

# Bioinformatics reports

## Analysis of The cadherin-like protein (CAD) genes from *Plutella xylostella* (L.)

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Time : 21 / 2 / 2012

Presented By  
Harry Mills /

 素彩  
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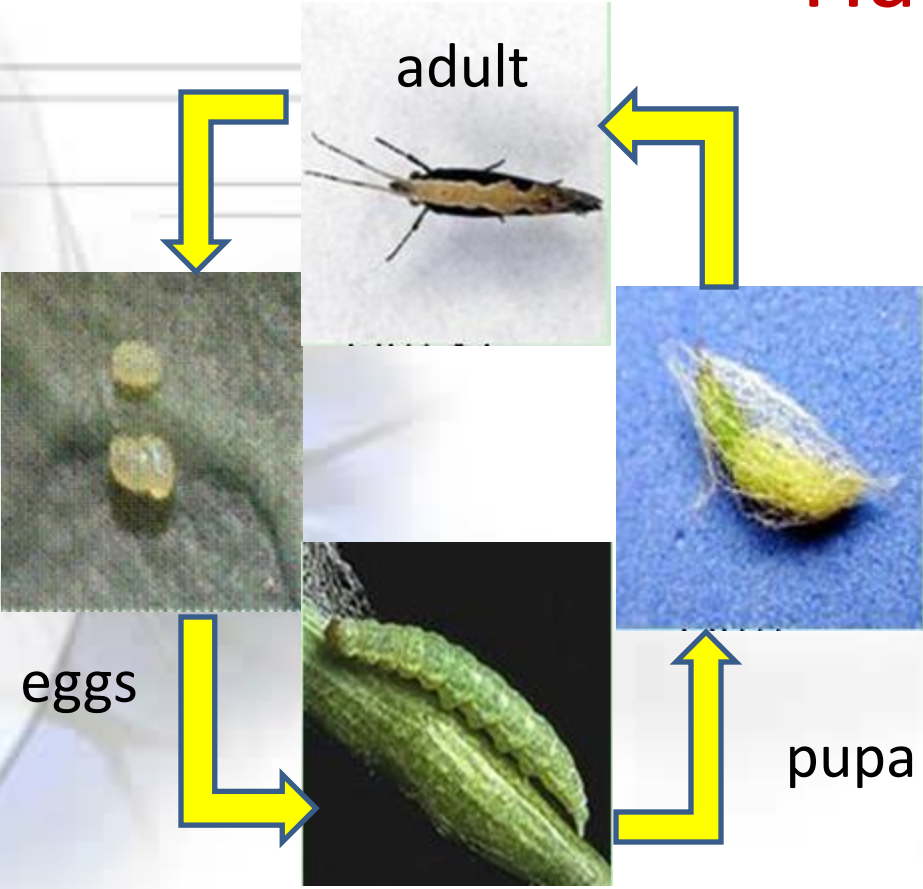
Thanks

# Backgrounds:

## 1、introduction of *Plutella xylostella* (L.)

*Plutella xylostella* (L.) belong to lepidoptera Plutellidae, one of The main agricultural pests in Cruciferous vegetables in the world.

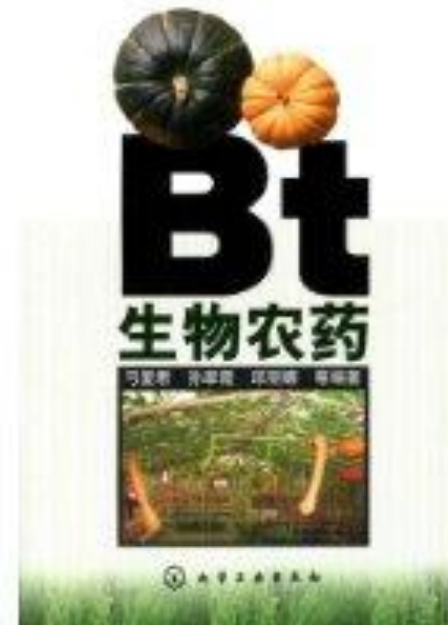
# Harm form



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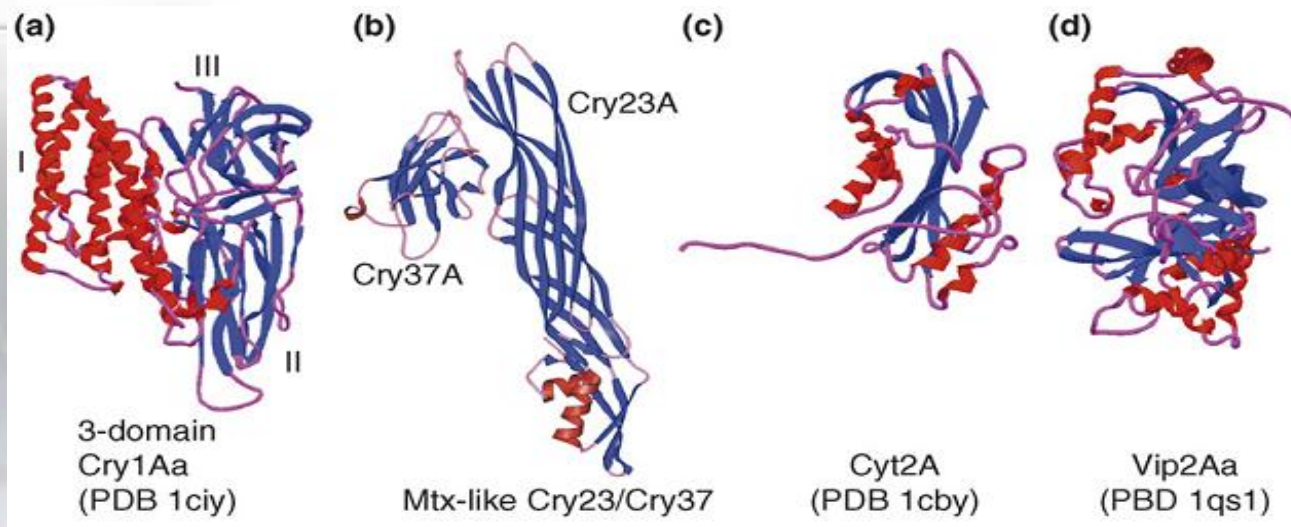
## 2、Pests management

- ◆ Physical Control
- ◆ Chemical Control
- ◆ biological control



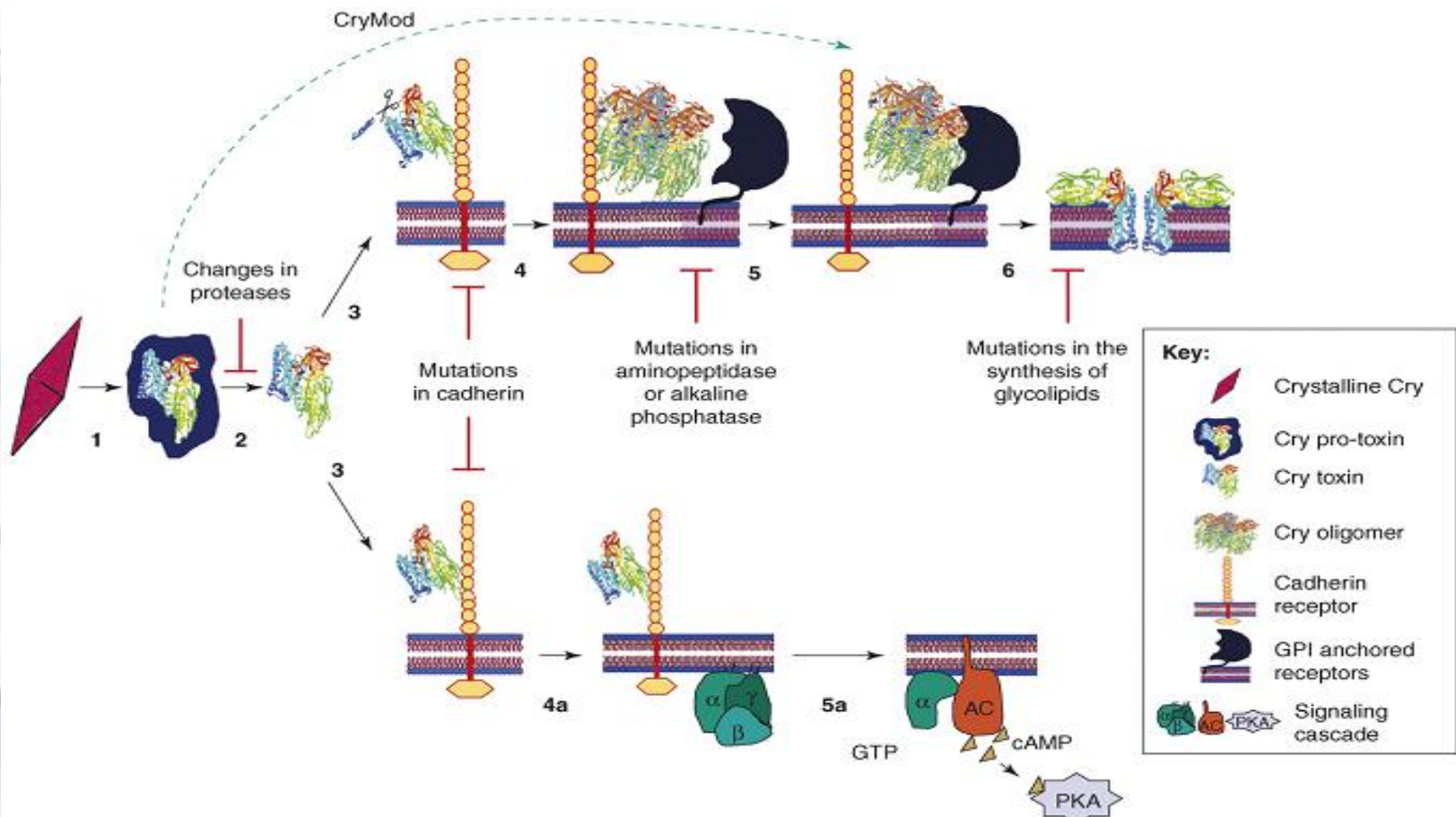
### 3、 Bacillus thuringiensis (Bt)

- ◆ Gram-positive bacteria
- ◆ Insecticidal crystal proteins, ICPs: Cry Cyt

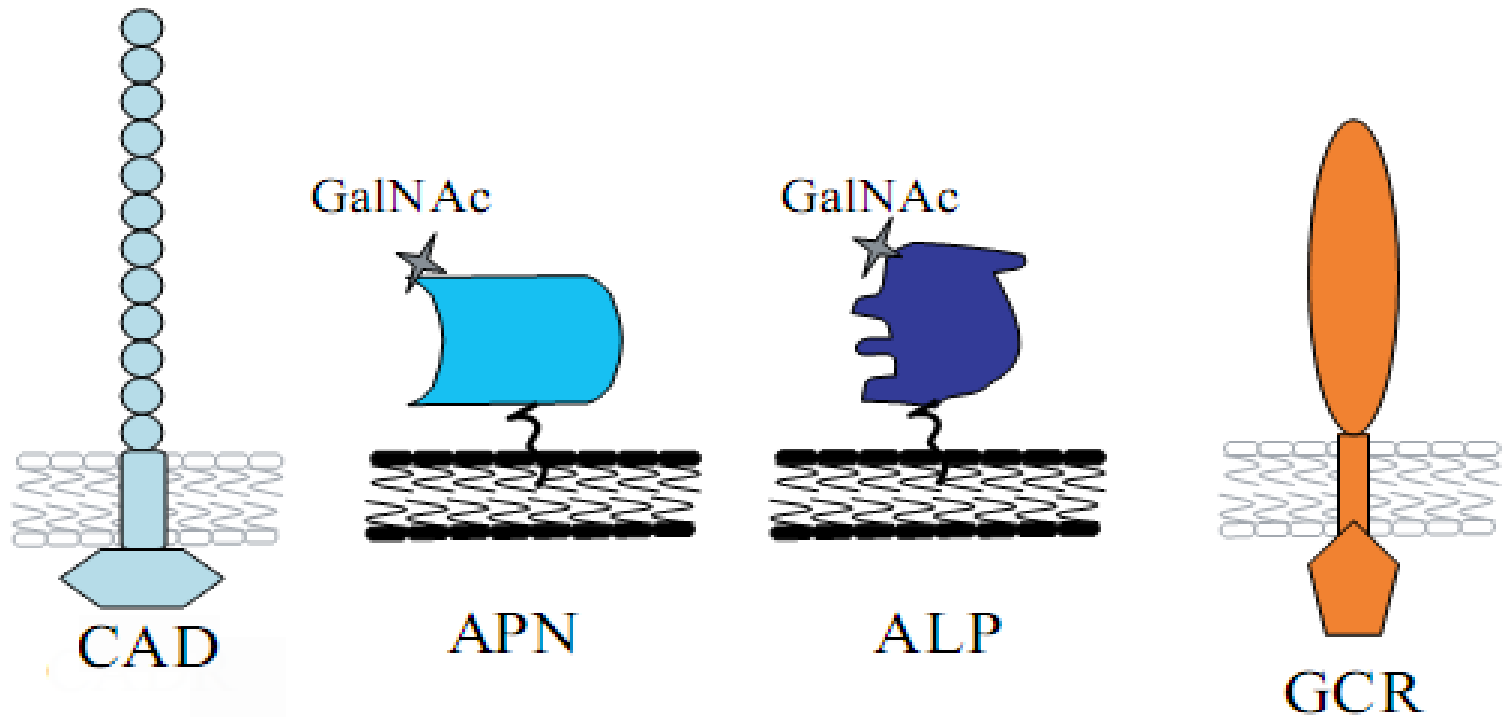


Alejandra and Mario, 2008 Presented By Harry Mills /

# 4、 Mechanisms of Resistance to Bacillus thuringiensis



## 5、Receptors Molecular of Cry1A proteins

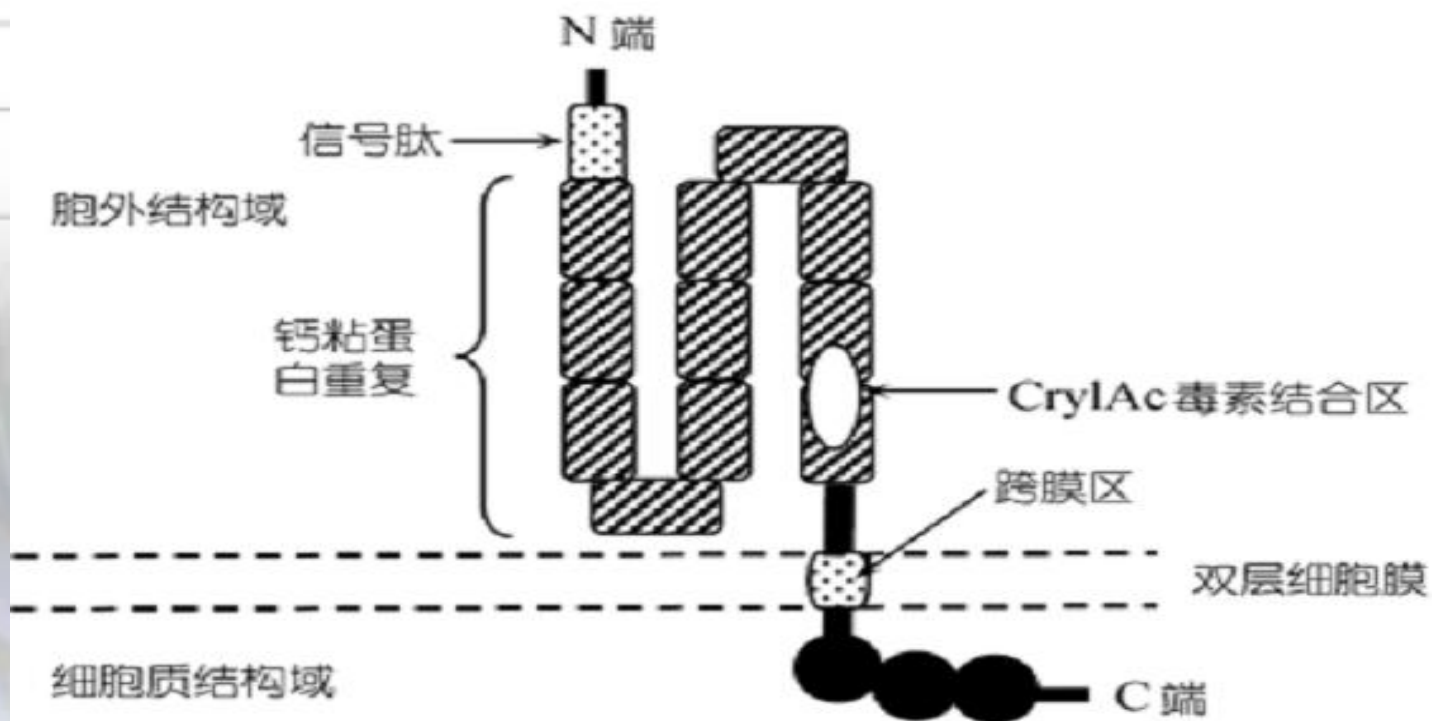


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Alejandra *et al*, 2007



## The model of CAD in BBMV of *Helicoverpa armigera*



Wang *et al*, 2004

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Harry Mills /

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# purpose

Molecular Mechanisms of Resistance to *Bacillus thuringiensis* Cry1Ac Toxin in *Plutella xylostella* (L.) through receptor gene (CAD)

# methods

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1、 DNAMAN

2、 SMART

3、 Signalp 4.0

4、 TMHMM

5、 MEGA

# analysis

## 1、DNAMAN

Multiple alignments showed that nucleotide similarity and amino acid identity of the two strains were 98.3% and 98.8%, respectively. 87 nucleotides and 21 amino acids changed in resistant population Cry1AcR compared to the susceptible population SS.

## 2、SMART

SMART [SETUP](#) [FAQ](#) [ABOUT](#) [GLOSSARY](#) [WHAT'S NEW](#) [FEEDBACK](#)

**Domains within the query sequence of 1715 residues**

1 100 200

**CA domain** [\(go to full annotation\)](#)

**Position:** 1365 to 1454  
**E-value:** 2.74e-01

<b>Definition:</b>	Cadherin repeats.
<b>Description:</b>	Cadherins are glycoproteins involved in Ca <sup>2+</sup> -mediated cell-cell adhesion. Cadherin domains occur as repeats in the extracellular regions which are thought to mediate cell-cell contact when bound to calcium.
<b>InterPro abstract (IPR002126):</b>	Cadherins are a family of adhesion molecules that mediate Ca <sup>2+</sup> -dependent cell-cell adhesion in all solid tissues of the organism which modulate a wide variety of processes including cell polarisation ... <a href="#">(full abstract)</a>

Mouse over domain / undefined region for more info; click on it to go to detailed annotation; right-click to save whole protein as PNG image

Transmembrane segments as predicted by the *TMHMM2* program (■), coiled coil regions determined by the *Coils2* program (■), segments of low compositional complexity determined by the *SEG* program (■). Signal peptides determined by the *SignalP* program (■). Regions containing repeats detected by *Prospero*, but not covered by domains are indicated by ■. Intron positions are indicated with vertical lines showing the intron phase and exact position in AA.

You can save the results of your search for easy access in the future by bookmarking this page. It will be available for one month.

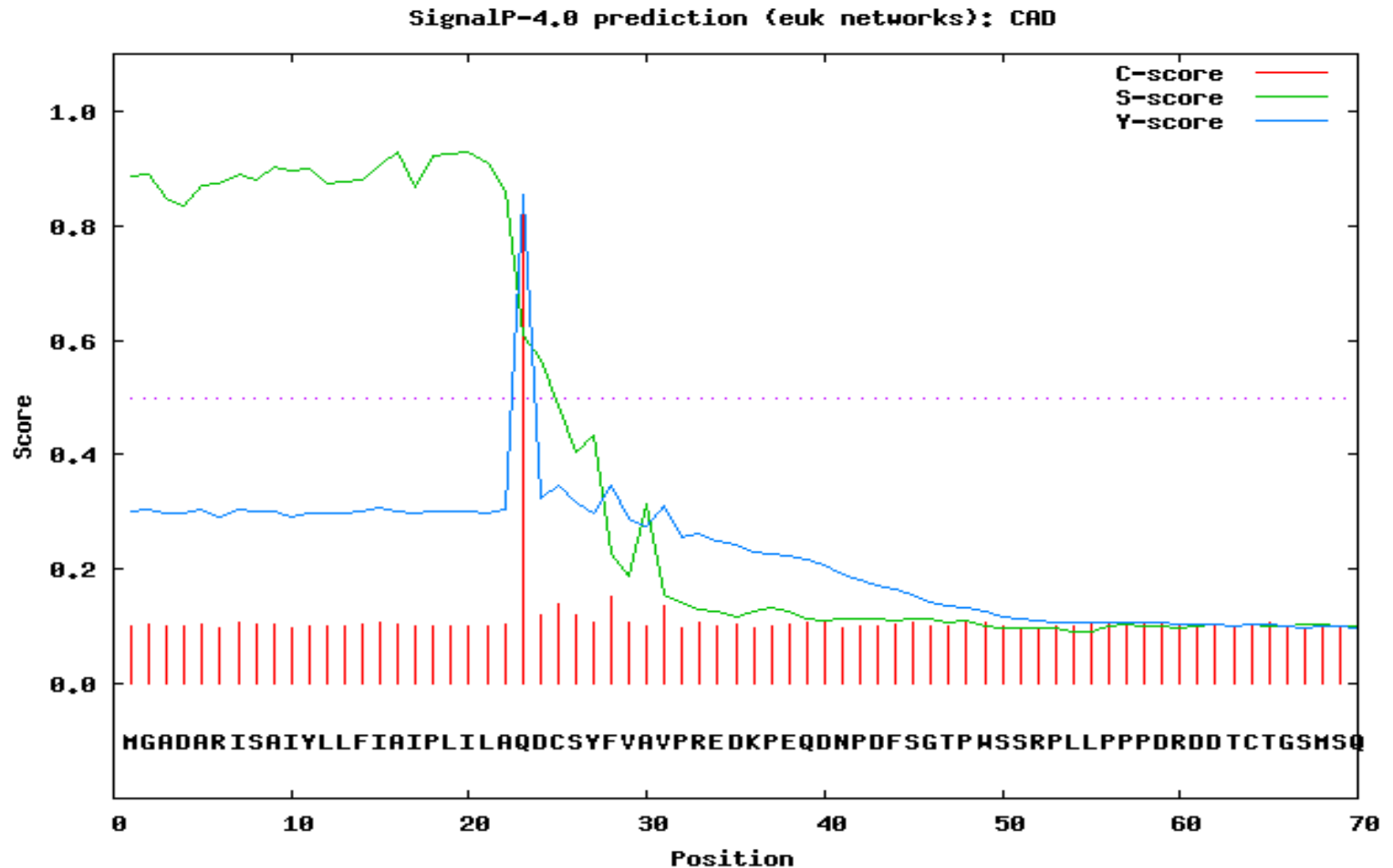
Confidently predicted domains, repeats, motifs and features:

Name	Begin	End	E-value
signal peptide	1	22	-
low complexity	52	62	-
CA	199	288	6.49e-02
CA	309	396	3.34e-12
CA	421	515	2.64e-02
CA	539	620	1.28e-08
CA	645	755	1.20e-02
CA	781	879	2.30e-02
CA	903	998	3.01e-05
CA	1024	1116	2.72e-03
CA	1149	1235	8.31e-02
CA	1266	1345	9.51e-02
CA	1365	1454	2.74e-01
transmembrane	1568	1590	-

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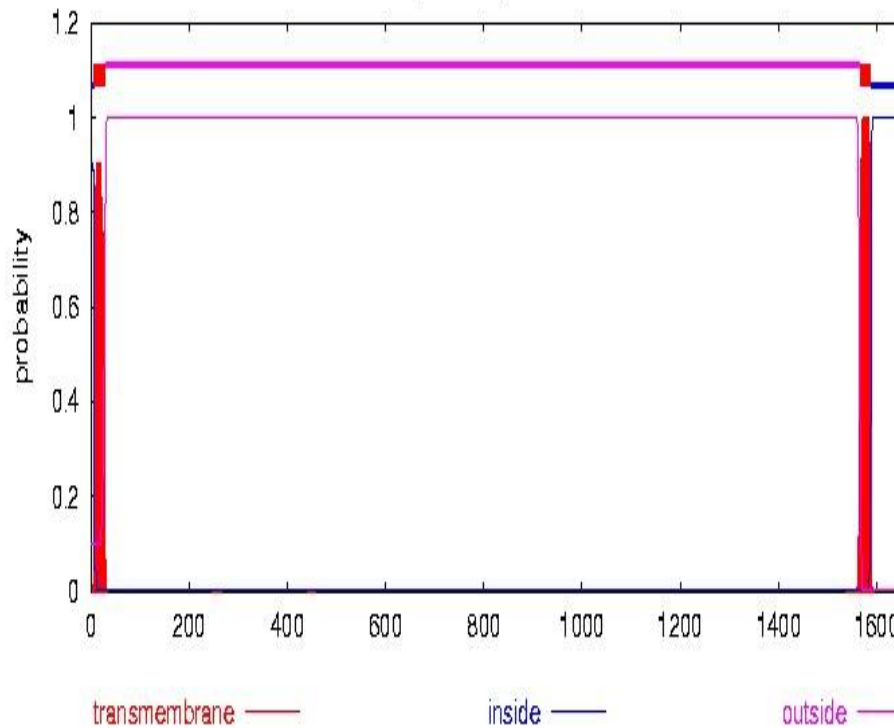
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# 3、Signalp 4.0

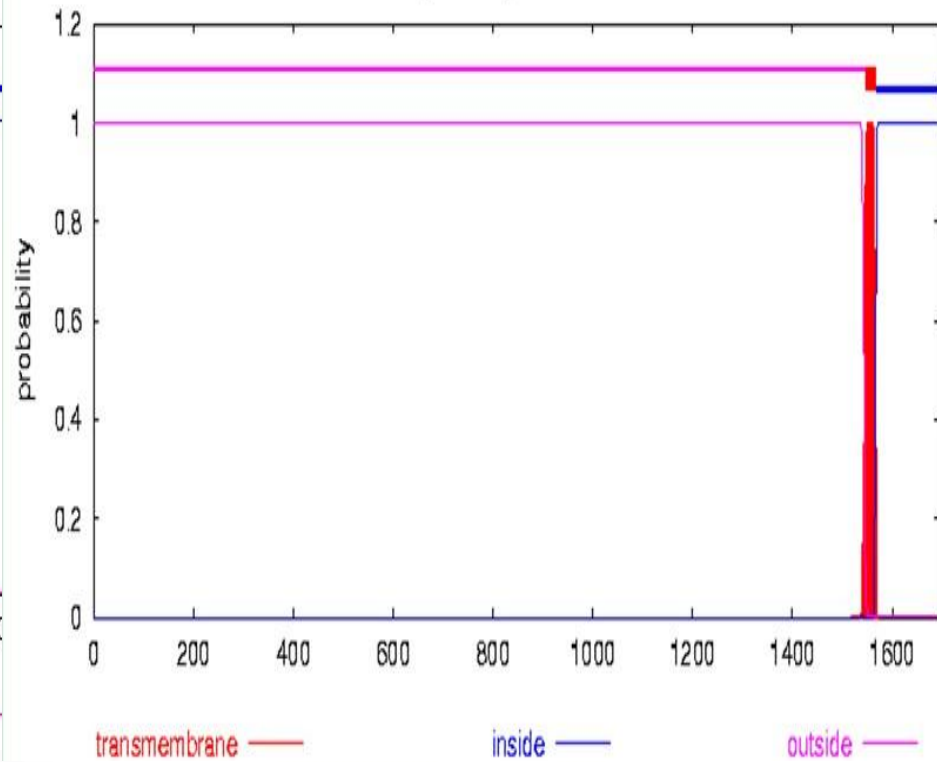


## 4、TMHMM

TMHMM posterior probabilities for CAD



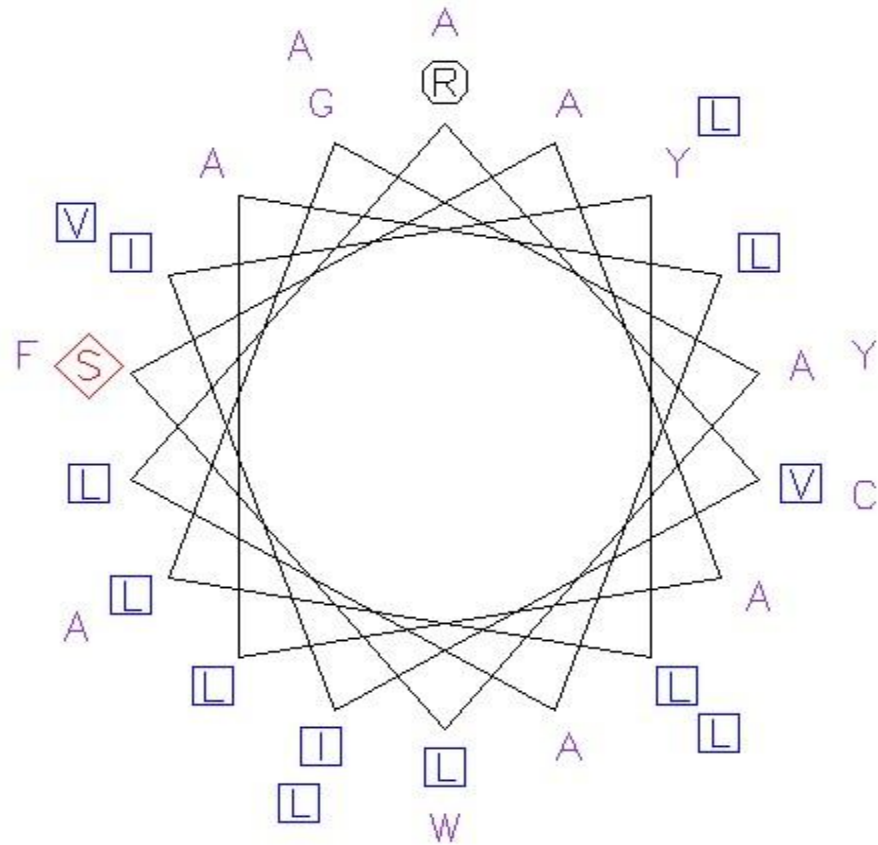
TMHMM posterior probabilities for CAD



# 5、 pepwheel

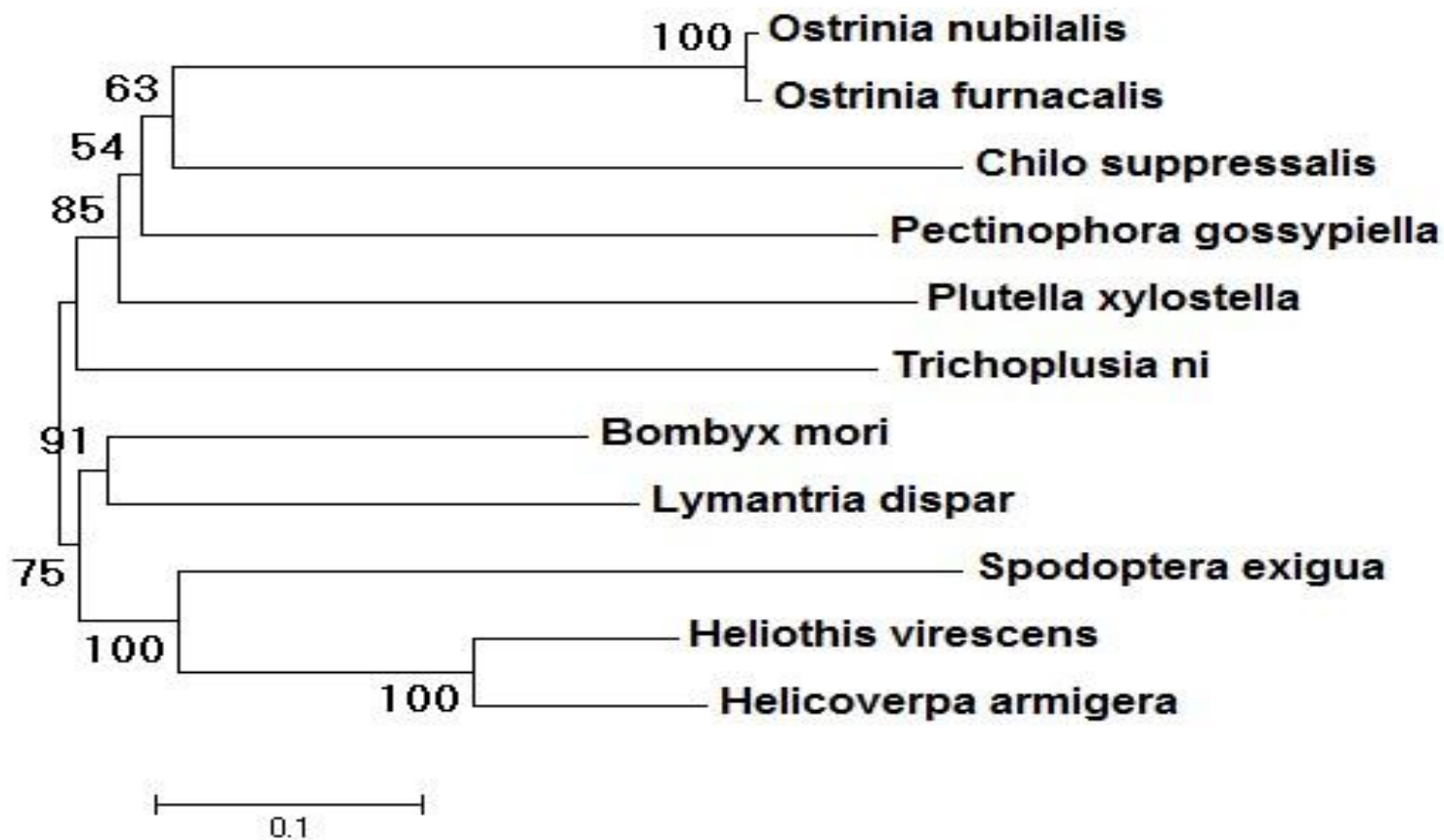
Helical wheel of raw::509443

Fri 17 Feb 2012 21:30:08





# 5、MEGA



# Discussion

- 1、 there are 87 nucleotides and 21 amino acids changed in resistant population Cry1AcR compared to the susceptible population SS.
- 2、 Through the analysis of the structure of genes ,we can find four characteristics:a signal peptide ;11 repeats; a transmembrane ; a Intracellular structure domain.
- 3、 homology comparison analysis furtherly, the gene has more 85% homology than the other CAD of pests.
- 4、 But we need more expirences to find the interaction of Bt and CAD

**Thank you for teacher LUO's teaching**  
**Thank you my team members:**  
**ZhangWenyue ,LiPeirong ,LiuShulin,TangXiaofeng**

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