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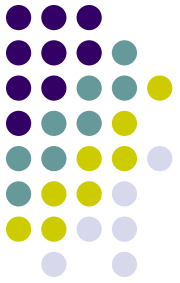


# Fertility life-table construction of different European strains of *Trichogramma aurosum* Sugonjaev & Sorokina (Hymenoptera: Trichogrammatidae)



**Samara R.Y., Monje J.C. & Zebitz C.P.W.**

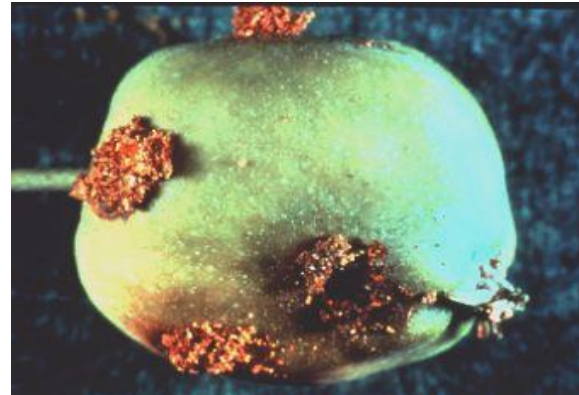
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# INTRODUCTION



# Codling moth, *Cydia pomonella* L. (Lepidoptera: Tortricidae)





### Control methods :

- Chemical control using insecticides,
- Mating disruption technique,
- Sterile male technique,
- Biological control using natural enemies.

*T. platneri*, *T. minutum*, *T. dendrolimi*, and *T. cacoeciae*.



*T. aurosum* occurs in North America and in Europe  
Collected in Germany in 2000 on *Nematus tibialis*.  
In the USA and in the former Soviet Union on *C.*  
*pomonella*

- World wide almost no work has been done on the biology and ecology of this *Trichogramma* species.

### **Aims:**

Select an appropriate strain among seven European strains of *T. aurosum* by:

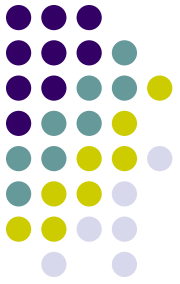
Comparing life table characteristics,

Parasitization potential,

Population growth parameters.



# MATERIALS AND METHODS



Code	collection places	latitude	longitude	Year
Ta4	Germany: BaWü, Stuttgart, Plieningen	48°42 North	9°13 East	July 2001
Ta22	Austria: Vienna, Schönbrunn castle	48° 11 North	16° 18 East	July 2003
Ta27	Luxembourg, Luxembourg, Corniche	49° 36 North	6° 07 East	July 2003
Ta28	Belgium, Brussels, Hallepoort, Hallepootlaan	50° 50 North	4° 21 East	July 2003
Ta30	France, Paris, Quai de Orsay	48° 42 North	2° 10 East	August 2003
Ta33	Netherlands, Amsterdam, Laagte Kadijk, Center	52° 22 North	4° 53 East	August 2003
Ta34	Denmark, Copenhagen, Vodroffs Tvaegrage	55° 41 North	12° 34 East	August 2003

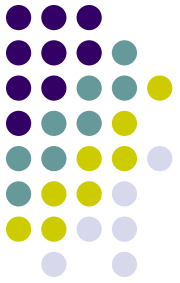




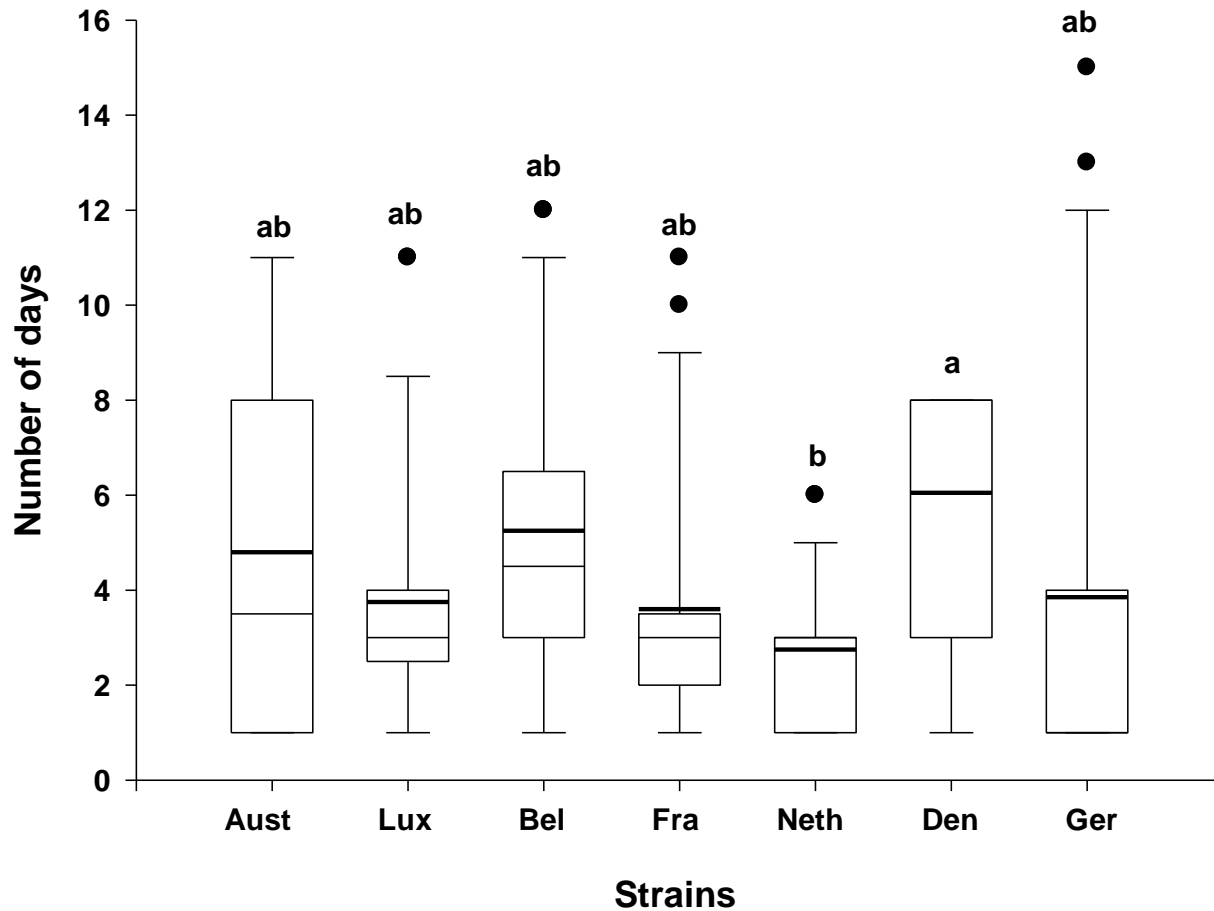


- 24 hours old mated females
- 50 *E. kuehniella* eggs
- Daily fresh eggs
- At 25°C, 80%RH, 16:8 L:D





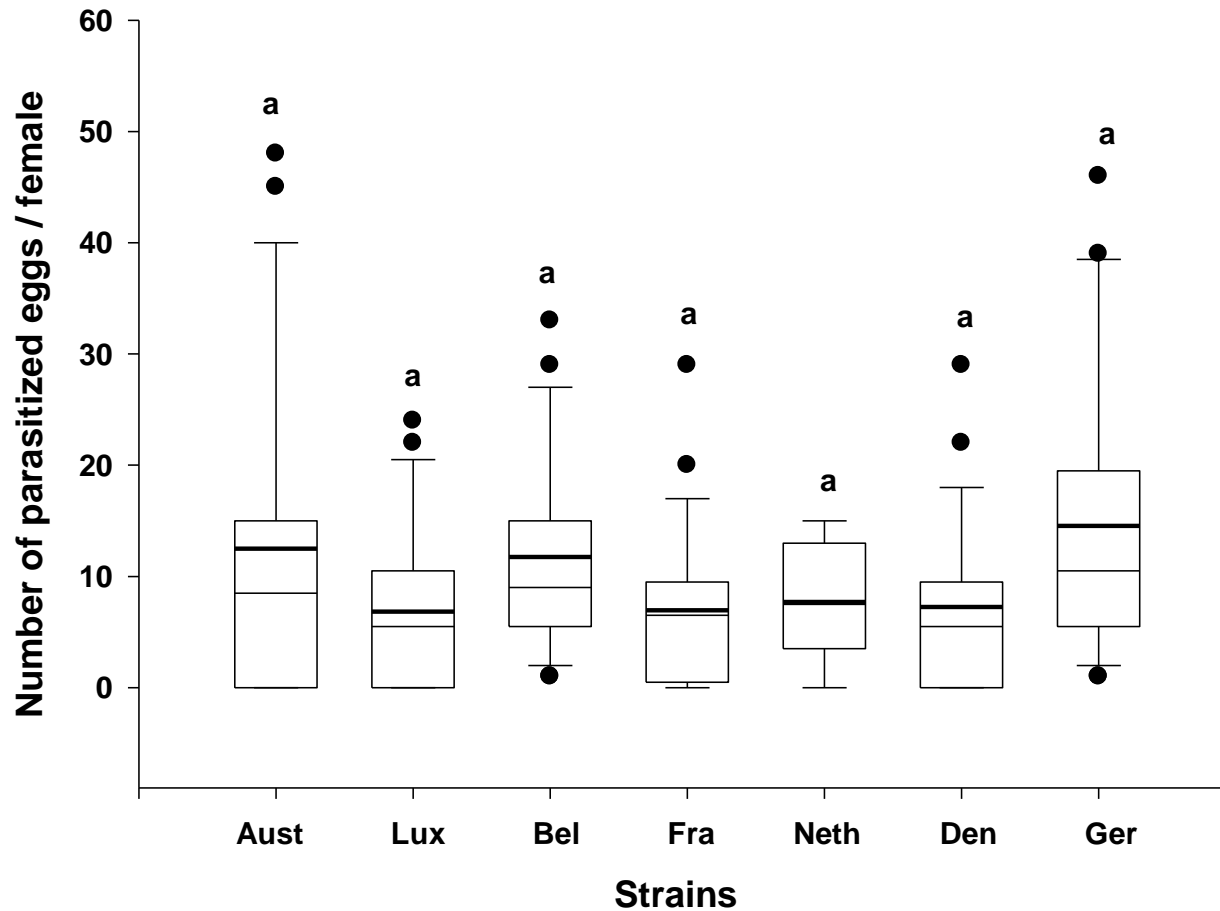
# RESULTS



**Figure 1. Longevity of the female wasps of the different strains (n = 20)**

Log transformed data were used for the mean values

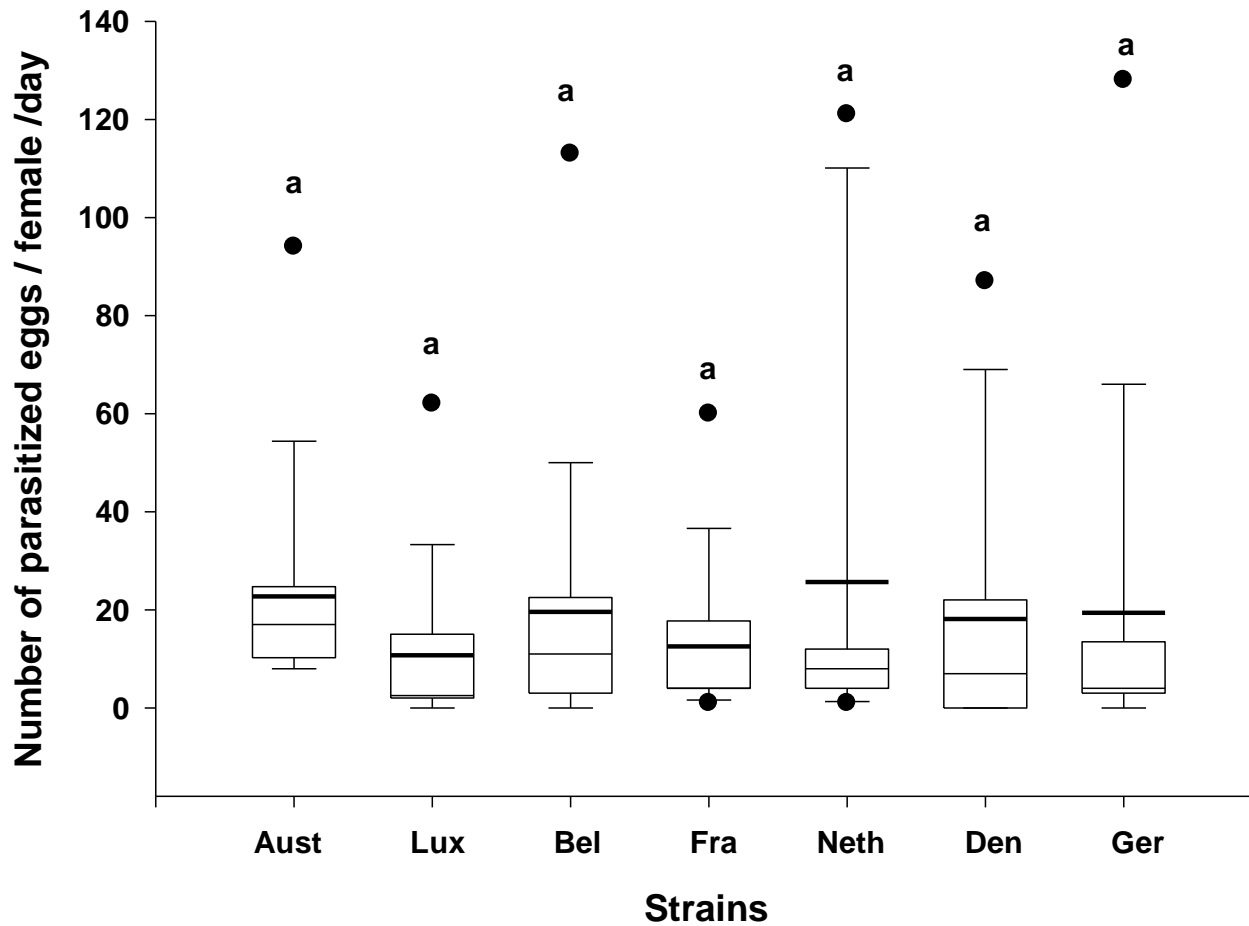
means followed by the same letter are not significantly different ( $P > 0.05$ , Student Newman Keuls (SNK) test)



**Figure 2. Fecundity of the female wasps of the different strains (n = 20)**

Log transformed data were used for the mean values

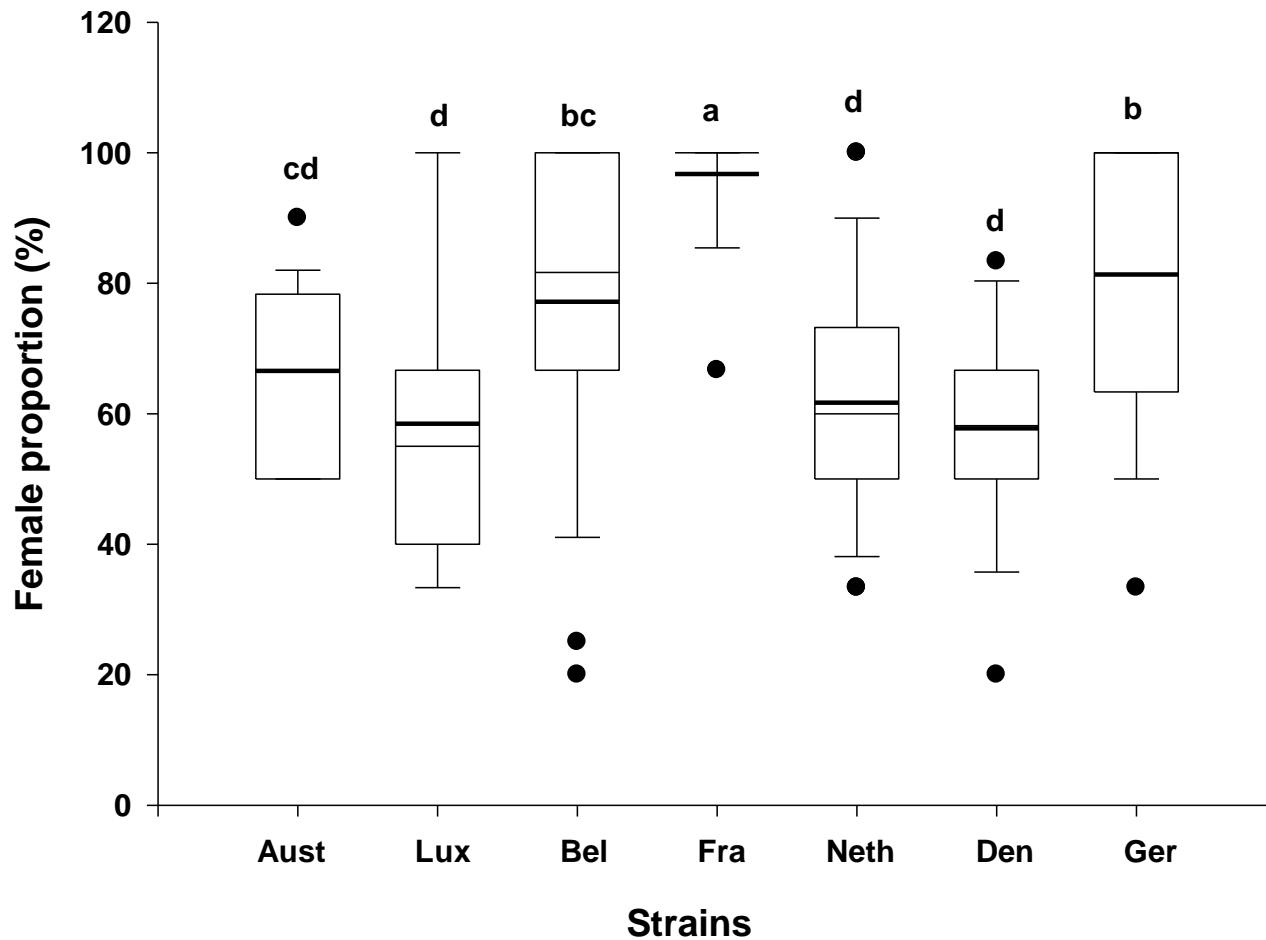
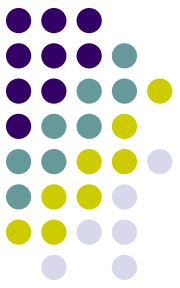
means followed by the same letter are not significantly different ( $P > 0.05$ , Student Newman Keuls (SNK) test)



**Figure 3. Life time fecundity of the female wasps of the different strains (n = 20)**

Log transformed data were used for the mean values

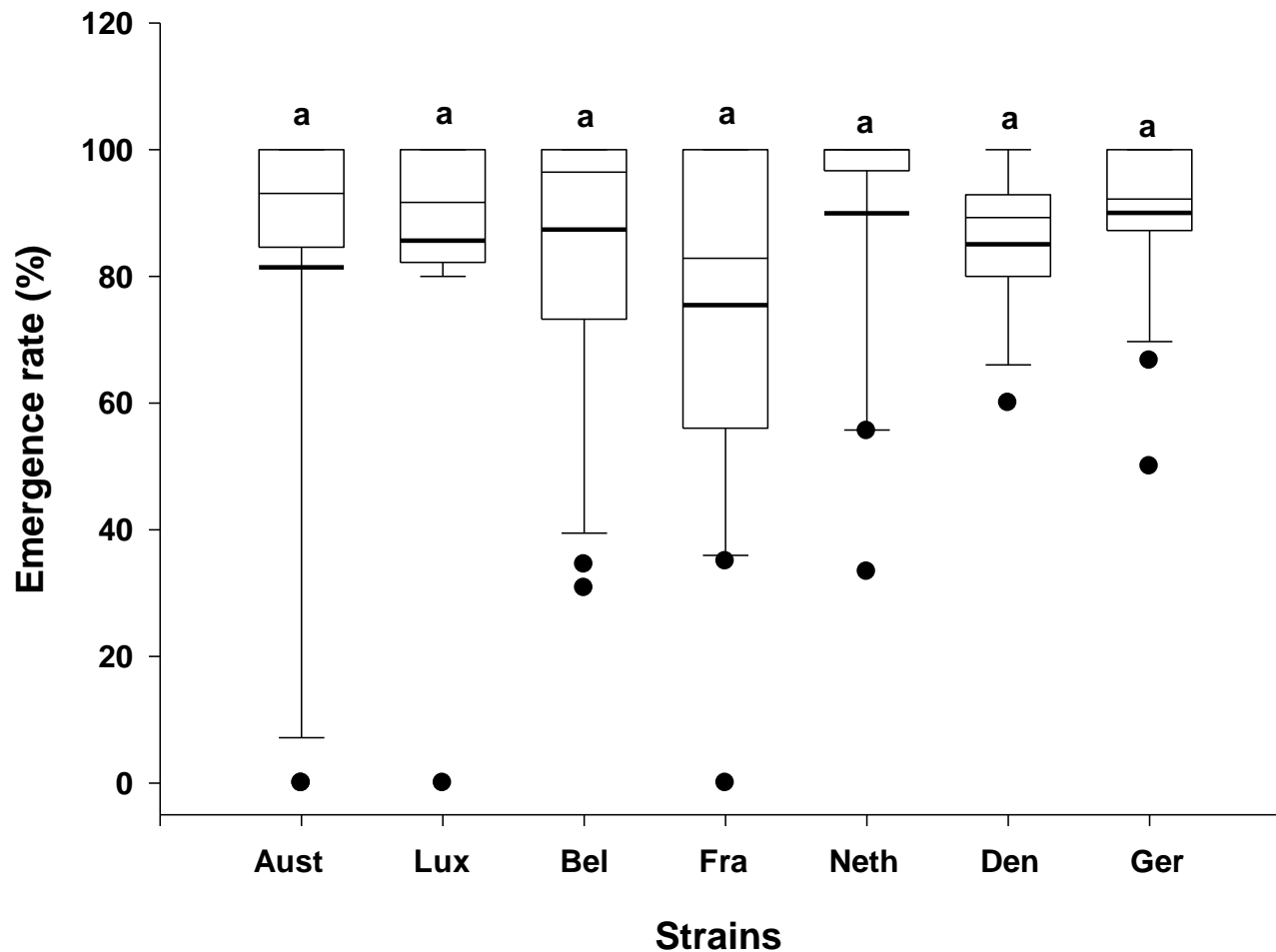
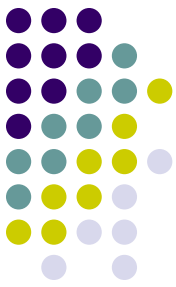
means followed by the same letter are not significantly different ( $P > 0.05$ , Student Newman Keuls (SNK) test)



**Figure 4. Sex ratio of the female wasps of the different strains (n = 20)**

Arcsine transformed data were used for the mean proportion.

means followed by the same letter are not significantly different ( $P > 0.05$ , Student Newman Keuls (SNK) test)

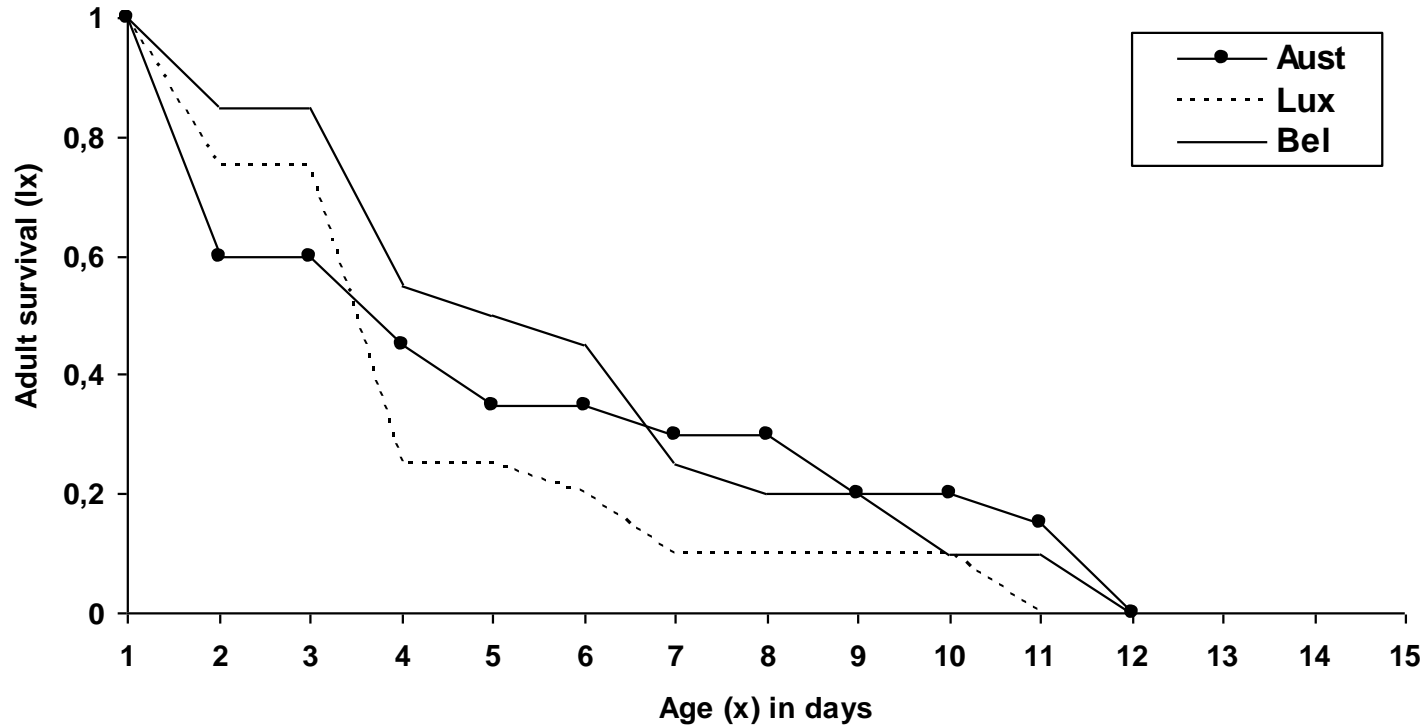


**Figure 5. Emergence rate of the female wasps of the different strains (n = 20)**

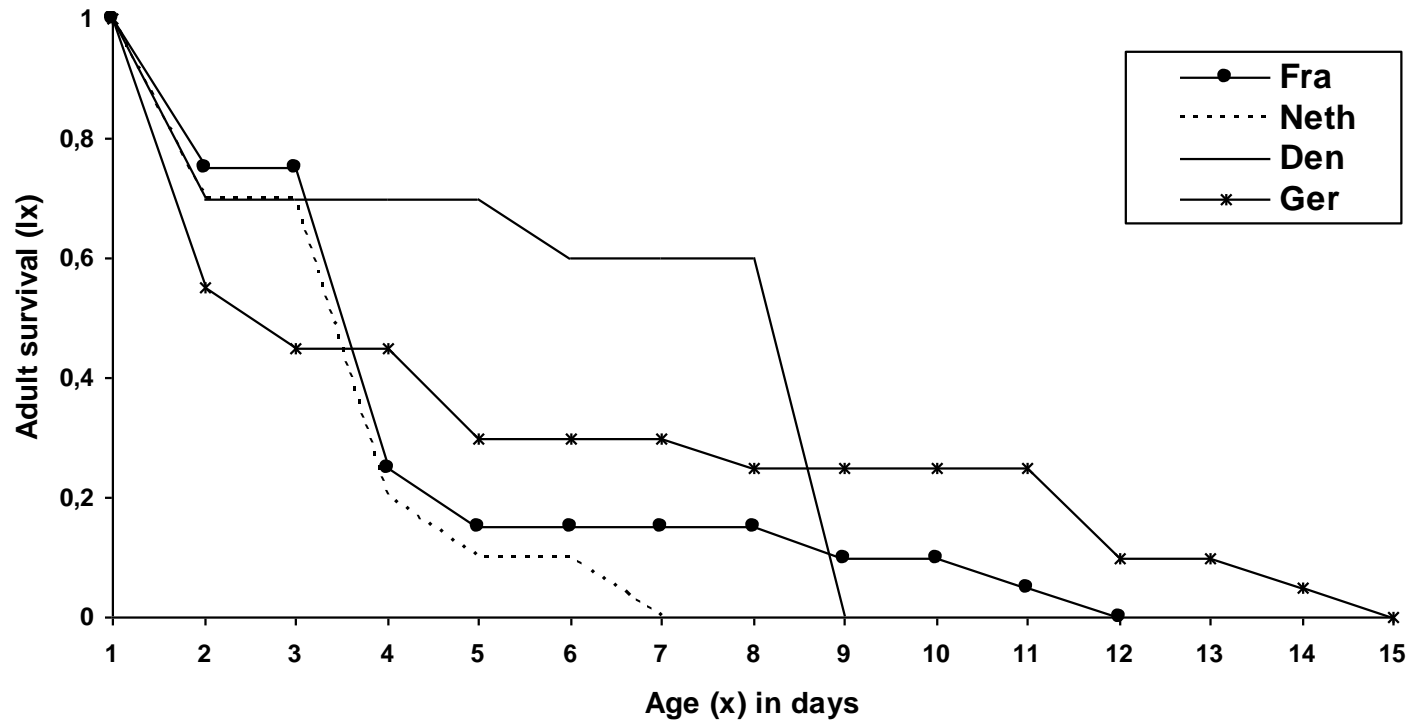
Arcsine transformed data were used for the mean proportion.

means followed by the same letter are not significantly different ( $P > 0.05$ , Student Newman Keuls (SNK) test)





**Figure 6. Age specific survival ( $l_x$ ) of Austria, Luxemburg, Belgium strains.**



**Figure 6. Age specific survival ( $l_x$ ) of France, Netherlands, Denmark, Germany strains.**

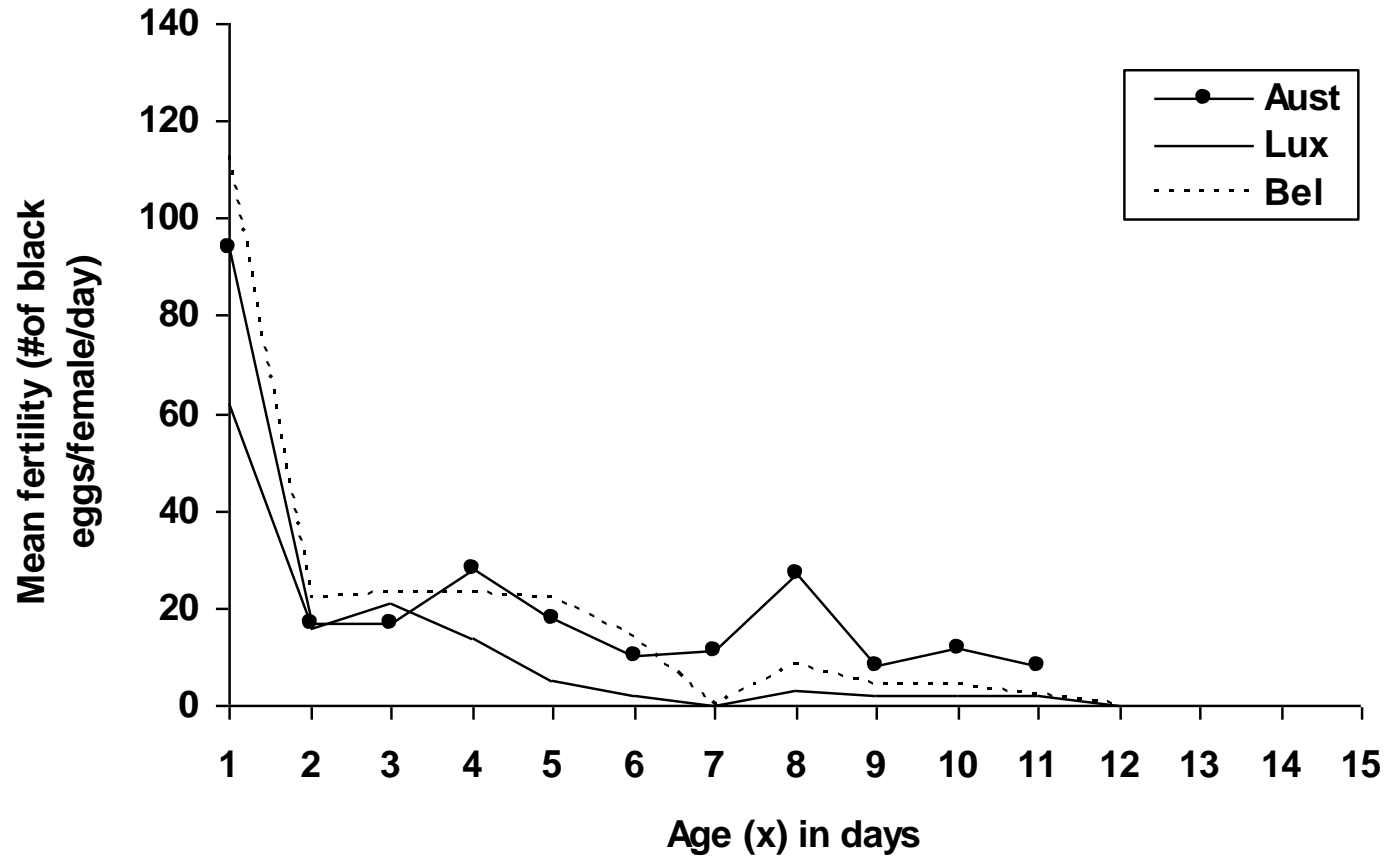
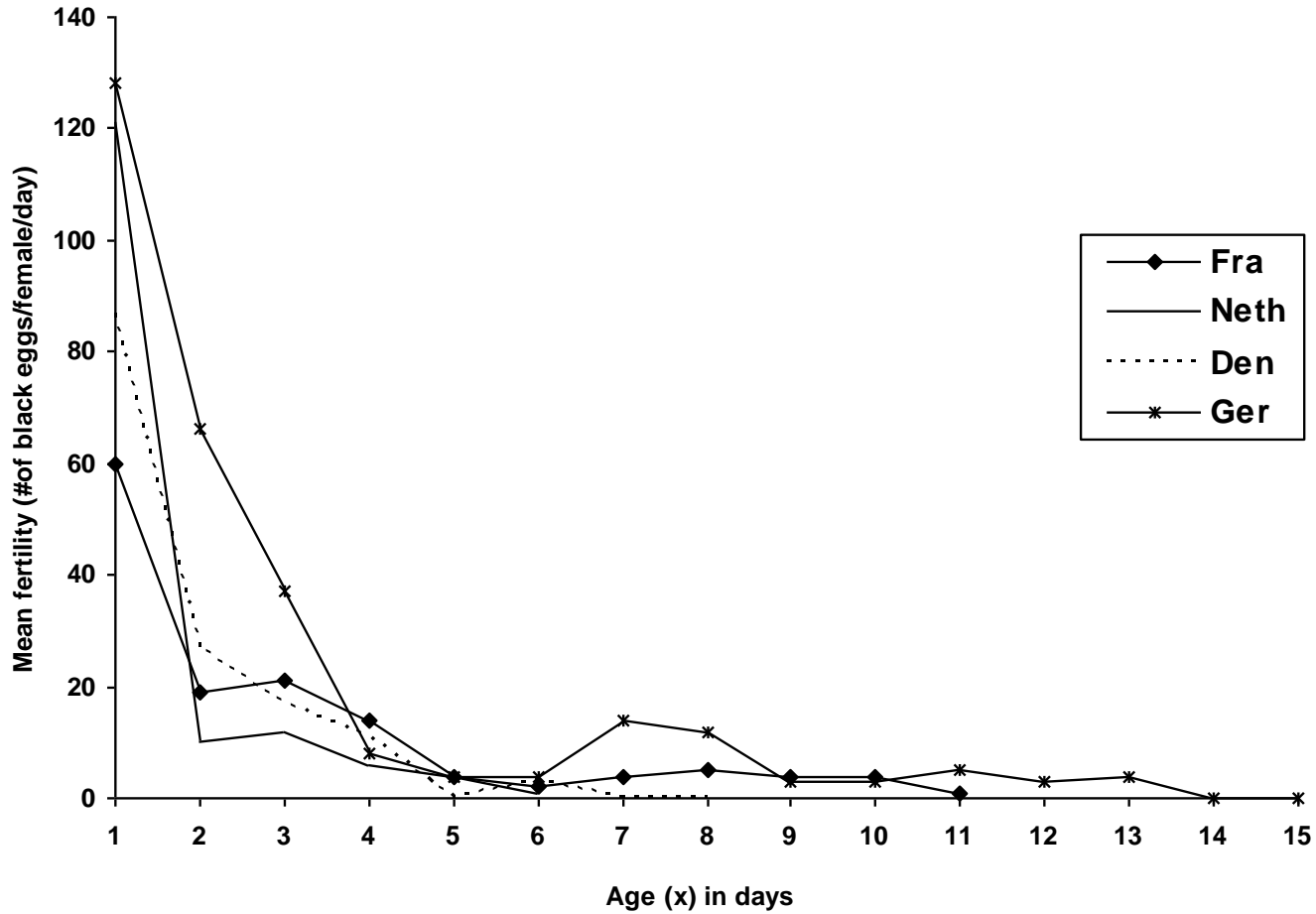
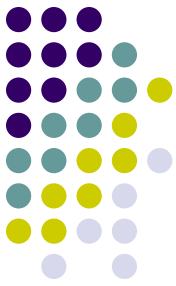
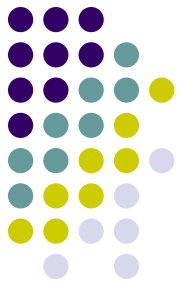


Figure 7. Age specific life time fertility of Austria, Luxemburg, Belgium strains.

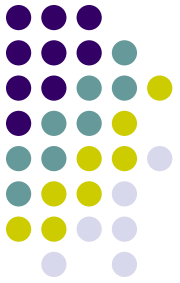


**Figure 8. Age specific life time fertility of France, Netherlands, Denmark, Germany strains.**



**Table 1. Life table parameters of the seven *T. aurosum* strains.  $R_0$ = net reproductive rate,  $T_c$ = cohort generation time (days),  $r_m$ = intrinsic rate of increase,  $\lambda$ = finite capacity for increase,  $D_t$ = doubling time (days) (n = 20).**

<b>Code</b>	<b><math>R_0</math></b>	<b><math>T_c</math></b>	<b><math>r_m</math></b>	<b><math>\lambda</math></b>	<b><math>D_t</math></b>
<b>Aust</b>	<b>12.500</b>	<b>4.056</b>	<b>0.623</b>	<b>1.864</b>	<b>1.113</b>
<b>Lux</b>	<b>6.350</b>	<b>2.457</b>	<b>0.752</b>	<b>2.122</b>	<b>0.921</b>
<b>Bel</b>	<b>11.750</b>	<b>2.868</b>	<b>0.859</b>	<b>2.361</b>	<b>0.807</b>
<b>Fra</b>	<b>6.900</b>	<b>2.928</b>	<b>0.660</b>	<b>1.934</b>	<b>1.051</b>
<b>Neth</b>	<b>7.700</b>	<b>1.474</b>	<b>1.385</b>	<b>3.994</b>	<b>0.501</b>
<b>Den</b>	<b>7.250</b>	<b>1.752</b>	<b>1.131</b>	<b>3.098</b>	<b>0.613</b>
<b>Ger</b>	<b>14.550</b>	<b>2.890</b>	<b>0.926</b>	<b>2.526</b>	<b>0.748</b>



# CONCLUSIONS



1. The average number of progeny per female, lifetime fecundity and emergence rate did not differ significantly between the seven parasitoid strains.
2. Female longevity and female proportion differed significantly between the seven parasitoid strains.
3. The Danish strain survived the longest (6.05 days) and the Netherlands strain survived the shortest (2.75 days).
4. Sex ratio was always female-biased (57.76 – 96.72%).



5. Survival rates started to decrease rapidly after the second and the third day.
6. The Netherlands strain had good potential, including a high net reproduction rate ( $R_0=7.770$  female), a high intrinsic rate of natural increase ( $r_m= 1.385$ ), a high finite rate of increase ( $\lambda=3.994$  days) and a short population doubling time ( $D_t=0.501$  days).
7. Further experiments on the effect of constant and fluctuating temperature on its biological characteristics, parasitization behaviour and dispersal.





- ❖ *DFG for financing the field collection*
- ❖ *Entomology team*

*Thank you for your attention*

