

Morphometrical study of parasitic bee mite *varroa destructor* (Acari: Varroidae) in Algeria

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INTRODUCTION

The apiculture is an important factor in the Algerian agricultural development, in particular, in the crossing pollination of numerous plants and the honey production. Honeybee constitutes a very important ecological index of the environment but like all animals, honeybee can be affected by various and serious diseases. More particularly, the varosis is an illness caused by an ectoparasitic, which was observed in Algeria in 1981; represent the most serious threat for apiarian production.

This work is for the purpose of identifying the parasitic bee in Algeria by the biometric study, which confirms that is *Varroa destructor* (Acari: Varroidae) as being parasitic of *Apis mellifera intermissa* L. (Hymenoptera: Apidae).

MATERIALS & METHODS

It's due to the morphometrical studies and the using of molecular markers, two species of *varroa*, were illustrated: *Jacobsoni* with nine haplotypes which affect mostly *Apis cerana* and *destructor* with six haplotypes which affect *Apis mellifera* and also *Apis cerana*.

Concerning our biometrical studies, we had measured twelve morphometrical characters. Those measurements were done on a group of twenty parasites taken randomly in diverse colonies in the region of El-Tarf (the northeastern of Algeria) and the region of Biskra (southern of Algeria) in order to identify the species which affect the Algerian honeybees.



Figure 1: Algerian map

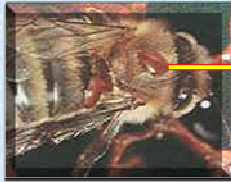


Figure 2: Honeybee affected by a Varroa destructor.

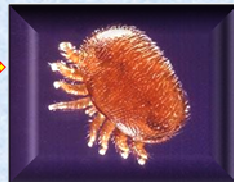


Figure 3: Varroa destructor.

The twelve morphometrical characters :

1. Length and width of the body
2. Length and width of the scutum genito-crural
3. Length and width of the scutum left metapodal
4. Length and width of the scutum right metapodal
5. Length and width of the scutum anal
6. Length and width of the coxa
7. Length and width of the trochanter
8. Length and width of the femur
9. Length and width of the knee
10. Length and width of the tibia
11. Length and width of the tarsus
12. Length and width of the suction pad

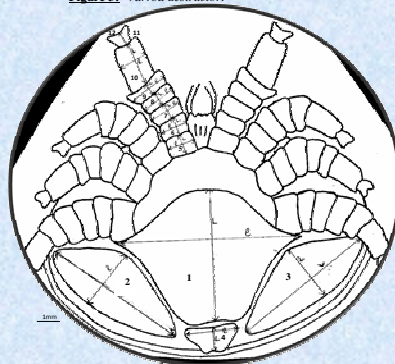


Figure 4: Diagram of the 12 biometrical parameters measured from a *V. destructor*.

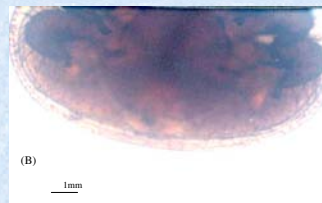


Figure 6: Ventral surfaces (A) (G.x35) and dorsal surface (B) (G.x35) of adult females of *V. destructor*.

RESULTS

The biometrical study of this parasite shows that he has an oval form contrary of the *Jacobsoni* form which is spherical; also he has a length of (1.132±0.085 mm) and a width of (1.685±0.071mm), those results are accorded by several works in 1998 by Anderson and also in 1982 by Tewardson.

The following tables represent the length and width of the body of the parasite also the lengths and widths of the different scutum and the articles of the 1st, the 2nd, the 3rd and the 4th pair of leg.

Table 1. Length of the Body and the scutum (m ± sd, n = 10)

Length	n	m (mm)	sd (mm)	Xmin(mm)-Xmax(mm)
Body	10	1,2	0,038	1,160 -- 1,280
Scutum genito-crural	10	0,761	0,02	0,715 -- 0,780
Scutum left metapodal	10	0,739	0,05	0,611 -- 0,780
Scutum Right metapodal	10	0,777	0,028	0,715 -- 0,806
Scutum anal	10	0,133	0,01	0,260 -- 0,299

Table 2. Width of the body and the scutum (m ± sd, n = 10)

Width	n	m (mm)	sd (mm)	min(mm)-Xmax(mm)
Body	10	1,776	0,047	1,660 -- 1,800
Scutum genito-crural	10	0,605	0,034	0,546 -- 0,637
Scutum left metapodal	10	0,312	0,017	0,286 -- 0,325
Scutum right metapodal	10	0,319	0,028	0,260 -- 0,351
Scutum anal	10	0,280	0,014	0,117 -- 0,156

Table 3. Length and width of the 1st pair of leg (m ± sd, n = 14 - 17)

Articles	n	Length (mm)			Width (mm)		
		m	sd	Xmin-Xmax	m	sd	Xmin-Xmax
Coxa	14	0,143	0,02	0,078 -- 0,169	0,248	0,041	0,130 -- 0,286
Trochanter	17	0,104	0,023	0,078 -- 0,156	0,180	0,036	0,130 -- 0,247
Femur	17	0,113	0,018	0,078 -- 0,156	0,178	0,032	0,143 -- 0,234
Knee	17	0,061	0,010	0,052 -- 0,078	0,195	0,012	0,182 -- 0,222
Tibia	17	0,063	0,008	0,052 -- 0,078	1,173	0,012	0,156 -- 0,195
Tarsus	17	0,182	0,021	0,130 -- 0,208	0,124	0,011	0,104 -- 0,221
Suction pad	15	0,068	0,026	0,039 -- 0,091			

Table 4. Length and width of the 2nd pair of leg (m ± sd, n = 13 - 14)

Articles	n	Length (mm)			width (mm)		
		m	s	Xmin-Xmax	m	s	Xmin-Xmax
Coxa	14	0,156	0,028	0,091 -- 0,195	0,282	0,045	0,169 -- 0,325
Trochanter	14	0,105	0,018	0,091 -- 0,143	0,201	0,053	0,078 -- 0,294
Femur	14	0,118	0,016	0,078 -- 0,134	0,197	0,031	0,143 -- 0,247
Genou	14	0,067	0,012	0,052 -- 0,104	0,221	0,024	0,182 -- 0,260
Tibia	14	0,064	0,006	0,052 -- 0,065	0,200	0,022	0,143 -- 0,234
Tarsus	14	0,195	0,009	0,182 -- 0,202	0,131	0,012	0,117 -- 0,156
Suction pad	13	0,075	0,024	0,052 -- 0,091			

Table 5. Length and width of the 3rd pair of leg (m ± sd, n = 15 - 20)

Articles	N	Length (mm)			Width (mm)		
		m	sd	Xmin-Xmax	m	sd	Xmin-Xmax
Coxa	15	0,175	0,033	0,130 -- 0,267	0,246	0,086	0,117 -- 0,338
Trochanter	19	0,145	0,028	0,078 -- 0,195	0,227	0,032	0,156 -- 0,260
Femur	20	0,142	0,038	0,078 -- 0,195	0,225	0,027	0,130 -- 0,247
Knee	20	0,095	0,023	0,065 -- 0,143	0,226	0,021	0,195 -- 0,273
Tibia	20	0,085	0,021	0,052 -- 0,130	1,193	0,030	0,145 -- 0,247
Tarsus	20	0,179	0,039	0,117 -- 0,242	0,152	0,055	0,091 -- 0,325
Suction pad	17	0,081	0,012	0,052 -- 0,091			

Table 6: Length and width of the 4th pair of leg (m ± sd, n = 14 - 17)

Articles	n	Length (mm)			Width (mm)		
		m	sd	Xmin-Xmax	m	sd	Xmin-Xmax
Coxa	14	0,140	0,040	0,052 -- 0,195	0,271	0,078	0,130 -- 0,338
Trochanter	16	0,128	0,032	0,065 -- 0,195	0,240	0,053	0,117 -- 0,312
Femur	17	0,140	0,047	0,052 -- 0,185	0,227	0,029	0,273 -- 0,182
Knee	17	0,088	0,019	0,052 -- 0,117	0,234	0,019	0,208 -- 0,247
Tibia	17	0,084	0,019	0,052 -- 0,117	1,201	0,026	0,156 -- 0,234
Tarsus	17	0,172	0,032	0,130 -- 0,234	0,128	0,025	0,078 -- 0,208
suction pad	16	0,070	0,015	0,039 -- 0,091			

CONCLUSION & PERSPECTIVES

This biometrical study recently shows that the *Varroa destructor* is the ectoparasitic responsible of varosis in the Algerian bee *Apis mellifera intermissa* L., because they thought before, that *Varroa jacobsoni* Oudemans is the parasite of the Algerian bee. The *Varroa destructor* provokes in the bee a decrease of proteins and carbohydrates and a malformation of some appendix which cause a lot of illness.

It would be interesting in the future knowing the genetic structure of the population of the *V. destructor*, which permit for us understanding the modalities of their invasion in the colonies of bees.