

Data on distribution of screwworm fly *Wohlfahrtia magnifica* (SCHINER) in Southwestern Europe (Diptera: Sarcophagidae)

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Summary

In this paper new distribution records for the screwworm fly *Wohlfahrtia magnifica* (SCHINER) in Spain, South France and Italy are given. The normal hosts of this parasite species were sheep and goats in extensive pasture management. In all examined groups the prevalence of the wohlfartiosis oscillated between 0.5 to 17%. In Southwestern Europe the distribution of this parasite species seemed widespread according to the occurrence of both wohlfartiosis and captures of gravid females.

Key Words: *Wohlfahrtia magnifica*, wohlfartiosis, distribution, Southwestern Europe.

Introduction

The first comprehensive work on bionomics, control measures and relation to man of *Wohlfahrtia magnifica* was carried out by PORTSCHINSKY (1884), which was followed in 1916 by a second one. In these studies the particular character of this parasitic fly was pointed out clearly and his obligatory parasitic character in warm-blooded vertebrates, in contrast to *Sarcophaga* species and other *Wohlfahrtia* species, never developed in carcasses and other decaying matter. One century after, data concerning the presence of various susceptible species of animals and the localization of wohlfartiosis in these animals were recorded in Israel (HADANI & RAUCHBACH, 1973). Though originally recorded from temperate-warm and subdesertic climates, the distribution of *W. magnifica* is widening due to many environmental modifications introduced by man (LEHRER *et al.*, 1988) and, locally, by means of introduced sheep races (LEHRER & VERSTRAETEN, 1991).

In Southern Spain there are approximately 10,000,000 sheep and goats and our studies recorded a minimum number of 250,000 to 300,000 annual cases of wohlfartiosis (RUÍZ MARTÍNEZ *et al.*, 1992a). We think that these data are not an

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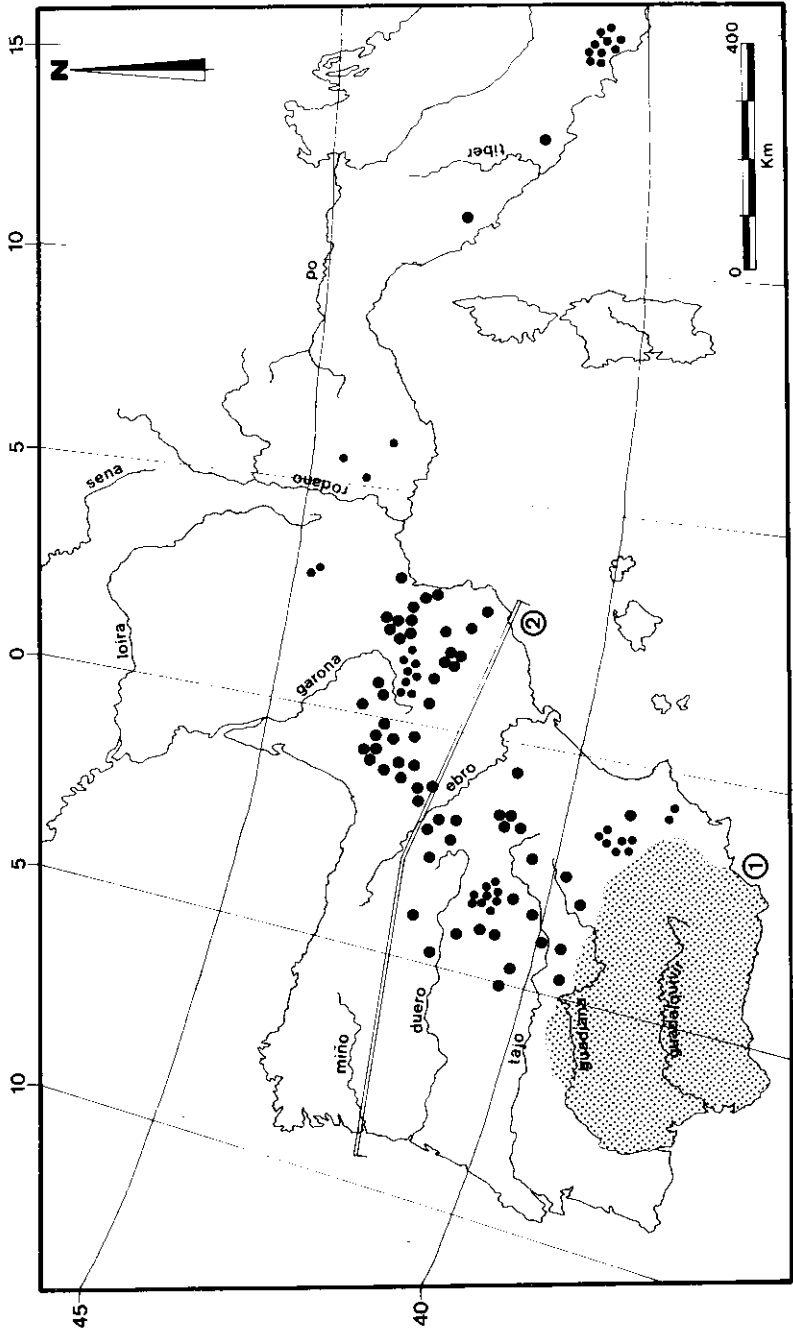


Fig.1. - Distribution of *W. magnifica* in Southwestern Europe during 1983 to 1992. (1) Intensely studied area (around 250,000 to 300,000 annual cases). (2) Maximum distribution area, according with CORDERO DEL CAMPILLO (1980). Each point (●) includes the observation of 10 to 15 wohlfartiosis cases per 500 heads. Each point (●) includes the minimum capture of 10 adults with two gravid females.

exception and might be generalized to other countries in the Mediterranean basin (Southern France, Greece, Italy, Yugoslavia, Israel, Tunisia, Turkey and Morocco).

According to geographical distribution given by ZUMPT (1965), VERVES (1986) and SPRADBERY (1991), *W. magnifica* is widely distributed over the median part of Palearctic Region, from Southern Germany to Iran, and from Portugal to Mongolia, but it does not occur in the Afrotropical region. Nevertheless, only in several points its prevalence rates are known (such as CEI, Israel, Romania, Spain, Bulgaria...) and oscillate between 9 and 35%.

In this paper some new records of *W. magnifica* (males and females) and data on prevalence of wohlfartiosis in Southern France (27 localities), Central Italy (12 localities) and Spain (71 new localities) are given.

Materials and methods

Between May and November from 1983 to 1991 systematic and gradual epidemiological studies were carried out in four regions of Spain (Castilla-La Mancha, Extremadura, Murcia and Andalucía) and 495,000 individuals were examined (fig.1.1.). During July to September from 1989 to 1992 non systematic studies were carried out in six new regions (Valencia, Madrid, Castilla-León, Aragón, Navarra and Cataluña) over 40,000 individuals (see fig.1). The sampling methods followed consisted in: direct observations of parasitized hosts, epidemiological inquiries and random observations between groups (RUÍZ MARTÍNEZ *et al.*, 1987, 1991, 1992a, b, c).

The adults of *W. magnifica* were sampled by means of baited traps (PICKENS & MILLER, 1978) and wind-oriented baited traps (VOGT *et al.*, 1985), which were installed near of watering place and near of hosts places during mid-day hours (hot hours of the day) (RUÍZ MARTÍNEZ, 1990).

Between August to September from 1989 to 1991 field trips were carried out over nine French departments (Hautes-Pyrénées, Pyrénées Atlantiques, Haute-Garonne, Ariège, Pyrénées Orientales, Aude, Hautes-Alpes, Alpes de Haute-Provence, Cantal) and three regions of Italy (Toscana, Abruzzos, Catania), to observe wohlfartiosis in sheep, goats, cattle and to capture adults of *W. magnifica*. All data were obtained following the anterior methodology. All locations were situated between 39° and 44° Northern latitude and 3° Western and 15° Eastern latitude.

Results and discussion

The figure 1 shows the distribution of *W. magnifica* obtained in this study, both in epidemiological observations (wohlfartiosis) and field captures (males and females in baited-traps). Throughout epidemiological data and captured adults, seventy one new localities from Spain, twenty-seven from France and twelve from Italy were found. Though these localities are included in geographical distribution given for this species (see VERVES, 1986) is mostly interesting the knowledge of its detailed distribution area and firstly characteristics of its parasitic rates and seasonal oscillations (PODMOGYL'NAYA, 1983).

The foremost data obtained in Spain, France and Italy are shown in table 1. For all localities *W. magnifica* were found between June and October, between 200 m asl and 2,900 m asl, and with similar prevalence rates to those obtained in Southern Spain (RUÍZ MARTÍNEZ *et al.*, 1992a).

Table 1. - Main localities where *Wohlfahrtia magnifica* has been recorded (wohlfartiosis and captured adults, included and detailed).

Country	Region/Department	Locality	Height	Date	Sample	Results
Spain	Castilla-León	41°35'N-3°4'W	1,400	89.07	W	9.8%
Spain	Cataluña	42°11'N-2°30'E	400	91.08	W	11.1%
Spain	Castilla-La Mancha	40°51'N-1°52'W	1,100	89.09	W	4.0%
Spain	Navarra	41°55'N-1°5'W	2,000	90.09	W	0.5%
Spain	Cataluña	42°6'N-1°48'E	1,300	89.08	W	5.5%
Spain	Aragón	42°10'N-0°52'E	550	90.08	W	10.5%
Spain	Aragón	40°33'N-1°5'W	1,900	90.08	W	9.1%
Spain	Murcia	38°57'N-1°12'W	500	89.06	B-T	n=31
Spain	Castilla-León	40°53'N-4°0'W	2,300	90.07	W	12%
Spain	Madrid	40°51'N-3°35'W	900	89.07	B-T	n=68
Spain	Castilla-La Mancha	39°42'N-4°16'W	650	90.07	W	7.5%
France	Hautes-Pyrénées	42°54'N-0°22'E	1,700	90.08	W	16%
France	Pyrénées Atl.	42°15'N-0°35'W	2,600	90.08	W	4%
France	Ariège	42°59'N-1°8'E	1,000	90.07	B-T	n=45
France	Hautes-Alpes	44°33'N-6°5'E	2,000	89.08	B-T	n=12
France	Cantal	44°55'N-2°55'E	800	89.08	B-T	n=19
Italy	Toscana	43°4'N-11°30'E	600	91.08	W	12.5%
Italy	Abruzos	41°40'N-13°3'E	1,100	91.09	W	17.5%
Italy	Campania	41°2'N-14°36'E	250	91.07	B-T	n=24
W: Wohlfartiosis (results in percentages); B-T: Baited-Trap (results in capture number)						

As shown in figure 2, only in several points of its distribution, the prevalence and incidence rates of this species have been studied. Moreover, cases of wohlfartiosis in humans have been reported from Northern Africa, Yugoslavia, Turkey, Israel and CEI (see ZUMPT, 1965). There are evidences that confirm the geographic and ecologic expansion of *W. magnifica* (see LEHRER & VERSTRAETEN, 1991). We agree with these authors in this question (see RUÍZ MARTÍNEZ & CRUZ MIRA, 1992). In broad outline some facts could be support the progressive expansion of *W. magnifica*:

- 1) Increase of the domestic sheep and goats number from 15th century onward (i.e. in Spain, see ESTEBAN MUNOZ, 1990). This increased availability has been

one of the main factors that broke off the ecological equilibrium of parasitic diptera.

- 2) Parallely, it seems that parasitary strategy of this species consists in to invade the host genitalia and to produce temporal emasculation (RUIZ MARTÍNEZ *et al.*, 1992c), as a mode of population regulatory system.
- 3) The historic transhumance between Northern and Southern Spain (i.e. see LAGUNA SANZ, 1986), along 1,000 km per year, might be another factor in the spread of parasitic diptera. The environmental adaptations of *W. magnifica* to vegetation and soil diversity, height and temperature rates are very broad, at least in Mediterranean region (RUIZ MARTÍNEZ & CRUZ MIRA, 1992).
- 4) Moreover, the widespread distribution (see fig.2) could be explained by the effective larval structures and survival mechanisms (RUIZ MARTÍNEZ *et al.*, 1989, 1990), that to act it as similar way than the blowfly in Australia *Lucilia cuprina* WIED. (MONZU, 1983), the screwworm fly *Cochliomyia hominivorax* COQ. in the Nearctic (GRAHAM, 1985) or *Chrysomya bezziana* VILL. in the Afrotropical region (ZUMPT, 1965).

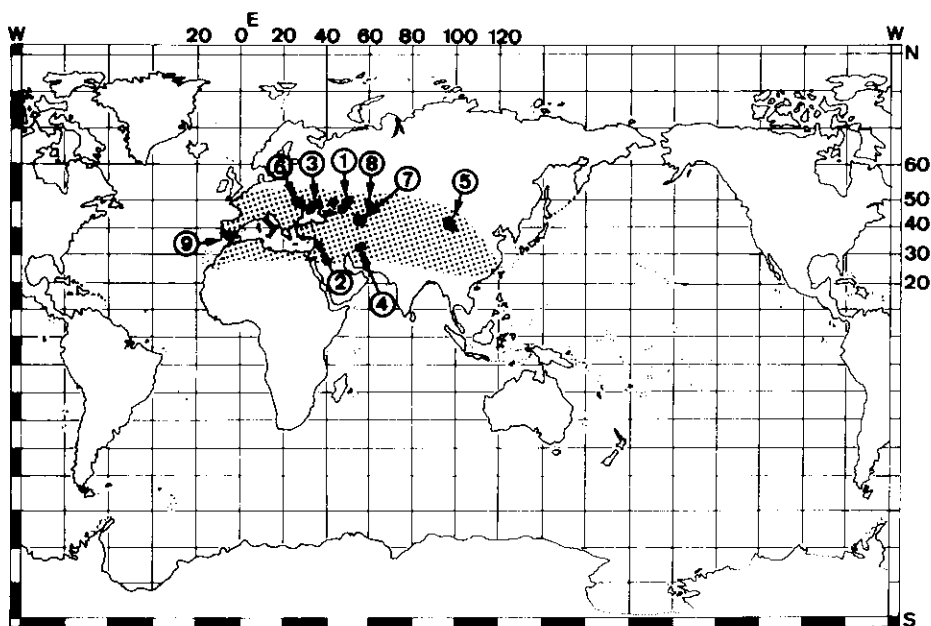


Fig.2. - Palearctic distribution of *W. magnifica* according to ZUMPT (1965), VERVES (1986) and SPRADBERRY (1991). Numbers from 1 to 9 refer to localities where prevalence and incidence rates have been studied: (1) CEI (TERNOVOY, 1960; PODMOGIL'NAYA, 1981, 1983); (2) Israel (HADANI *et al.*, 1971); (3) CEI (POKIDOV & GONCHAROV, 1971; POKIDOV & KHRANOVSKII, 1984); (4) Iran (JANBAKHS *et al.*, 1976); (5) Mongolia (SCHUMANN *et al.*, 1976); (6) Romania-Bulgaria (DULCEANU *et al.*, 1980; LUNGU *et al.*, 1983; LEHRER *et al.*, 1988); (7) CEI (KUNICHKIN *et al.*, 1981; KUNICHKIN & KHAMZAEV, 1985); (8) CEI (ISIMBEKOV & ZHUMABEKOV, 1983; ISIMBEKOV, 1985) and (9) Spain (RUIZ MARTÍNEZ *et al.*, 1987, 1991, 1992).

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Résumé

Ce travail concerne les nouvelles localisations de *Wohlfahrtia magnifica* (SCHINER) (Diptera: Sarcophagidae) en Espagne, dans le Sud de la France et en Italie. Cette mouche, parasite obligatoire aux stades larvaires (myiase spécifique), attaque les ovins et les caprins (hôtes très attractifs): prévalence de 0,5 à 17% dans toutes les exploitations en pâture extensive. L'observation répétée des femelles gravides et des wohlfahrtiases animales nous permet de conclure que l'aire de répartition de cette myiase correspond à tout le Sud-Ouest de l'Europe.

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