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Agriculture

Plant Protection Products Usage on Crops in Malta: 2007

The second sample survey on the use of plant protection products on commercially-grown crops in Malta and Gozo was undertaken in the summer months of 2007 and covered the agricultural year from September 2006 to August 2007.

Areas treated

The basic area (see definition) amounted to 5,077.6 hectares or 62.7 per cent of the area surveyed. Although forage areas were the most cultivated, only 45.6 per cent of all forage areas were treated. In contrast, all areas under glass were treated, while 86.6 per cent of all open areas under vegetable cultivation were treated at least once. Similarly, treated areas under potatoes, vines and stone fruit amounted to 96.4 per cent, 91.6 per cent and 87.1 per cent of the respective cultivated areas. On the other hand, only 45.5 per cent of citrus fruit areas received at least one treatment.

Fungicides dominated in the use of plant protection products, in weight applied and area treated. 72.4 per cent of the formulation area (see definition) was treated with at least one fungicide. Similarly, fungicide applications amounted to 96.7 per cent in terms of weight. The formulation area of herbicides and insecticides amounted to 11.8 per cent and 14.0 per cent respectively.

Overall, 4.2 applications were sprayed, with fungicide applications being sprayed on average 6.1 times while herbicide applications just once. Insecticide applications on average amounted to 3.3 sprays. Where treated, citrus fruit, vines and vegetables under glass were sprayed intensively, these crops receiving over 8 treatments with fungicide. Insecticides were regularly used in stone fruit cultivation, with an average of 4.4 sprays.

Application methods

Land fragmentation is a common feature of Maltese agriculture. As a result, the knapsack (76.5 per cent) was the most common method of pesticide application in Malta. Tractor-mounted spraying (14.4 per cent) was mainly used for forage and vines, where areas under these crops tend to be larger than areas with vegetables. On the other hand, 9.1 per cent of all applications were effected by methods infrequently encountered.

Active substances

On average, 5.6 kg of active substance per hectare was sprayed, ranging from less than 0.1 kg per hectare with acaricides to 7.5 kg per hectare with fungicide. The application rates of fungicide differ, from 28.7 kg per hectare for vegetables in the open (due to the high amounts of sulphur used), to 0.7 kg per hectare on potatoes. Vines, on average, received 2.1 kg per hectare, mainly due to the high number of applications. Herbicide application rates averaged 1.2 kg per hectare. Application rates per hectare for insecticides were negligible, with an average of 0.3 kg per hectare.

In total, 87 different active substances were recorded in the pesticide survey. Their combined use amounted to just over 120 tonnes. More than 95 per cent in terms of weight of active substances was dominated by three active substances, namely sulphur, mancozeb and MCPA albeit for different uses, as shown in Table 7. Table 8 ranks the most important active substances by chemical family. Fungicide use was dominated by sulphur (92.5 per cent in terms of weight of active substance) while MCPA dominated herbicide use (92.1 per cent of herbicides). On the other hand, 4 active substances namely Carbaryl (24.9 per cent), Malathion (23.0 per cent), Chlorpyrifos (20.2 per cent) and Dimethoate (19.2 per cent) dominated insecticide use.

Pesticide usage in Malta follows the typical pattern of the Mediterranean climate. Herbicide applications are mainly used at the beginning of the agricultural season while fungicide use occurs throughout the agricultural year, with the main period of application occurring from April to July. Insecticide use is at its peak during the summer period ■

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Table 1. Basic area (ha) treated by chemical family by crop

	All crops	Potatoes	Fresh vegetables in the open	Fresh vegetables under glass	Forage	Vines	Citrus fruit	Stone fruit
Acaricide	131.6	-	109.6	8.6	-	10.8	0.3	2.3
Additive	18.3	-	-	-	-	13.6	-	4.7
Fungicide	2,547.2	885.6	766.2	49.0	0.7	752.6	1.6	91.6
Herbicide	2,470.7	123.1	29.5	-	2,281.0	36.9	-	0.2
Insecticide	911.5	56.4	325.6	28.3	0.1	256.7	28.3	216.1
Soil sterilant	13.6	-	-	-	-	13.6	-	-
Any PPP	5,077.6	893.1	826.4	49.6	2,281.7	759.4	28.6	238.7
Area of crop grown	8,100.5	926.1	954.5	49.6	5,004.2	829.0	62.9	274.2

Table 2. Formulation area (ha) treated by chemical family by crop

	All crops	Potatoes	Fresh vegetables in the open	Fresh vegetables under glass	Forage	Vines	Citrus fruit	Stone fruit
Acaricide	271.5	-	216.3	41.0	-	10.8	0.3	3.1
Additive	25.5	-	-	-	-	13.6	-	11.9
Fungicide	15,523.9	5,072.3	3,413.2	545.0	0.7	6,244.6	13.9	234.3
Herbicide	2,539.6	179.0	31.8	-	2,291.6	36.9	-	0.2
Insecticide	3,005.4	231.3	845.6	87.7	0.1	744.5	140.4	955.9
Soil sterilant	68.0	-	-	-	-	68.0	-	-
Total	21,434.0	5,482.6	4,506.9	673.7	2,292.5	7,118.3	154.6	1,205.4

Table 3. Average applications¹ sprayed by chemical family by crop

	All crops	Potatoes	Fresh vegetables in the open	Fresh vegetables under glass	Forage	Vines	Citrus fruit	Stone fruit
Acaricide	2.1	-	2.0	4.8	-	1.0	1.0	1.4
Additive	1.4	-	-	-	-	1.0	-	2.5
Fungicide	6.1	5.7	4.5	11.1	1.0	8.3	8.8	2.6
Herbicide	1.0	1.5	1.1	-	1.0	1.0	-	1.0
Insecticide	3.3	4.1	2.6	3.1	1.0	2.9	5.0	4.4
Soil sterilant	5.0	-	-	-	-	5.0	-	-
Total	4.2	6.1	5.5	13.6	1.0	9.4	5.4	5.0

¹The average application is the formulation area (Table 2) divided by the basic area (Table 1)

Table 4. Weight of formulation (kg) by chemical family by crop

	All crops	Potatoes	Fresh vegetables in the open	Fresh vegetables under glass	Forage	Vines	Citrus fruit	Stone fruit
Acaricide	12.0	-	8.6	0.4	-	2.8	0.0	0.3
Additive	49.4	-	-	-	-	17.1	-	32.3
Fungicide	116,721.1	3,639.7	98,123.5	1,380.4	1.7	13,312.1	3.4	260.3
Herbicide	2,957.6	191.1	29.1	-	2,657.1	80.1	-	0.2
Insecticide	918.3	73.1	174.2	18.2	0.0	297.4	51.5	303.9
Soil sterilant	71.2	-	-	-	-	71.2	-	-
Total	120,729.6	3,903.9	98,335.3	1,399.0	2,658.7	13,780.7	54.9	597.0

Table 5. Application rate² (kg/ha) sprayed by chemical family by crop

	All crops	Potatoes	Fresh vegetables in the open	Fresh vegetables under glass	Forage	Vines	Citrus fruit	Stone fruit
Acaricide	0.0	-	0.0	0.0	-	0.3	0.0	0.1
Additive	1.9	-	-	-	-	1.3	-	2.7
Fungicide	7.5	0.7	28.7	2.5	2.4	2.1	0.2	1.1
Herbicide	1.2	1.1	0.9	-	1.2	2.2	-	0.9
Insecticide	0.3	0.3	0.2	0.2	0.0	0.4	0.4	0.3
Soil sterilant	1.0	-	-	-	-	1.0	-	-
Total	5.6	0.7	21.8	2.1	1.2	1.9	0.4	0.5

²The application rate is the weight of formulation (Table 4) divided by the formulation area (Table 2)

Table 6. Formulation area (ha) treated by chemical group by application method

	Total	Granular broadcast	Granular incorporated	Ground spray	Knapsack	Other
	21,434.0	173.0	49.7	3,087.7	16,390.3	1,733.3
Acaricide	271.5	-	-	5.3	266.2	-
Additive	25.5	-	-	10.2	1.7	13.6
Fungicide	15,523.9	173.0	49.7	1,787.9	12,386.7	1,126.6
Herbicide	2,539.6	-	-	892.3	1,428.6	218.7
Insecticide	3,005.4	-	-	392.0	2,307.2	306.3
Soil sterilant	68.0	-	-	-	-	68.0

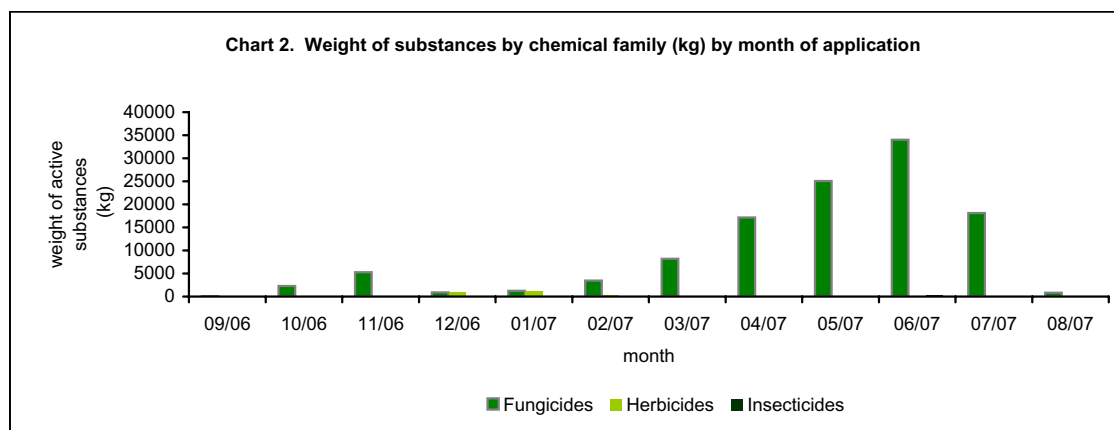
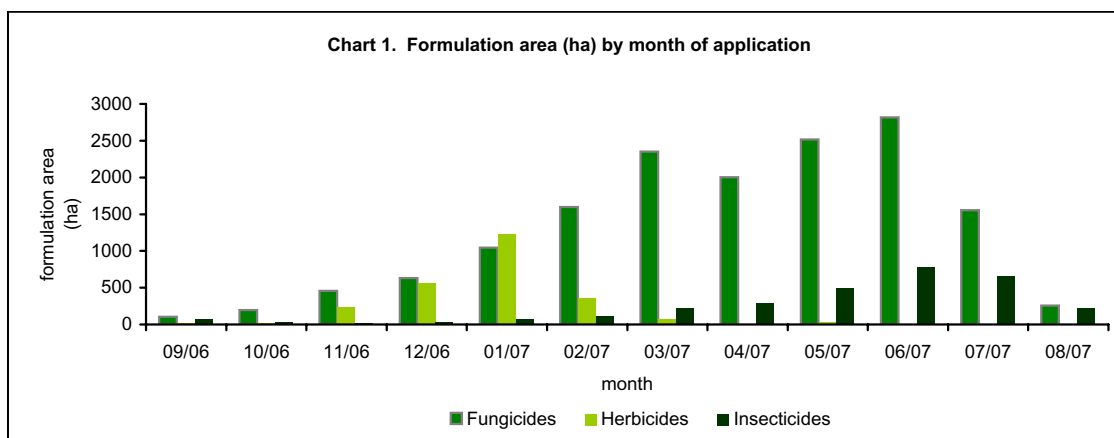


Table 7. Weight (kg) of active substance treated

Rank	Active substance	Chemical family	Weight of active substance applied	%	Cumulative %
1	Sulphur	Fungicide	108,006.3	89.5	89.5
2	Mancozeb	Fungicide	5,602.1	4.6	94.1
3	MCPA	Herbicide	2,724.5	2.3	96.4
4	Zineb	Fungicide	397.5	0.3	96.7
5	Fosetyl-Aluminium	Fungicide	324.2	0.3	97.0
6	Chlorothalonil	Fungicide	287.8	0.2	97.2
7	Copper Oxychloride	Fungicide	283.9	0.2	97.4
8	Ziram	Fungicide	230.3	0.2	97.6
9	Carbaryl	Insecticide	228.6	0.2	97.8
10	Malathion	Insecticide	211.6	0.2	98.0
11	Chlorpyrifos	Insecticide	185.8	0.2	98.1
12	Propamocarb	Fungicide	177.0	0.1	98.3
13	Dimethoate	Insecticide	176.4	0.1	98.4
14	Linuron	Herbicide	174.1	0.1	98.6
15	Cymoxanil	Fungicide	167.6	0.1	98.7
16	Folpet	Fungicide	162.3	0.1	98.8
17	Procymidone	Fungicide	140.3	0.1	99.0
18	Metalaxyl-M	Fungicide	134.8	0.1	99.1
19	Diclofluanide	Fungicide	126.1	0.1	99.2
20	Benalaxyl	Fungicide	93.4	0.1	99.3
	Other pesticides (<90 kg per active substance)		895.0	0.7	100.0

Table 8. Weight (kg) of active substance treated by chemical family

Rank	Active substance	Chemical family	Weight of active substance applied	%	Cumulative %
1	Sulphur	Fungicide	108,006.3	92.5	92.5
2	Mancozeb	Fungicide	5,602.1	4.8	97.3
3	Zineb	Fungicide	397.5	0.3	97.7
4	Fosetyl-Aluminium	Fungicide	324.2	0.3	98.0
5	Chlorothalonil	Fungicide	287.8	0.2	98.2
6	Copper Oxychloride	Fungicide	283.9	0.2	98.4
7	Ziram	Fungicide	230.3	0.2	98.6
8	Propamocarb	Fungicide	177.0	0.2	98.8
9	Cymoxanil	Fungicide	167.6	0.1	98.9
10	Folpet	Fungicide	162.3	0.1	99.1
11	Procymidone	Fungicide	140.3	0.1	99.2
12	Metalaxyl-M	Fungicide	134.8	0.1	99.3
13	Diclofluanide	Fungicide	126.1	0.1	99.4
14	Other fungicides (< 100 kg of active substance)		680.9	0.6	100.0
	Total fungicides		116,721.1	100.0	
1	MCPA	Herbicide	2,724.5	92.1	92.1
2	Linuron	Herbicide	174.1	5.9	98.0
3	Other herbicides (< 100 kg of active substance)		58.9	2.0	100.0
	Total herbicides		2,957.6	100.0	
1	Carbaryl	Insecticide	228.6	24.9	24.9
2	Malathion	Insecticide	211.6	23.0	47.9
3	Chlorpyrifos	Insecticide	185.8	20.2	68.2
4	Dimethoate	Insecticide	176.4	19.2	87.4
5	Other herbicides (< 100 kg of active substance)		115.9	12.6	100.0
	Total insecticides		918.3	100.0	
	Other pesticides		132.7	100.0	
	Total pesticides		120,729.7	100.0	

Methodological Notes

1. Scope and Overview

Plant protection products have been used in the agricultural sector for a number of years. As a consequence of their usage, environmental pressures are on the increase for a reduction in the use of plant protection products. These past years a growing awareness among the general public to monitor their usage has been evident. Pressures on demand for greater agricultural production have, perhaps, brought about greater use of plant protection products. This exercise is intended to quantify usage in Maltese agricultural practices. There are no licensed companies registered as manufacturers of plant protection products in Malta.

In Decision 1600/2002/EC adopting the 6th Environment Action Programme (6EAP), the European Parliament (EP) and the Council recognised that the impact of plant protection products on human health and the environment and in particular by those used in agriculture, must be reduced further. They underlined the need to achieve a more sustainable use of plant protection products and called for a significant overall reduction in the use of plant protection products and the associated risks, consistent with that necessary for crop protection. In its Communication to the Council, the EP and the Economic and Social Committee (EESC) entitled 'Towards a Thematic Strategy on the Sustainable Use of Pesticides' (COM (2002)349 final), the Commission clearly recognised the need for detailed, harmonized and up-to-date statistics on sales and use of plant protection products at EU level and proposed to establish relevant mandatory requirements within two years of the adoption of the Thematic Strategy for the reinforcement of ongoing work on the collection of data concerning plant protection products use.

2. Data Collection

The data has been collected by means of a statistical sample survey extracted from a list of farmers from the Agricultural register. A threshold was applied and any agricultural holding with a utilised agricultural area less than 0.2 ha, was excluded from the target population. The agricultural holdings were stratified by typology and size of utilised agricultural area (ha). This type of stratification enabled groups of homogenous holdings to be grouped into specific strata. The units from each stratum were extracted using the optimum allocation method, where the greater the variability within the stratum, the more holdings were chosen. 399 agricultural holdings were selected to take part in the survey, of which 381 agricultural holdings were successfully interviewed.

The PPP survey was carried out over an 8-week period in the Summer months of 2007. Face-to-face interviewing was undertaken by 10 officials of the Ministry of Rural Affairs and the Environment. The period covered the agricultural year from September 2006 to August 2007.

The PPP survey undertaken covered only the major crops cultivated in Malta and not all the crops. The total area surveyed within the survey amounted to 10,343.7 ha of which 8,100.5 ha were analysed for PPP usage. The remaining 1,917.6 ha were mainly set-aside areas and areas cultivated with vegetables in the open of which usage of pesticides on these areas considered as negligible.

3. Definitions

Basic area treated

The physical area receiving a particular pesticide, independent of the number of applications.

Formulation area treated

The area of crop treated with individual formulations of plant protection products (products). Thus, one hectare of crop treated with four products (consecutively or tank-mixed together) would give 4 formulation treated hectares.

Application rate

Total quantity of active substance by chemical group or category divided by the formulation area treated.

Active substance

Any substance or micro-organism, including a virus, having general or specific action against harmful organisms or on plants, parts of plants or plant products.

Fungicide

A plant protection product used to control unwanted fungal diseases in plants.

Insecticide

A plant protection product used to control unwanted insects.

Herbicide

A plant protection product used to control unwanted vegetation (weed killer) often specifically designed to selectively kill weeds in amongst crop plants, whilst leaving the crop unaffected.

Acaricide

A specific type of insecticide specifically designed to control mite pests on crops.

4. The data in this release are final and are not normally subject to revision.

5. These statistics together with a full methodological report are published and disseminated by the National Statistics Office and can also be found on the NSO website <http://www.nso.gov.mt>.