A preliminary note on the relationship between the number of adult *Prays oleae* Bern. caught in pheromone traps and the resulting level of infestation

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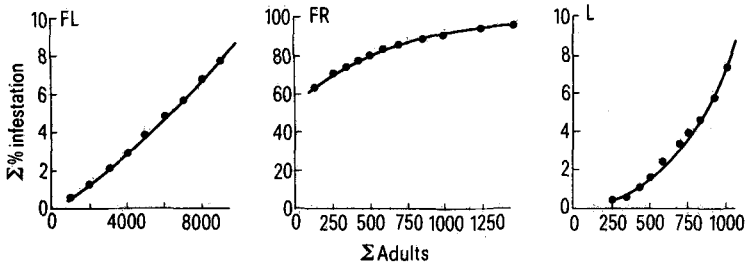
Summary. Preliminary studies in Granada, Spain, have shown a highly significant correlation between the number of adult male *Prays oleae* caught in pheromone traps and the resulting level of infestation in all the 3 annual generations of this species.

Population studies on *Prays oleae* Bern. (Lep. Hyponomeutidae) have been carried out in Granada, Southern Spain, since 1970 and the possibility of using the sex pheromone for monitoring this species has recently been investigated with a view to using the information collected for integrated control[2,3]. During 1980, studies were carried out to investigate the relationship between the number of adults caught in traps baited with the sex pheromone (Z-7-tetradecenal) and the level of infestation which is subsequently recorded on the various organs of the olive tree which are attacked by the 3 annual generations. Oviposition on the flowers (April/June), the fruits (June/July) and the leaves (October/November) was used as an indicator of the level of infestation. 5 delta traps were placed at random within the area studied but with at least 50 m between each trap. Samples of the appropriate parts of the trees were taken from 10 trees at random and the traps inspected every 5–7 days[4], according to recommendations given concerning the methodology for the study and uses of *P. oleae* pheromone for population monitoring (FAO, European Cooperative Network on Olive, Subnetwork on Olive Protection, Chania 1978 and Tunis 1980).

At the end of the 3 generations a total of 243,269 flowers (=2345 eggs), 5943 fruits (=29,943 eggs) and 88,780 leaves (=943 eggs) had been observed; with a corresponding capture of 17,056 adults over the same period.



Exponential regression curves of Σ adults captured/trap and Σ% of infestation, in *Prays oleae*, during flower, fruit and leaf-generations.

Experimental data and statistical analysis.

Flower Date	Σ adults	Σ% infestation	Fruit Date	Σadults	Σ% infestation	Leaf Date	Σadults	Σ% infestation
29/IV	362.2	0.14	21/VI	17.2	46.20	5/X	176.6	0.19
7/V	664.5	0.38	23/VI	158.8	60.64	10/X	207.8	0.27
11/V	975.9	0.49	27/VI	362.8	73.05	15/X	257.4	0.39
14/V	1094.1	0.49	30/VI	517.0	78.92	20/X	270.6	0.44
18/V	1328.3	0.66	2/VII	667.8	82.67	25/X	320.2	0.50
22/V	1429.9	0.83	5/VII	912.4	83.85	30/X	337.6	0.53
27/V	1613.1	0.87	8/VII	1108.8	87.96	4/XI	353.8	0.72
31/V	1660.1	0.89	11/VII	1141.0	89.51	9/XI	364.6	0.85
6/VI	1700.5	0.88	14/VII	1153.4	90.62	14/XI	370.4	0.92
9/VI	1713.5	0.86	17/VII	1157.2	91.49	19/XI	373.2	0.96
			21/VII	1157.6	91.97	24/XI	374.4	1.02
						29/XI	376.0	1.06

Generation	r	Eq	ȳ	FL
Flower	0.9853 (p=0.001)	$y=0.0002\,x^{1.16}$	0.65	±0.09
Fruit	0.9927 (p=0.001)	$y=27.94\,x^{0.17}$	79.72	±3.45
Leaf	0.9697 (p=0.001)	$y=2.78\cdot10^{-6}\,x^{2.14}$	0.65	±0.15

r = exponential regression coefficient; y = Σ% of infestation;
Eq = exponential regression equation; x = Σ adults captures per trap;
ȳ = mean of % infestation; FL = fiducial limits.

Although the data presented are for 1 season only, there is a very strong correlation (p=0.001) in all the 3 generations between the number of adults caught per trap and the exponent of resulting percentage of infestation in the area studied.

The results of regression analysis carried out on the data obtained are shown in the table and graphically in the figure.

The curves (fig.) corresponding to the flower and leaf-generations (FL and L, respectively) allow us, knowing the number of adults captured, to anticipate the level of infestation on the respective vegetative stages of the tree, which are normally low in both cases in the area. However, during the fruit-generation, the resulting percentage of infestation is usually very high in the biotope, due to several oeco-biological factors, mainly the low incidence of population reduction factors intervening during the precedent anthophagous generation[5].

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Experimentally induced encapsulation of *Diplostomum phoxini* (Faust) in the fish host

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Summary. Experimentally induced encapsulation of *Diplostomum* by the host *Phoxinus,* is recorded for the first time and requires the metacercariae to develop in fish at a temperature (23–26 °C) which is above that naturally encountered.

The metacercariae of *Diplostomum phoxini* (Trematoda) live in the brain of the second intermediate host, a fish, *Phoxinus phoxinus.* These parasites do not encyst and may occur anywhere in the brain although most of them lie beneath the ependyma of the IVth ventricle[2,3]. Naturally infected fish are common even though they may support numerous metacercariae; 1296 being the maximum number recorded[3,4].

The occurrence in the brain of so many active, feeding metazoan parasites which have little if any recorded effect upon the host[3] is a paradox made the more extraordinary by the absence of an effective host response against the parasites. An accumulation of rounded, vacuolated cells around the parasites is, however, a feature of this infection[2,3].

Parts of the brain may be immunologically privileged[5] and this, together with a lack of connective tissue cells in the brain[6], could account for the host's failure to encapsulate the parasite and for the need of a parasite derived cyst. However, the logic of this argument is weakened because *Diplostomum baeri eucaliae* and *Ornithodiplostomum ptychocheilus* which live in the brain of other fish are, respectively, encapsulated in a 'tumor' by their host[7] or encyst there[8]. Therefore, the assumption that *P. phoxinus* is incapable of encapsulating the metacercariae of *D. phoxini* was tested. The simplest method to perturb the relationship between the host and parasite without at the same time damaging the morphologic basis for the privileged nature of the brain was to raise the temperature of experimentally infected fish above that existing in natural conditions.

Materials and methods. Naturally infected snails *(Lymnaea peregra)* emitting cercariae of *D. phoxini* were collected from Fron Goch Pool, near Aberystwyth, Wales, the source used by Rees[9]. Uninfected fish *(P. phoxinus)* were collected from a lake (Pen dam) from which no infected fish have been recorded[9]. To experimentally infect each fish with 30–60 parasites, a single infected snail was exposed to light in 200 ml of lake water. After 1 h the snail was removed and

Induction of capsule around developing metacercariae (23–25 °C)

Days after infection	Experiment 1 (13/11/1979)				Experiment 2 (23/2/1980)				Experiment 3 (16/6/1980)			
	1	2	3	4	1	2	3	4	1	2	3	4
10	35	–	–	35	34	–	–	34	16	–	–	16
20	46	–	–	46	30	–	–	30	40	–	–	40
22	40	–	–	40	41	–	–	41	48	–	–	48
24	38	–	–	38	39	–	–	39	50	–	–	50
26	50	–	–	50	51	–	–	51	34	–	–	34
28	54	–	25	29	36	–	20	16	55	–	17	38
30	52	–	30	22	42	–	28	14	31	–	18	13
32	36	–	25	11	45	20	12	13	27	15	10	2
34	48	28	15	5	41	25	12	4	50	27	12	11
36	35	15	10	10	18	10	6	2	45	29	4	12
38	42	23	12	7	29	12	9	8	19	19	–	–
40					35	17	8	10	32	20	8	4
50					52	28	14	10	46	23	10	13
60					30	21*	2	7	28	15**	8	5

1 Total number of parasites recovered; *2* number of encapsulated specimens; *3* number of parasites with abnormal accumulation of cells; *4* number of normal parasites. * 18 dead; 3 living parasites, ** 15 dead parasites.