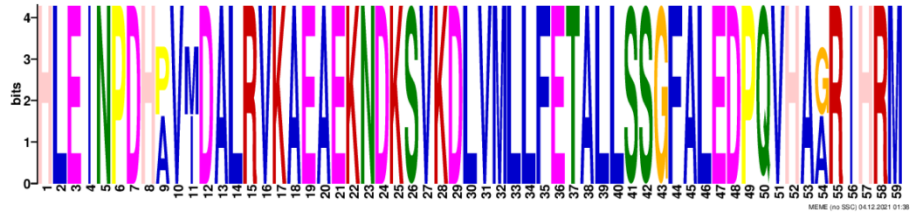
Sites 4

Motif 8

E-value 1.1e-015

Width 59

Sites 2

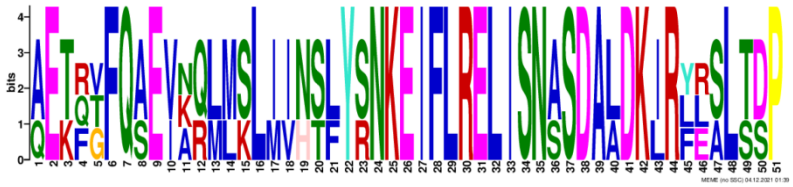


Motif 9

E-value 1.8e-018

Width 51

Sites 3



Motif 10

E-value 2.4e-008

Width 30

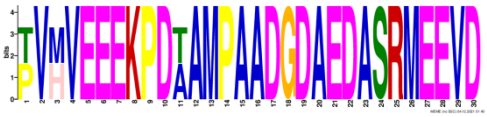
Sites 4

Motif 11

E-value 3.6e-003

Width 30

Sites 2



Motif 12

E-value 2.8e+004

Width 34

Sites 2

Motif 13

E-value 3.4e+005

Width 30

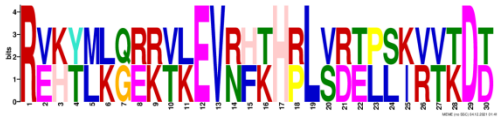
Sites 2

Motif 14

E-value 1.9e+005

Width 30

Sites 2



Motif 15

E-value 3.1e+006

Width 30

Sites 2

Motif 16

E-value 3.1e+006

Width 30

Sites 2

Motif 17

E-value 3.1e+006

Width 30

Sites 2

Motif 18

E-value 3.1e+006

Width 30

Sites 2

6. Sequence logos for the conserved motifs of HSP100s in *Bemisia tabaci*

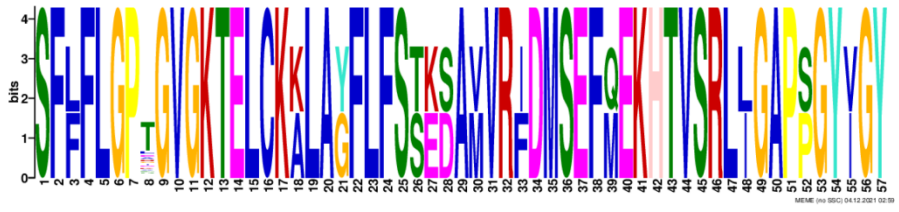
BtaHsp100 Motif

Motif 1

E-value 1.2e-014

Width 57

Sites 2

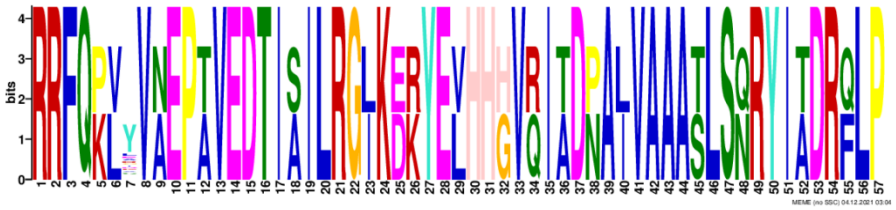


Motif 2

E-value 1.7e-006

Width 57

Sites 2

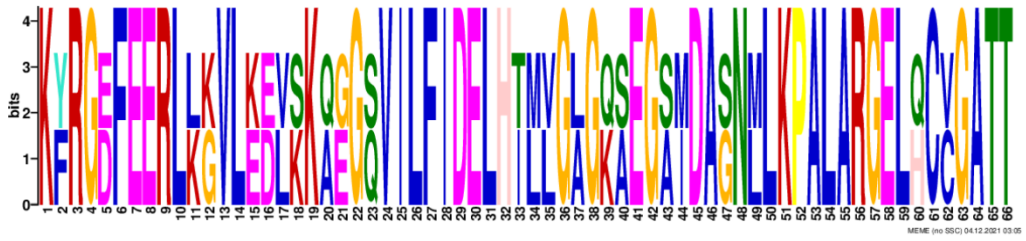


Motif 3

E-value 1.3e-005

Width 66

Sites 2

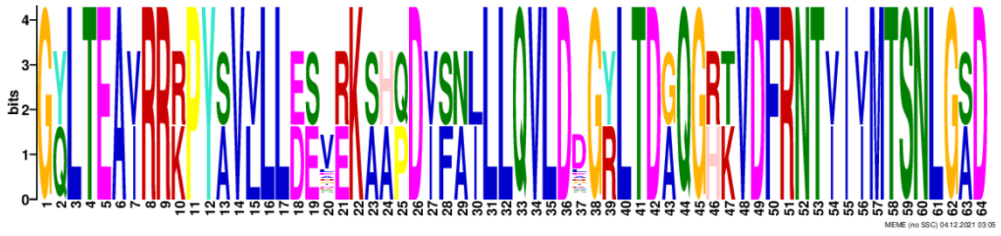


Motif 4

E-value 3.4e-005

Width 64

Sites 2

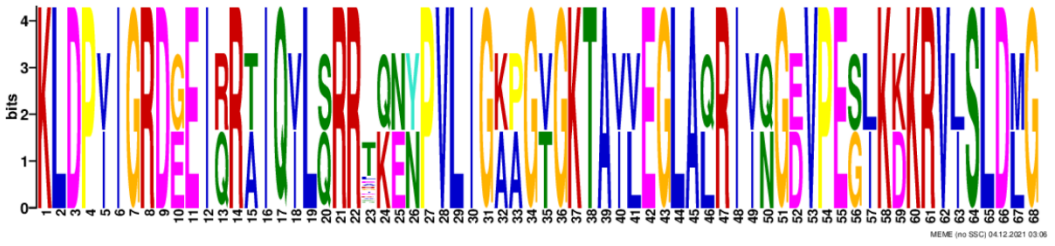


Motif 5

E-value 5.4e-002

Width 68

Sites 2

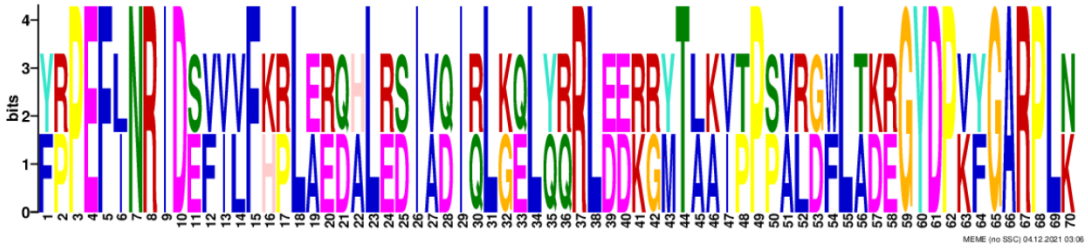


Motif 6

E-value 9.4e-002

Width 70

Sites 2

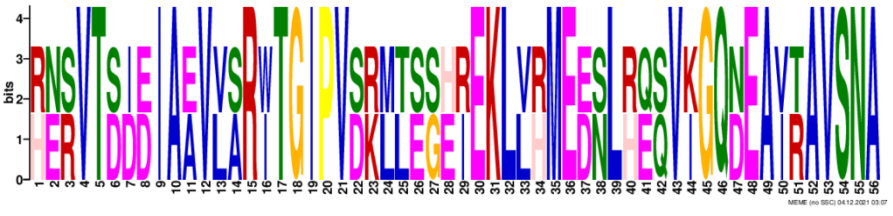


Motif 7

E-value 2.4e-001

Width 56

Sites 2



Motif 8

E-value 4.5e+001

Width 53

Sites 2

Motif 9

E-value 4.6e+003

Width 45

Sites 2

Motif 10

E-value 3.3e+004

Width 30

Sites 2

Motif 11

E-value 1.8e+004

Width 30

Sites 2

Motif 12

E-value 5.6e+005

Width 30

Sites 2

Motif 13

E-value 5.6e+005

Width 30

Sites 2

Motif 14

E-value 5.6e+005

Width 30

Sites 2

Supplementary data sheet 2

Information of *Hsp* sequences in the six surveyed species

Bemisia tabaci

>BtaHsp70-1

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GKPKLQVEFKGETKTFAPEEVSSMVLTKMKETAEAFLGGQVKDAVITVP

AYFNDSQRQATKDAGAIAGLNVLRIINEPTAAALAYGLDKNLKGERNVL

IFDLGGGTFDVSILTIDEGSLFEVRATAGDTHLGGEDFDNRLVNHLAEEFK

RKYRKDLRGNNRALRRLRTAAERAKRTLSSSTEASIEIDALMDGIDYYTK

VSRARFEELCSDLFRSTLHPVEKALADAKMDKGSIHDVVLVGGSTRIPKIQ

SLLQNFFCGKTLNLSINPDEAVAYGAAVQAAILSGDTSSAIQDVLLVDVA

PLSLGIETAGGVMTKIVERNARIPCKQSQTFTTYSDNQPAVTIQVYEGERA

MTKDNNLLGTFDLTGIPPAPRGVPKIDVTFDLDANGILNVSAKENSTGKS

KNIVIKNDKGRLSREEIDRMVNEAEKYKEEDERQRAKIAARNQLESYVFN

VKQAVDEAGDKLPESDKQLVRDECQAALSWLDNNTLADVEEFNYKLQE

VQKKCSPIMSKMHGAGQGGMHAWRNGRYARRNGRHAWRIPWRHAR

TRRTRPNC

>BtaHsp70-2

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SIDEGSLFEVKSTAGDTHLGGEDFDNRLVTHFSEEFKRKYKKDLRGNARA

LRRLRTACERAKRTLSSSTEASLEIDALHEGELCMDLFRNTLAPVERALTD

AKMDKGSIHDVVLVGGSTRIPKVQKMLQDFFCGKSLNLSINPDEAVAYG

AAVQAAILSGDQSAEIQDVLLVDVTPLSLGIETAGGVMTKIVERNARIPC

KQTQTFTTYSDNQPAVTIQVFEGERSMTRDNNLLGTFNLSGIPPAPRGVP

KIEVTFDLDANGILNVSAKDNSSGKMERITIKNDKGRLSKEDIEKMLADA

EKYKHEDEKQKERVTARNQLEGYTFNVKQAVEEAGSKLSETDKKAVLD

KCSAVLTWLDTNSLAEKEEYEEKLKDLQKDCAPVMTKLHQQGGKGPTV

EEVD

>BtaHsp70-3

MEVISNEQGNRVTPSYVAFSEVRLIGDTAKMLAPINPKNTIFDVKRLIGRK

FDDPLVQADMKHWPFTVINDAGNPKVSVEYQGVDKVFAPEEISSMVLSK

LKETAEVYLNRKVTDAVITVPAYFNDSQRQATKDAGVIAGLNVLQIINEP

TSAAIAYGLDQNLKSKRNILVFDLGSGTFDVSVLTVDEGSLFEVKSTAGDT

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ASLSGNDDLKIKDIVLRDVTPLSLGVQMTNDVFSVVIKRNTRIPCKKTQN

YTTPKDNAKGLRFTIYEGERAVASENHLLGEFNLEGIKLAPKFVPSVDVTF

DLNAEGILLVTAEEKGTDKSENITITNEKGRLTDKDIRRMIQEAKRFKEED

DKHLARSRARNQLGDYTYKVTQELKAAESKLSKTDKSRLKEESDKTWD

WLKKNPKAGLGEYKQKLQDIQGKCQSIMKKINKDDALLD

>BtaHsc70-1

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DVRKDNRAVQKLRREVEKAKRALSSAHQVRIEIESFFDGEDFSETLTRAKF

EELNLDLFQSTLKPVQKVLEDADMNKKDVDE

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QVSAEDKGTGNREKIVITNDQNRLTPDDIERMIKEAEKFADDDKKLKERV

EARNELESYAYSLKNQLADKEKLGSKVDGMILFQLSDEEKTKMEEAIDEK

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VPQIEVTFDIDANGIVHVSARDKGTGKEQQIVIRSSGGLSKDEIENMVKSA

EEYAQSDKIKKERVEAINQAEGIIHDTESKMTEFKDQLPSEECDKLREQMS

KVRDILTKGEEADPEEIRTATNELQQASLKLFEMAYKKMAADRDGSSSSS

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>BtaHsp70-4

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AQRQATKDAGRIAGLEIKRIINEPTAAAIAYGLDKATGNRTIAVYDLGGG

TFDISIIEIEEVKGEKTFEVLATNGDTHLGGEDFDNRLINYLADEFKKEQGF

DLRKDPLAMQRLKEAAEKAKVELSSAQQTDVNLPYITADAAGPKHMN

MRVTRAKLESLVEDLVSRSIEPLKVALQDAGLSVSDIDDVILVGGQTRMP

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RASDNKSLGQFNLDGIQPAPRGTSQIEVTFDIDADGILNVSAKDKNTGRE

QKITIKASSGLSEAEIEKMVKDAEANSEADRKFEDLIQARNQADHLINSTT

KKLKEAGDKVSPEEKTSIEQALQALETAIKGEDKTDIESKANALTMVSAK

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>BtaHsp70-5

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EFFGKEARKDVNPDEAVAMGAAIQGGVLGGDVKDVLLLDVTPLTLGIET

MGGIMTPLIEKNTTIPTKKTQIFSTAEDNQTAVTIHALQGERKKALQNKSL

GRFDLTDIPPAPRGTPQIEVAFDLDANGILNITAKDKATGKEQSIIIKSSGG

LSEEEINKMIQDAETNKEEDKKFEELVQTRNQADGMIHTIRKTLKEIKNE

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YFIFS

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NPVVQLYKKRFPFYNLEADPNRSTVLFKHPSGKSYSPEELVGQLLYKAQE

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ALNYGIFRRKEFADSAQYVMFFDMGASSTTATIVQYQTVKVKDRGIVETL

PQASVIGVGFDRTLGGLEMTLRLRDYLAQK

FNEMKKTDIDVTQNPRAMAKLFKEAGRVKTVLSANADHFAQIEGLLEGI

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EDFSFHVNYADLDHLDPFAVEALGSLNLTKVNLKGVPEALAKFSTEGHE

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VGAPTEIAMKEKKARVEDALQATRAAVEEGVVPGGGVALIRVASKIANS

SLKGDNEDQNVGIRVALRAMESPLRQIVVNAGEEASVIANKIKENKGND

NYGYNAQTEAYGDMIEMGILDPTKVTRSALQYAASIAGLMITTECMVTD

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KAFLDSLGSDQSKDSQLIGQFGVGFYSAFIVSDTVTVRTRGAGVASELGVF

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LADEDHHGEQKEAEQALQPFIERVKTLLGERVKEVRFTHRLSDTPSIVTT

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>BtaHsp90A2

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GMTKGDLVKNLGTIAKSGTAEFLSQMNEKSEVKQDLNDMIGQFGVGFYS

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PTEKAEEDVEVEESKDEEPKTKKVEKTVWDWELLNDHKPIWTRKPNEIE

DAEYNEFYKSMTKDKNDPLAKTHFVAEGEVTFKSLLFVPNAQPADSFNK

YGTVSDNIKLYVRRVFITDEFTDLLPRYLNFLRGVVDSDDLPLNVSRETLQ

QHKLLKVIRKKLVRKALDMIKKLDPETYKKFYQEYSTNVKLGIVEDPANR

VRLAKLLRFYSSNQSGLTSLADYVTRMKPKQDHIYFIAGTSRDEVEKSPFV

ERLISKGYEVLYLIEAIDEYAVSSLPEFEGKKFQNVAKEGLTLDNPEKLKEV

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Supplementary Tables

Table 1. Gene-specific primers for q-RT-PCR used in this study.

Gene name	Forward primer (5'-3')	Reverse primer (5'-3')
BtaHsp70-1	GTCTATGAAGGTGAGCGAGCAATGA	CGTTGAGGATACCGTTGGCATCA
BtaHsp70-2	GGAGACCAGAGTGCGGAAAT	AGCGTTCCTCTCGACGATCT
BtaHsp70-3	TGAAGGTGAGCGTGCAGTAG	CGTGACATCAACTGAAGGTACAA
BtaHsc70-1	ACAGCAAGCCTCACATCGAA	GGTTGAAACTACAGGTTTGCCA
BtaHsc70-2	CCCTCTGTCGTAGCATTCTCTA	TTCTTCACTTCAGCATCGTCAA
BtaHsp70-4	TGTGGTCACTGTGCCCGCTTA	CGTTCCGCCTCCGAGATCGTAA
BtaHsp70-5	AGTCGGTGGTCAAACACGCATG	TCGCCACCTAATACGCCTCCTT
BtaHsp70-6	ACTGAACGGAAAGATCAATGCAG	GGTTTCCGACTAAGGCCATCA
BtaHsp105/110	GCGAGTGGTTGGATGAAGAAGG	CAATGCCTCTGGTGTGGTCTCA
BtaHsp70-7	GGATCTTTAAGGCGGAAGATGG	TGAACGCAAGTTGGATGGCT
BtaHsp67B2	TCCGTCCCAATGAGTGCTTGT	GCTTGAGTGACTTCGCCTAAGG

BtaHsp60	ACAGGCAACAAGAGCAGCAGTA	TGGCACGAAGAGCAACACGAAT
BtaHsp90A1	CGCTCTCCTCGCCAGAATTGT	CCAACACCGAACTGACCGATGA
BtaHsp90A2	CCTCTTGCCACGCTACCTGAAC	CTTGGCGAGCCTCACTCTGTTG
BtaHsp90A3	ATTGGAATGACCAAGGCTGACC	AGCGACGAGGAAGGCTGAG
BtaHsp90A4	AGCTCATGGTGCACTTTAGG	GACATCAACTGGGCGATTTCC
BtaHsp100	AGCCGACGGTAGAAGACACCAT	TGCCGCCGCTTCATCAATCAA
BtaHsp23.8	TGTGTTGCAGCTCGACCAA	TGACGTCGAACCTCAGCTTG
BtaHsp40-1	GGTCGTTCTTCGGCGGACATT	TGGTGGAATTGCTGAGCGTGAT
BtaHsp40-2	AAGCGAAGTGAACCAGGAACCA	GCGACCGACTACCATCCTAACG
BtaHsp40-3	CGCCCTGAAATACCACCCTGAC	TCCTCCTCCACCTCCGACATTG
BtaHsp40-4	CGAAGGAATGCCTCAGTACAAGAA	TTATCCGCTGCTATCGAATCTGG
dsgfp	TAATACGACTCACTATAGGGAGAC	TAATACGACTCACTATAGGGAGAC
	CACTGACCCTGAAGTTCATCT	CACGTCTTGTAGTTGCCGTCGT

	GC	C
dsBtaHsp90A	TAATACGACTCACTATAGGGT	TAATACGACTCACTATAGGGA
3	GGACAACTGCGAAGACCTCAT	GACCAGGTTCTTACCGTCGTAG
	C	T