Interspecific Horizontal Transfer of *Wolbachia* in *Trichogramma wasps*

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- *Wolbachia* is a common and widespread group of bacteria found in reproductive tissues of arthropods. These bacteria are transmitted through the cytoplasm of eggs and have evolved various mechanisms for manipulating reproduction of their hosts. Among them, the thelytokous parthenogenesis of *Trichogramma* induced by *Wolbachia* is expected to be an effective way to improve bio-control efficiency of *Trichogramma* wasps.

MATERIALS

- ***Wolbachia*-doner :** *Trichogramma pretiosum* Riley, thelytokous parthenogenesis. Life period is 11 days.
- ***Wolbachia*-recipient:** *T. confusum* Viggiani, without Wolbachia. Life period is 8 days
- **Host-egg:** eggs of *Corcyra cephalonica* Stainton, irradiated for about 50 min by 30w ultraviolet lamp. Its PCR product of *Wolbachia wsp* gene are negative.

METHODS

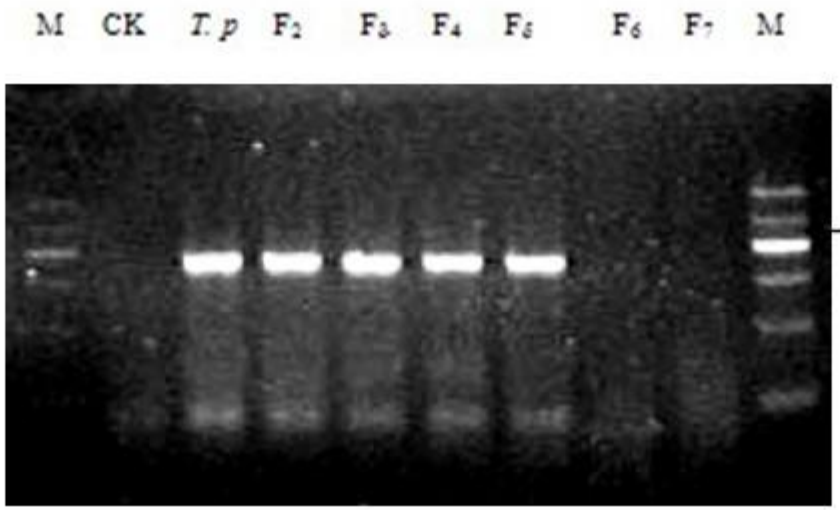
- **Methods of synparasitism:** enough mated females of *T. confusum* for eggs of Corcyra cephalonica Stainton (females :eggs=1 :50);then *T. pretiosum* for the same eggs.
- **Methods of detection:** a. observation of *Wolbachia*-recipient T. confusum reproductive biology for every generation; b. molecular detection of *Wolbachia wsp* gene for every generation. *wsp* 81F: 5'-TGGTCC AATAAG TGA AGA AAC-3', : *wsp* 691R: 5'-AAA AAT TAA ACG CTA CTC CA-3'

RESULTS

- **Observation for every generation.** Among 38870 virgins obtained from synparasitism, there were four virgins *T. confusum* producing both females and males. One virgin female also produced an intersexual individual. Therefore, *Wolbachia* from an infected species, *T. pretiosum*, were successfully transferred into an uninfected species, *T. confusum*.
- **Molecular detection.** *Wolbachia* was detected by PCR of *wsp* gene of *Wolbachia* for up to 5 generations after transferring. PCR product of *Wolbachia wsp* gene turned to be negative after 5 generations. *wsp* gene PCR product of specific amplification in *Wolbachia*-doner is similar to that in *Wolbachia*-recipient.

a b c

a Typical male; b Typical female; cIntersexes



F_2-F_7：第 2-7 代 *Wolbachia* 受体拟澳洲赤眼蜂后代；*T. p*：短管赤眼蜂阳性对照 CK：水阴性对照；M：标准分子量 Marker

F_2-F_7: The second to seventh generation of *Wolbachia*-recipient *T. confusum*;

T. p: *T. pretiosum* as Positive contrast ; CK: *water as* negative contrst; M: Maker

图 1 *Wolbachia* 在受体拟澳洲赤眼蜂后代 *wsp* 基因 PCR 特异性扩增片断

Fig. 1 Specific amplification of *wsp* gene in *Wolbachia*-recipient *T. confusum*

- **Blast results.** Neighbor—Joinning tree based on *Wolbachia wsp* gene. *Wolbachia* we got from *Wolbachia*-doner *T. pretiosum* and *Wolbachia*-recipient *T. confusum* are close to that of *T. pretiosum* from Uruguay in GenBank, belonging to Sib of group B.

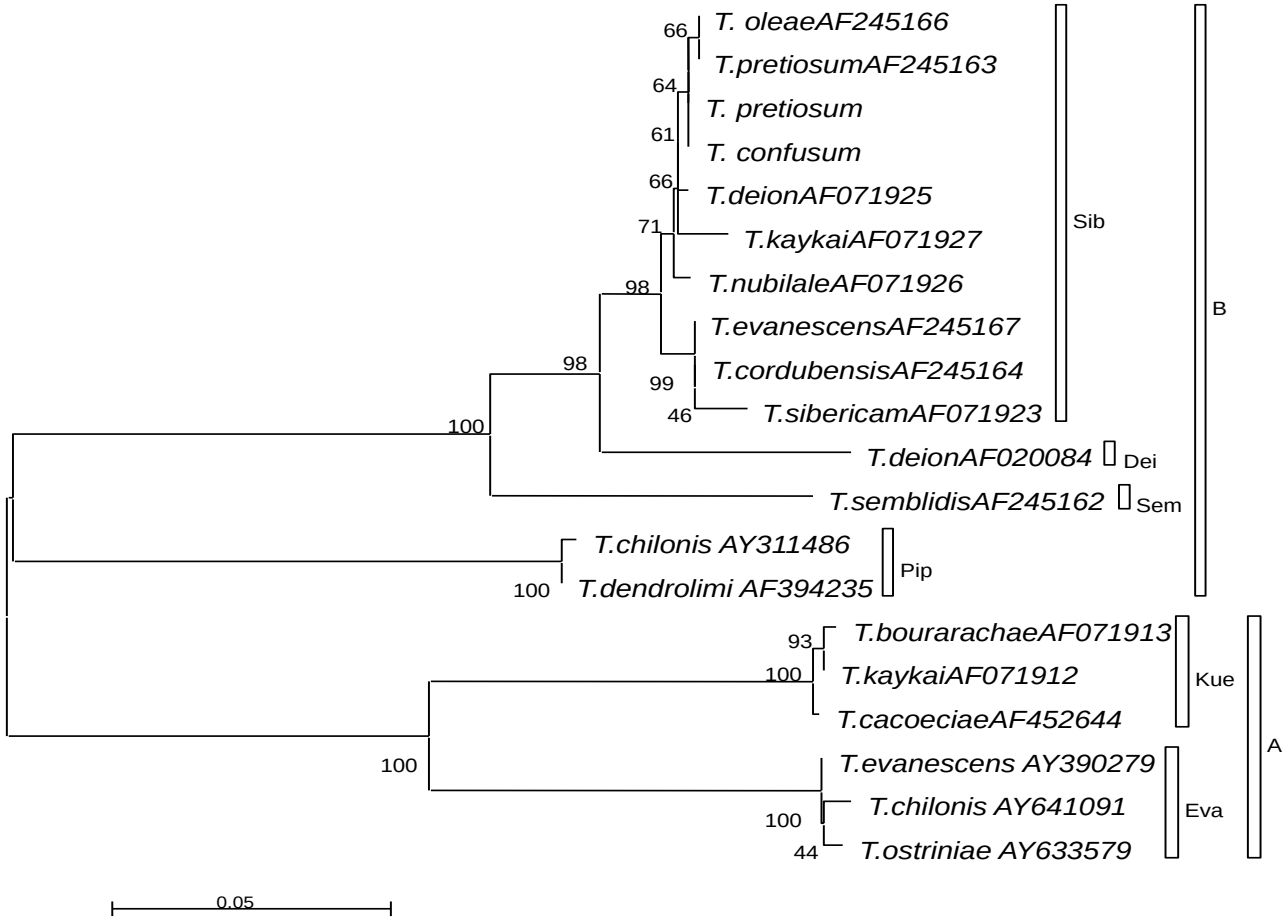


Fig. 2 NJ tree based on *Wolbachia wsp* gene in *Trichogramma*

DISCUSSION

- interspecific horizontal transfer of *Wolbachia* between *Trichogramma* wasps was proved successful. One virgin female also produced an intersexual individual. Eggs of Corcyra cephalonica are small. Usually there is one survival wasp in one egg, sometimes two wasps. Synparasitism of *T. confusum* and *T. pretiosum* on one egg might result in death of *T. pretiosum*, then absorbed by *T. confusum*. Consequently nterspecific horizontal transfer of *Wolbachia* happened. The conclusion need more studying.

- PCR product in *Wolbachia*-recipient *T. confusum* turned to be negative after 5 generations. The ability of vertical transfer of *Wolbachia* in new hosts, *T. confusum*, decreased with increasing transfer generations. We deduced that *Wolbachia* in new hosts has instability.

Effects of *Wolbachia* on its' new host were also studied in another paper (published).

- Effect ofWolbachia infection on longevity, fecundity and olfactory response of T. confusum(Hymenoptera: Trichogrammatidae).

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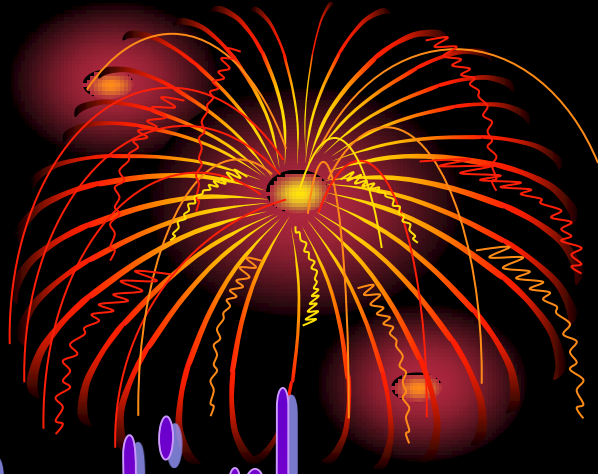

. Thank you for your attention!