SPREADING OF CROP PESTS AND DISEASES IN MOLDAVIA, DURING 2001-2005

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ABSTRACT – *The work presents the evolution of pathogenic agents and pests from crops, under the direct influence of climatic conditions, registered during 2001-2005, in the region of Moldavia. We showed the frequency of the attack of main pests and pathogenic agents, as well as the measures taken by Phytosanitary Units for limiting the damages. This paper is useful to engineers and practitioners, for elaborating a long-term prognosis on the appearance of pests and pathogenic agents and for establishing the optimum moment of warning for treatments.*

Key words: pathogenic agents, pests, cereals, food plants, industrial plants, pulse and field legumes, fruit trees and bushes

REZUMAT – Răspândirea bolilor şi dăunătorilor culturilor agricole din Moldova în perioada 2001 – 2005. *Lucrarea prezintă situaţia evoluţiei agenţilor patogeni şi a dăunătorilor culturilor agricole sub influenţa directă a condiţiilor climatice înregistrate în anii agricoli din perioada 2001-2005 în zona Moldovei. Este prezentată frecvenţa atacului principalilor agenţi patogeni şi dăunători, precum şi măsurile luate de Unităţile fitosanitare în vederea limitării pagubelor. Lucrarea va servi inginerilor şi practicienilor în elaborarea unei prognoze de lungă durată a apariţiei agenţilor patogeni şi dăunătorilor şi pentru a stabili momentul optim al emiterii avertizării tratamentelor.*

Cuvinte cheie: agenţi patogeni, dăunători, cereale, plante alimentare, plante industriale, leguminoase pentru boabe şi furaj, pomi şi arbuşti fructiferi

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The knowledge of phytosanitary condition in a certain area is an essential element for achieving a correct technology in crop growing.

The analysis of climatic data registered by the Weather Station of Podu-Iloaiei, Iaşi County (*Table 1*), correlated to data obtained from County Phytosanitary Units is the background for characterizing the main climatic factors during September 2001 – September 2005 and their influence on the evolution of pathogen and pest attack on crops from Moldavia.

The farming year 2000-2001 was, generally, warm, the mean annual temperature exceeding the normal one by 1.1^0 C. An amount of 638.4 mm rainfall was registered, in comparison with 517.8 mm (value of multiannual normal), with excess rainfall in March, April, May, June and September, the other months having deficit of rainfall.

Under these conditions, maize crops have been attacked by *Gibberella zeae* (Schw.) Petch., f.c. *Fusarium graminearum* Link., *Ustilago maydis* DC., *Sorosporium holci-sorghi* (Riv.) Moesz., *Trichometasphaeria turcica* Tuttr. and *Nigrospora oryzae* (Berk.et Br.) Petch., with frequencies between 0.5 – 40%; 2 - 45%; 1 -30%, 1 – 35%; 0 -30%. Yield losses were between 5 -20%.

The autumn of the farming year 2001-2002, has registered temperatures close to the normal ones, with rainfall excess, followed by a dry period in winter. March was very wet, April, dry, and summer, very rainy (especially, July).

Bugs and thrips attacked the spiked cereals, especially wheat and barley, yield losses being not significant. Due to complex preventing phytosanitary treatments, the appearance and evolution of mildew and rot attack has been limited in Botoşani, Iaşi, Vaslui and Vrancea counties.

The pathogenic agents signalled in maize crop in 2002, caused low and mean attacks, excepting *Sorosporium holci-sorghi*, which had a frequency of 10-45% attacked plants in certain counties (Botoşani, Iaşi, Neamţ, and Vaslui).

Characterization of the farming year 2002-2003. In the autumn of 2002, temperatures were higher compared to the normal ones in the area, and with rich rainfall in October. Winter was cold (in January, temperatures of -20.0^0 C were registered), affecting rape, barley, wheat, and other crops. In spring, drought was significant, and in summer, the amount of rainfall was low in June and high in July.

The attack of pathogenic agents and pests on spiked cereals, maize, technical and industrial plants has registered values close to the ones signalled in 2002.

The temperatures, which were registered in the farming year 2003-2004, were close to the normal ones. Winter was warmer and temperatures were higher during the crop vegetation season, and deficit of rainfall was signalled in April, May and June. In July and August, the rainfall amount was of 600 mm in all the counties from Moldavia.

Pathogen attacks and yield losses have been registered in spiked cereals, vegetables, fruit-trees and vine, especially in untreated crops. Maize, sunflower, and sugar beet crops were delayed in vegetation because of low temperatures from May, which favoured the appearance of plant yellowing and of strong attacks in maize caused by *Ustilago maydis* and *Sorosporium holci-sorghi,* in Bacău (7 – 40%), Botoşani (10 – 18%), Iaşi (10 – 47%), and Vaslui (3 – 35%) counties.

The farming year 2004-2005 presented a series of deviations from the normal climatic conditions, which had a significant influence on the evolution of plant vegetation phases and the evolution of pathogenic agents causing yield losses in most of crops from Moldavia (especially in untreated or inadequately treated crops) (*Tables 2, 3, 4, 5*).

CEREALS

Attacks produced by 12 pathogenic agents and 14 pests were signalled during 2001-2005 in winter spiked cereals (wheat, barley, and two-row barley) and spring spiked cereals (two-row barley and oats) from Moldavia (Tables 2, 3). Only some of them caused damages, which varied each year, according to climatic factors and growing technologies. Among these pests and pathogens, there are:

Blumeria graminis (DC.) Speer - treatments were applied in 2002 on 2700 ha from Botoşani County and on 4350 ha from Iaşi County;

Gibberella zeae (Schw) Petch;

Ustilago tritici (Jensen) Rostrup;

Puccinia recondita Rob. et Desm. - f.sp. tritici;

Puccinia striiformis West.;

Eurigaster integriceps Put., *E. maura* L., *E. austriaca* Schrank, *Aelia* spp. – treatments were applied in 2002 on 2860 ha. from Botoşani County, on 5230 ha. from Iaşi County, on 5028 ha. from Neamț County and on 26000 ha. from Vaslui County. In 2003, treatments were applied on 11500 ha in Botoşani County, 3800 ha in Iaşi County, 5889 ha in Neamț County and on 25000 ha in Vaslui County, and in 2005, 4431 ha.were treated in Botoşani County, 12450 ha in Iaşi County and 26000 ha. in Vaslui County;

Schizaphis graminum Rond.;

Table 1

Climatic data registered during September 2000 – September 2005, at the Weather Station of Podu – Iloaiei, Iaşi County (Central Moldavian Plain)

Farming year	2000				2001								
Months	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX
No. of wet days	11	1	15	10	11	10	10	10	13	15	12	4	3
Rainfall (mm)													
Monthly sum	136.9	9.7	26.0	16.3	23.0	14.4	30.9	71.7	43.8	103.3	67.2	20.4	146.6
Multiannual monthly average	40,7	30,3	34,8	28,7	28,2	24,1	24,0	42,1	53,4	77,8	72,4	60,8	42,1
Deviation +/-	96.2	20.6	-8.8	-12.4	-5.2	-12.7	6.9	29.6	-9.6	25.5	-5.2	-40.4	104.5
Air temperature (^{0} C)													
Monthly average	14.7	10.2	8.7	2.8	0.1	1.0	6.8	11.4	16.6	18.9	23.7	22.5	16.2
Multiannual monthly average	15.6	9.6	4.2	-1.0	-3.2	-1.9	3.2	9.5	15.5	18.7	20.6	18.8	15.6
Deviation +/-	-0.9	0.6	4.5	3.8	3.3	2.9	3.6	1.9	1.1	0.1	3.1	3.7	0.6
Farming year	**2001**				**2002**								
Months	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX
No. of wet days	13	3	14	14	8	6	9	9	6	11	14	11	10
Rainfall (mm)													
Monthly sum	146.6	30.4	67.2	21.3	6.9	6.6	56.6	18.9	29.4	57.4	120.2	107.6	38.3
Multiannual monthly average	42.1	30.3	35.2	28.6	27.9	23.8	24.4	41.8	53.1	77.5	73.0	61.4	42.0
Deviation +/-	104.5	0.1	32.0	-7.3	-21.0	-17.2	32.2	-32.9	-23.7	-20.1	47.2	46.2	-3.7
Air temperature (^{0} C)													
Monthly average	16.2	12.2	2.9	-6.0	-1.9	4.5	6.6	10.5	19.1	20.5	23.5	21.0	15.4
Multiannual monthly average	15.6	9.6	4.2	-3.2	-3.2	-1.4	3.2	9.5	15.5	18.7	20.6	19.0	15.6
Deviation +/-	0.6	2.6	-1.3	-2.8	-1.3	-2.6	3.4	1.0	3.6	1.2	2.9	2.0	-0.2
Farming year	**2002**				**2003**								
Months	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX
No. of wet days	10	16	11	12	15	9	14	12	7	9	23	7	6

Rainfall (mm)													
Monthly sum	38.3	53.1	60.2	4.6	35.3	21.6	22.3	21.1	10.0	19.1	118.4	44.1	38.5
Multiannual monthly average	42.0	30.6	35.5	28.2	27.7	23.9	24.5	41.5	52.5	76.7	48.1	61.2	42.1
Deviation +/-	-3.7	22.5	24.7	-23.6	7.6	-2.3	-2.2	-20.4	-42.5	-57.6	70.3	-17.1	-3.6
Air temperature (^{0} C)													
Monthly average	15.4	9.7	5.8	-6.0-	-2.5	-5.4	1.4	9.8	21.2	21.9	21.8	22.1	15.3
Multiannual month average	15.6	9.6	4.2	-1.2	-3.2	-1.8	3.2	9.5	15.6	18.7	20.6	18.8	15.6
Deviation +/-	-1.2	0.1	1.6	-4.8	-1.3	3.6	-1.8	0.3	5.6	3.2	1.2	3.2	-0.3
Farming year	**2003**				**2004**								
Months	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX
No. of wet days	6	4	7	11	19	7	5	5	8	5	6	4	6
Rainfall (mm)													
Monthly sum	38.5	41.4	4.7	27.0	62.1	51.9	27.2	29.4	31.8	19.4	131.2	146.8	55.2
Multiannual monthly average	42.1	34.4	34.6	28.9	28.9	27.4	28.1	40.3	52.5	75.1	69.2	57.6	40.8
Deviation +/-	-3.6	-7.0	29.9	-1.8	33.2	24.5	0.9	-10.9	-20.7	-55.7	62.0	89.2	4.4
Air temperature (^{0} C)													
Monthly average	15.3	10.3	5.6	-0.2	-4.6	0.0	7.0	12.4	17.1	21.0	22.3	20.5	15.8
Multiannual monthly average	15.6	10.1	4.1	0.8	-3.6	-1.9	3.3	10.1	16.1	19.4	21.3	20.6	16.3
Deviation +/-	-0.3	0.2	1.5	0.6	1.0	1.9	3.7	2.3	1.0	1.6	1.0	0.1	0.5
Farming year	**2004**				**2005**								
Months	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX
No. of wet days	6	4	5	2	5	7	3	11	9	7	8	7	3
Rainfall (mm)													
Monthly sum	55.2	22.8	38.5	11.9	36.1	55.5	22.5	109.2	130.8	96.6	115.8	81.8	7.8
Multiannual monthly average	40.8	34.4	34.6	20.9	30.0	29.0	30.0	43.1	54.0	78.0	70.0	56.1	41.5
Deviation +/-	4.4	-11.6	3.9	-9.0	6.1	27.2	-7.5	66.1	76.8	18.6	45.8	25.7	-30.7
Air temperature (^{0} C)													
Monthly average	15.8	12.3	6.6	2.2	0.9	-3.1	3.9	10.7	16.6	19.0	22.2	21.0	17.4
Multiannual monthly average	16.3	12.0	10.3	3.0	0.6	-3.0	3.1	8.9	15.0	18.5	20.1	20.2	17.0
Deviation +/-	0.5	3.0	-4.3	-0.8	0.3	-0.1	0.8	1.8	1.6	0.5	2.1	0.8	0.4

Table 2

Evolution of the attack of pathogens from wheat and barley crops in Moldavia during 2001 – 2005

Disease (pathogenic agent)	Years	Bacău	Botoşani	Iaşi	Neamţ	Suceava	Vaslui	Vrancea
		Frequency of attacked plants (%)						
Wheat streak mosaic virus	2003	-	sporadic	-	-	-	-	-
	2004	sporadic	-	-	-	-	-	-
Blumeria graminis (DC.) Speer	2002	1-10	4-30	3-15	1-5	2-3	10-50	3-10
	2003	2-20	3-10	1-7	1-3	3-7	9-45	1-7
	2004	3-20	4-20	5-10	3-5	5-6	10-35	5-8
	2005	3-25	2-8	3-12	2-4	4-6	1-48	1-5
Gibberella zeae (Schw.) Petch.	2001	3-12	1-2	3-10	1-3	2-4	1-3	2-7
	2003	4-15	0.5	-	-	-	0.1-7	1-4
	2004	1-7	0.1-4	-	-	-	0.1-30	2-12
Cladosporium herbarum Pers.	2002	-	0.1-3	0.1-4	0-1	-	0.1-2	1-3
	2003	0.1-7	sporadic	-	-	-	1-5	0-3
	2005	0.5-4	-	1-7	0.5-3	1-4	-	-
Micronectriella graminicola (Berk. et Br.) Wr.	2002	1-7	-	low	0.1-3	-	-	0-0.2
	2003	0.1-3	sporadic	-	low	-	1-3	-
	2005	1-10	-	-	0,2-1	0-0,3	0,5-4	0,1-2
Pseudocercosporella herpotrichoides (Fron.) Deight.	2001	1-2	-	low	-	-	-	-
	2003	0,7-3	-	-	-	-	-	low
	2004	0,2-1	-	-	low	-	-	-
Septoria tritici Rob. et Desm. şi *S. nodorum* Berk.	2002	15-35	0,1-2	-	-	-	10-25	-
	2003	1-7	-	-	-	low	-	-
	2005	2-10	-	-	-	-	-	-

Disease (pathogenic agent)	Years	Bacău	Botoşani	Iaşi	Neamţ	Suceava	Vaslui	Vrancea
		Frequency of attacked plants (%)						
Ustilago tritici (Pers.) Jens.	2002	1-15	0,5-5	0,1-2	0-1	0-0,9	0,1-1	-
	2003	3-11	1-7	low	0,1-2	0,1-1	0-1,5	1-2
	2005	1-4	0.2-2	low	0.1-1.5	0-0.9	0.1-1	0.2-3
Tilletia sp.	2001	-	0.3-3	sporadic	-	-	10-30	-
	2002	-	-	sporadic	-	-	-	-
	2003	0.1-1	-	-	sporadic	sporadic	-	sporadic
	2004	-	-	sporadic	-	-	-	-
	2005	0.2-2	-	sporadic	-	-	-	-
Puccinia recondita Rob. et Desm.	2001	12-30	4-15	1-8	2-3	1-4	8-25	5-20
	2002	8-28	-	0.2-6	0.1-3	0-2	10-21	-
	2003	2-10	3-10	0.1-2	0-1	0.2-2	0-0.1	sporadic
	2004	3-14	-	low	-	-	-	-
	2005	0.8-7	0-0.3	-	-	-	-	-
Puccinia striiformis West.	2002	2-10	1-12	-	-	-	-	1-3
	2003	1-9	0.1-3	-	-		-	sporadic
	2004	0.5-6	0-0.1	-	-	-	-	-
	2005	1-10	-	-	-	-	-	-
Puccinia graminis Pers.	2003	3-8	2-15	-	-	-	-	-
	2005	1-10	-	-	-	-	-	-

Table 3

Evolution of the pest attack in wheat and barley crops from Moldavia during 2001 – 2005

Pests – attacked organ	Years	Bacău	Botoşani	Iaşi	Neamţ	Suceava	Vaslui	Vrancea
		Frequency of attacked plants (%)						
Zabrus tenebrioides Goeze (basal leaves)	2001/2002	0.3-0.9	0.1-1.8	0.1-0.5	0.1-0.7	0.1-0.3	0-1	0-0.1
	2003	0-0.4	0-2.9	0.1-0.2	0.2-4.7	0.3	0.4-3	0.1-2
	2004/2005	0.1-3	0-1	0.1-0.8	0-0.4	0.1	0.3-4	0-0.2
Eurygaster integriceps Put., *E. maura* L., *E. austriaca Schr.* and *Aelia spp.* (leaves, stems, caryopsis)	2001-2002	5-10	25-30	0.1-5	3-5	1-3	1-5	1-5
	2003	7-8	14-52	0.2-6	3-5	1-2	2-6	3-7
	2004-2005	2-6	5-15	0.1-5	4-7	-	1-6	0.1-2
Schizaphis graminum Rond. (leaves, spikes)	2001-2002	0.3-2.4	0.2-3.8	0.1-3	0.1-0.5	0.1-0.2	0.3-3	0-0.2
	2003	1-10.7	0.1-7.8	0.1-1	0.1-5.1	0.1	0.2-2	low
	2004-2005	0.4-8	0.2-0.3	0.1-0.2	0.2-2.7	-	0.2-3	0.1-2
Oscinis frit L., *Chlorops pumilionis* Bjerk. , *Meromyza nigriventris* Macq., *Phorbia spp* (straw)	2001-2002	0.4-4	0.1-2.5	0.1-0.3	0.5-7	-	0.1-2	0-0.3
	2003	0.3-2.5	0.6-4	0-0.1	2-22	-	0.5-3	0.2-0.4
	2004-2005	0.1-1.9	0-0.1	0.1-0.2	0.7-1	-	0.4-4	0.1-0.3
Cephus pygmeus L. (straw)	2001-2002	0.5-1.5	0.1-2	0.1-0.2	0.2-0.3	0.1-2	-	0-0.1
	2003	0.1-0.2	0-2.3	-	0.2-8	0.1-5	0.1-0.3	-
	2004-2005	0.1-0.9	0-0.1	0.1-0.2	0.1-0.7	-	0.1-1	0.1-0.2
Haplodiplosis equestris Wag (straw)	2001-2002	0.1-0.5	0-1.8	-	0.1-2.7	-	0.1-3	-
	2003	0-3.8	0-1.6	-	0.2-3	-	-	-
	2004-2005	0.1-0.7	-	-	-	-	-	-
Haplothrips tritici Kurdj. (spike)	2001-2002	0.1-0.2	0.4-2.2	0.3-6	0.1-3	0.1	0.1-2	low
	2003	2.8-8	0.2-5.3	0.2-3	1-3	0.3	0.2-2	5-10
	2004-2005	0.2-4	0.1-0.3	0.1-0.5	0.3-7.8	-	0.3-3	0.1-0.2

Pests – attacked organ	Years	Bacău	Botoşani	Iaşi	Neamţ	Suceava	Vaslui	Vrancea
		Frequency of attacked plants (%)						
Anisoplia austriaca Hbst., *A.segetum* Herbst. (spike, caryopsis)	2001-2002	1.5-2	0.1-2.7	0.1-0.4	0.1-0.4	0.2	0.1-0.4	0-0.1
	2003	0.1-0.5	0.1-2.5	0.1-0.3	0.3-0.7	-	0.1-0.4	0.2-3
	2004-2005	0.1-5.2	0-0.1	0.1-0.4	0.1-1.6	-	0.4-0.3	0.5-4
Oulema melanopus L., Lema lichenis Weise. (leaves)	2001-2002	0.2-0.6	0.6-1.7	0.1-0.2	0.2-0.9	0.3	0.1-2	low
	2003	3.8-11	1-7.8	0.3	1.5-7	1-3	0.2-3	low
	2004-2005	1.9-8	0.1-0.5	0.1-0.3	4-6.6	-	0.3-4	-
Agriotes lineatus L., A.ustulatus Schai. (neck, stems, caryopsis)	2001-2002	0.1	0.1	0.1-0.7	0.1-0.8	0.2-0.5	0-0.1	0.1
	2003	0.1-0.2	0.2	0.1	0.1-0.3	0.1	-	-
	2004-2005	0-0.1	0.1	0.1-0.2	0.1	-	0.1-0.2	0.1
Scotia segetum Schiff. (neck, stems, caryopsis)	2001-2002	-	-	-	-	-	-	-
	2003	-	-	-	-	-	-	-
	2004-2005	-	0.1-0.2	-	-	-	-	-
Anguina tritici Steinb. (neck, stems)	2001-2002	-	-	-	-	-	-	-
	2003	-	-	-	-	-	-	-
	2004-2005	-	-	-	-	-	-	-
Cnephasia pasquana Hb. (leaves)	2001-2002	-	-	0.1	0-0.15	0.1	-	-
	2003	0-1.6	-	-	-	0.1	-	-
	2004-2005	-	0.1	0.1	0.1-3	-	-	-
Phylotreta vittula Redt. (stems, leaves)	2001-2002	-	-	0.2	0-0.3	0.1	0.1-0.2	0.1
	2003	0-16	-	0.1	0.1-1	0.2	0.1-0.3	0.2
	2004-2005	0.1	0.1	-	0.1-0.6	-	0.1	0.2-0.5

Table 4

Evolution of pathogenic agents in maize crops from Moldavia during 2001 – 2005

Pathogenic agents – attacked organ	Years	Bacău	Botoşani	Iaşi	Neamţ	Suceava	Vaslui	Vrancea
		Frequency of attacked plants (%)						
Gibberella zeae (Schw.) Petch. f.c. *Fusarium graminearum* Link. (roots, stems, cobs, grains)	2001	10-20	0.5-1	15-30	18-25	0.7-0.8	12-30	7-40
	2002	3-7	1.5-5	12-35	7-11	7-12	3-25	1-3
	2003	7-25	3.5-10	5-15	10-14	3-10	1-3	7-8
	2004	2-7	2.8-5	3-7	6-7	1-3	2-7	5-7
	2005	1-6	1-4	4-8	5-6	2-4	1-3	2-6
Ustilago maydis (DC.) Corda (leaves, stems, cobs, panicles)	2001	3-5	10-20	10-35	10-25	7-12	15-45	2-9
	2002	10-40	8-33	7-10	9-28	5-10	3-10	1-4
	2003	12-32	7-25	3-5	11-25	7-20	3-30	1-3
	2004	7-40	10-28	10-25	8-16	5-10	3-25	2-4
	2005	6-25	12-30	7-12	7-10	3-8	4-27	1-3
Sorosporium holci-sorghi (Riv.) Moesz (cobs, panicles)	2001	1-3	15-20	12-28	8-30	3-5	18-30	5-10
	2002	3-7	10-35	15-45	6-28	7-12	3-30	6-12
	2003	10-23	12-45	7-25	7-18	3-10	3-28	1-3
	2004	3-25	10-18	10-47	7-9	2-3	3-35	2-5
	2005	3-21	11-28	10-35	5-10	2-4	2-30	1-7
Drechlera turcica (Pass.) Sub. (leaves)	2001	3-7	5-10	7-18	15-35	1-5	7-10	3-10
	2002	5-10	3-7	3-12	12-27	60-90	-	1-3
	2003	7-25	7-12	4-15	16-20	10-15	-	1-7
	2004	2-10	3-10	3-7	10-12	-	-	5-12
	2005	4-12	3-8	2-10	9-15	3-10	1-10	1-10
Nigrospora oryzae (Berk. et Br.) Petch. (stems, cobs)	2001	1.2-20	-	3-7	10-12	3-5	12-30	1-5
	2002	6-9	-	-	5-7	7-10	2-7	-
	2003	3-6	3-5	-	3-8	2-7	1-3	0.1-2
	2004	1-3	1-1.5	sporadic	5-10	3-5	-	1-3
	2005	2-6	2-3	0-1	4-7	2-6	0-2	0-1

Table 5

Evolution of pest attacks in maize crops from Moldavia during 2001 – 2005

Pests – attacked organ	Years	Bacău	Botoşani	Iaşi	Neamţ	Suceava	Vaslui	Vrancea
		Frequency of attacked plants (%)						
Agriotes ustulatus Schall., *A. lineatus* L. (seeds, neck)	2001	0.2-2	0.1-1.5	0.1-1	0.2-3	0.1-4	0.2-1.5	0.3-2
	2002	0-1.5	0.1-1	0.3-1	0.3-1	0.2-1.5	0.3-1	0.6-3
	2003	0.1-2	0.2-3	0.1-5	0.1-0.5	0.1-1	0.1-2	0.2-4
	2004	0-1.8	0.1-1	0.2-0.6	0.5-2	-	0.2-3	0.1-4
	2005	0.1-2.2	0.2-1.5	0.5-0.7	0.7-3	-	0.1-2	0.3-3
Tanymecus dilaticollis Gyll., *Opatrum sabulosum* L. (leaves, neck)	2001	0.1-0.5	0.2-0.4	0.1-0.3	0.3-5	0.4-6	0.3-3	0.7-5
	2002	0-2	0.3-3	0.5-4	0.1-5	0.2-4	1-3	0.9-4
	2003	0.1-4	0.5-3	1-3	0.7-3	0.1-2	0.9-4	1-6
	2004	0.5-2	1-3	0.1-4	1-5	-	0.1-4	0.3-5
	2005	0.1-5	0.5-4	0.2-3	0.7-4	-	1-6	1.5-7
Ostrinia nubilalis Hb. (panicle, stems, cobs)	2001	0.1-3	0.6-2	0.5-3	0.3-4	0.5-5	0.5-4	0.2-2
	2002	0.7-4	1.2-3	1-4	0.6-3	0.9-5	0.3-2	0.1-3
	2003	1.2-4	1.0-5	1-3	1-3	1.5-4	0.6-4	0.2-2
	2004	0.2-2	0.1-3	0.7-1	2-3	-	1.2-3	0.7-4
	2005	0.5-4	1.2-4	1-3	1-3	-	1.5-5	1-7
Oscinella frit L., *Delia platura* Cheig. *Scotia segetum* Schiff. (plantlets, neck, leaves)	2001	0-0.5	0.2-1	0.1-0.3	0.1-0.3	0.2-0.9	0.3-0.5	0.1-0.3
	2002	0.1-3	0.2-4	0.1-5	0-0.1	0.1-0.4	0.5-4	0.3-3
	2003	0-1.5	0.1-2	0.3-3	0.1-2	0.2-3	1-4.5	1-6
	2004	0.6-5	0.3-4	0.1-3	0.1-2	-	0.8-4	0.5-3
	2005	0-2	0.1-3	0.2-2	0.3-1.5	-	0.4-3	0.3-2
Rhopalosiphum maydis Fitch., *Heliothis armigera* Hb., *Corvus frugilegus* L. (seeds, leaves, panicle, cobs)	2001	3-11	0.9-15	0.3-20	0.1-1	0.2-2	2-18	1-20
	2002	0.8-4	0.5-3	0.1-5	0.4-1.5	0.1-2	1-7	0.5-5
	2003	0.3-4	0.1-3	0.2-3	0.1-3	0.3-5	0.5-5	0.3-3
	2004	0.1-3.5	0.2-2	0.1-3	0.1-3	-	0.4-3	0.1-2
	2005	2-6	0.6-4	0.2-2	0.2-2	-	1-8	3-10

Oscinis frit L., *Chlorops pumilionis* Bjerk., *Meromyza nigriventris* Macq., *Phorbia* spp.;

Cephus pygmeus L.;

Haplothrips tritici Kurdj.;

Oulema melanopus L., *Lema lichenis* (Weise.) – treatments were applied in 2003, on 1950 ha. and 6440 ha. in Neamț County.

Analysing data on the evolution of pathogenic agents and pests from maize crops of Moldavia (*Tables 4, 5*), during 2001-2005, we have drawn the following conclusions: *Ustilago maydis* (DC.) Corda and *Sorosporium holci-sorghi*(Riv.) Moesz. have produced the strongest attacks in maize stems, leaves, inflorescences and cobs in Bacău (7-40% respectively, 10-23%), Botoşani (7-33% respectively, 10-45%), Iaşi (10-35% respectively, 10 – 47%), Neamț (8-35% respectively, 7-35%), and Vaslui counties (3-45% respectively, 3-35%). The attacks were lower in Suceava and Vrancea counties; *Gibberella zeae* (Schw.) Petch. and *Drechslera turcica* (Pass.) Sub. produced weaker attacks in Bacău (7-25% respectively, 3-25%), Botoşani (0.5-10% respectively, 3-15%), Iaşi (3-35% respectively, 3-30%), Neamț (6-25% respectively, 10-35%), Vaslui (1-30% respectively, 1-10%) and Vrancea counties (1-40% respectively, 1-25%); *Nigrospora oryzae* (Berk. et Br.) Petch. produced low attacks in Bacău (0.1-20%), Neamț (0.3-12%), Suceava (2-10%) and Vaslui counties (1-30%).

In addition to the attack of these pathogens, losses caused by the following pests were added:

Agriotes ustulatus Schall., *A. lineatus* L., which attacked seeds and neck;

Tanymecus dilaticollis Gyll., which attacked plant leaves and neck. In Neamț County, 1883 ha were treated in 2004;

Ostrinia nubilalis Hb., which attacked stems, cobs and panicles. In 2002, in Neamț County, 21037 ha were treated, in 2003-12154 ha, and in 2004-9000 ha.;

Rhopalosiphum maydis Fitch. and *Heliothis armigera* Hb. attacked cobs.

The climatic conditions in the vegetation season (April-September), with draught and high temperatures during May-June and abundant rainfall during July-September, to which improper technological factors were added (4-5 year-maize continuous cropping, use of untreated seeds for sowing, lack of management and fertilization works) have resulted in the appearance and development of attacks of pathogenic agents and pests in maize crops from Moldavia. In certain counties, they exceeded the limit of damaging economic threshold.

PULSE AND FEED LEGUMES

Pea

Pseudomonas syringae p.v. pisi (Sackett.) Young, Dye et Wilkie presented low attacks in 2001 and 2003, in Botoşani, Iaşi and Neamț counties, with a frequency of 1-3% on almost 20% of the cultivated field.

Ascochyta pisi Lib. and *Ascochyta pinodella* Jones attacked pea with a frequency of 1-20% in Iaşi, Neamţ, Bacău and Vaslui counties; the attack was more reduced (1-3%) in Iaşi County in Aurelia and Marina varieties, in 2001 and 2005.

Erysiphe pisi (DC.) ex. Saint Amans was sporadically signalled in Iaşi, Neamţ and Vaslui counties, in 2001 and 2003.

Uromyces pisi (Pers.) De By. was mentioned in Iaşi, Bacău, Botoşani, Vaslui and Neamţ counties with a low attack in leaves (1-20%).

Bruchus pisorum L. produced attacks in pulse, with a frequency of 1-10% in pea varieties cultivated in Bacău, Botoşani, Iaşi, Vaslui, Neamţ, and Vrancea counties, in 2001, 2003, and 2005.

The treatment of seeds with Reldan 40 EC- 12.5 ml/t., was necessary after harvest.

Triaspis thoracicus was a parasite of *Bruchus pisorum* L. larvae found in pulse at a rate of 12-43%.

Sitona crinitus Hbst. and *S. lineatus* L. The density of adults being of 1-15 samples/m^2, they attacked the pea leaves at a rate of 15-30%, with an intensity of 1-3%, in all the counties from Moldavia, in 2001 and 2004.

Kakothrips (robustus) pisivorus Westw. attacked pods (F=1-12%), and *Cydia* (*Grapholitha*) *nigricana* F. produced weak attacks in pulses (1-3%), in Iaşi and Neamţ counties. *Acyrthosiplion pisum* Harr., *Mamestra pisi* L., *Autographa gamma* L.and *Amathes c-nigrum* produced weak attacks, with insignificant losses, in Iaşi and Vaslui counties.

Beans

Xanthomonas campestris pv. phaseoli (Smith.) Dye., associated to the other bacterioses, produced attacks on areas comprised between 20 and 40% in beans crops from Botoşani, Iaşi, Neamţ, and Vaslui counties, with the frequency of 5-30% in 2001 and 2003.

Colletotrichum lindemuthianum (Sacc. et Magn.) Br. et Cavara. The attack was noticed in all the crops, on the entire cultivated area, in 2001, 2002 and 2004, in Bacău, Botoşani, Vaslui and Iaşi counties, with the frequency of 10-20%, and lower values (1-3%) were found in the other counties.

Uromyces appendiculatus (Pers.) Ung. produced mean attacks (10-20%), in Bacău, Botoşani, Neamţ and Vrancea counties and low attacks in Iaşi and Vaslui counties, in 2001, 2002, and 2004.

Sclerotinia sclerotiorum (Lib.) de Bary produced a low attack (1-4%) in Neamţ, Bacău and Iaşi counties, during 2001-2004.

Acanthoscelides obsoletus Say. produced attacks in pulses of 0.1-0.5% in beans crops from Bacău, Botoşani and Iaşi counties and 0.1-2% in Neamţ, Vrancea and Vaslui counties. The untreated beans from storehouses and

households resulted in development of 1-2 generations. We recommend the treatment of seed with 40 EC- 12.5 ml/t, in storehouses and before sowing.

Tetranychus urticae Koch.. The attack was weak in beans and soybean leaves (1-18%), with 1-3 mobile forms/leaf, in Bacău, Iaşi, Neamț, Vaslui and Vrancea counties (2001, 2002, and 2004).

Soybean

Pseudomonas syringae pv. glicinea produced strong attacks in Bacău, and Botoşani (20-30%) and low attacks (1-7%) in Iaşi, Neamț and Vrancea counties (2001, 2004, and 2005).

Colletotrichum glycines Hari. was signalled in Botoşani, Vaslui, and Bacău counties, with a strong attack of 15-20%, and low attack in the other counties (2001-2004).

Peronospora manshurica (Naum.) Syd. et Gäum. was signalled in Bacău, Neamț and Vaslui counties with a mean attack (15-20%), in 2001, 2003, and 2005.

Erysiphe pisi D.C. et St. An. was signalled with a weak attack (1-17%) in Bacău, Iaşi, Neamț and Vaslui counties, in 2002, 2003, and 2004.

Delia (Phorbia) platura Meig. presented attacks in geminated seeds and seedlings (neck) (1-3%) in beans and soybean crops cultivated after spiked cereals and on wet soils, in Bacău, Iaşi and Neamț counties, during 2001-2004.

Etiella zinkenella Tr. caused weak attacks in bean (0.1-2%) in Bacău, Botoşani, Iaşi and Neamț counties, in 2001, 2003, and 2004.

Alfalfa

Pseudopeziza medicaginis (Lib.) Sacc.. In 2001, it produced weak attacks in leaves, at a rate of 1-7%, in seed and feed crops from Bacău, Iaşi, Vaslui and Neamț counties, during 2001-2004.

Uromyces striatus Schroet. had a weak attack (1-5%) in seed and feed crops from Bacău, Neamț and Vrancea counties and a sporadic attack in Iaşi, during 2001-2004.

Cuscuta sp. was signalled in all the counties from Moldavia, more frequently in lucerne fields.

Clover

Erysiphe polygoni DC. was mentioned only in Bacău, Iaşi and Neamț counties with weak attacks (1-12%), in 2001, 2003, 2005.

Pseudopeziza trifolii (Biv. Bernh.) Fuck. was sporadically signalled (0.5-2%) in Bacău, Iaşi and Neamț counties, during 2001-2005.

Uromyces trifolii (Hedw.) Lév. had a weak to mean atack (1-10%) in Bacău and Neamț counties, during 2001-2005.

Contarinia medicaginis Kieff. and *Bruchophagus roddi* Gus. produced attacks in seed lucerne fields, the first species in floral buds (1-7%), in Bacău, Botoşani, Neamț and Iaşi, and the second species attacked seeds (1-2%), during 2001-2004.

Adelphocoris lineolatus Goeze and *Lygus spp*. attacked floral buttons (0.1-2%). Alfalfa crops have been also attacked by *Sitona sp., Hypera variabilis* Hbst., *Subcoccinella 24-punctata* L., and *Phytodecta fornicata* Brügg. (attacks of 1-7%); (*Acyrthosiphon pisum* Harr.) and some leaf-eating Lepidoptera: *Semiothisa clathrata* L., *Mamestra suassa* Den. et Schiff., and *Amathes c-nigrum* L. They produced sporadic attacks. *Microtus arvalis* Pall. was signalled with sporadic attacks in Botoşani, Iaşi, and Vaslui counties.

For controlling pests from seed lucerne fields we recommend the products Sinoratox 50 CE (1 l/ha), associated to one of the following insecticides: Decis 2.5 CE (0.15 l/ha), Supersect 10 CE (0.15 l/ha), Sumialpha 2.5 CE (0.2 l/ha), Fastac 100 CE (0.05 l/ha), Regent 200 SC (0.1 l/ha) or Polytrin 200 CE (0.1 l/ha). The products are spread according to the scheme:

T_1 – maximum button formation;

T_2 – beginning of flowering, pod formation.

For controlling the pathogenic agents, we can use the fungicides Bavistin 50 WP (0.5 kg/ha), Bumper 250 CS (0.2 l/ha), etc.

INDUSTRIAL PLANTS

Sunflower

Plasmopara helianthi Novot. *f. sp. helianthi* Novot. had attacks of 7-10% in Bacău, Botoşani and Iaşi counties and 20% in Neamț. The attack was of 1-7% at the mother form from hybridization plots of Iaşi County, in 2001, 2003, and 2004.

Alternaria helianthi (Hansf. Tubakin et Mishihara) presented a weak attack (1-3%) in Iaşi and Vrancea counties, and a mean attack (5-12%) in Bacău, Neamț and Vaslui counties, in 2001, 2003, and 2004.

Phoma macdonaldii Boerma – *Phoma oleraceae* Sacc. *var. helianthi tuberosi* Sacc. In Bacău, Botoşani, Iaşi and Vrancea counties, they produced attacks comprised between 1-10% of cultivated areas, with low frequency (1-10%), during 2001-2004.

Phomopsis helianthi Mont. Cost. was signalled in Bacău, Botoşani, Vaslui and Iaşi counties on small areas (1-9%), the frequency of attacks being of 1-5%. In Neamț County, the atack was stronger (2-10%), in 2001, 2003, 2004.

Macrophomina phaseoli (Manbl.) Ashby, sclerotial form-*Sclerotium bataticola* (Tenb.) Butler. was signalled with weak attack in Iaşi and Botoşani counties (0.1-1%), moderate attack in Bacău (17%) and strong atack in Vaslui (30%), during 2001-2003.

Sclerotinia sclerotiorum (Lib.) De Bary attacked sunflower with a frequency of 5-15% in stems and heads, in Vrancea, Vaslui, Bacău, Botoşani, and

Iaşi counties, in 2001, 2002, 2004. The seed treatment by Ostenal diminished the attack of this pathogen below the damaging threshold.

Botrytis cinerea Pers. In 2001, 2003, 2004, it developed weak attacks in heads, the frequency being of 1-7% in Bacău and Botoşani counties and of 1-10% in Vrancea, Neamţ, Vaslui and Iaşi counties.

Brachyudus helichrysi Kalt. The sunflower crops presented sporadic attacks in leaves and heads, in 2001, 2003, and 2005, the damages being insignificant. *Chrysopa carnea* Steph., *Coccinella septempunctata* L., *Syrphus corollae* L., etc. diminished the populations of this pest at a rate of 20 – 70%, to which were associated the characteristics of high tolerance and resistance of sunflower hybrids and lines created in Moldavia (Agricultural Research Station of Podu-Iloaiei).

Homoeosoma nebulella Hb. attacked the sunflower hybrids with a frequency of 1-3% (heads) and 1-4% akenes in Botoşani, Iaşi, Vaslui and Vrancea counties. At the Agricultural Research Station of Podu-Iloaiei, we found, during 2001-2005, hybrids and many lines of total resistance to the attack of this pest's larvae.

Tanymecus palliatus F., *T. Dilaticollis* Gyl. and *Opatrum sabulosum* L. produced weak attacks (0.1-6%) in most sunflower crops from Moldavia, the density of adults being of 0.1-1 adults/m^2, during 2001-2005.

Agriotes spp. attacked (2001, 2003 and 2004) seeds and seedlings at a rate of 0-0.2% in crops with seed treated with Cruiser 350 FS 17.1 l/t, Mospilan 70 WP (12.5 kg/t). In crops with untreated seed, the attack was of 3-7%.

Sugar beet

Pythium de Baryanum Hesse, *Phoma betae* Tr. and *Rhyzoctonia solani* Kuhn. were signalled in Vaslui, Bacău, Iaşi and Neamţ counties, with an attack of 1- 10% during 2001-2004.

Erysiphae betae (Vanha) Weltz.. Weak attacks were signalled in Bacău, Neamţ, Iaşi, Vaslui and Vrancea counties, on small areas (10-15%), during 2001-2003.

Peronospora farinosa (Fr.) *f.sp. betae* Byford was signalled in Botoşani, Vaslui and Neamţ with low attacks (1-3%) in 2001, 2003, and 2004.

Cercospora beticola Sacc. Rare symptoms were found in all the crops, especially in irrigated ones. The attack was greater in Botoşani, Iaşi, Neamţ, Vaslui and Vrancea, in 2001, 2003 and 2005.

Ramularia betae Rostr. was signalled only in Neamţ County, with weak to mean attacks (5-15%). The beet crops will be carefully controlled during vegetation.

Bothynoderes punctiventris Germ., in associattion with *Tanymecus palliatus* F., showed weak and sporadic attacks in beet crops from Bacău, Botoşani, Iaşi and Neamţ counties (0.1-0.5 adults/m^2), the damages being small

and insignificant. The seed treatment with Carbodan 35 ST, Carbofuran 350-25 l/t, Furadan 35 ST-10.G.S.A./Kg seeds, etc. prevented and diminished the attack of these pests and of *Agriotes sp.,* under the damaging threshold, during 2001-2005.

Chaetocnema tibialis Ill., *Ch. haikertingeri* Liub. and *Opatrum sabulosum* L.. Sugar and fodder beet crops from Moldavia were attacked by 1-3 samples/m^2, in Iaşi and Neamț counties. Weak attacks produced by *Aphis fabae* Scop., *Pegomya betae* Curtis and *Mamestra brassicae* L. were signalled during 2001-2004.

Flax

Colletotrichum lini (Westerd) Tocchinai was signalled only in Iaşi and Neamț counties, with low attack (1-7%) in 2001 and 2003.

Fusarium oxysporum Schlecht. f. sp. *lini* was signalled sporadically in Neamț and Suceava counties, during 2001-2004.

Aphtona euphorbiae Schrank. attacked plants at emergence, on leaves and cotyledons, with the frequency of 7-15%, in Iaşi, Neamț and Vaslui counties. The seeds were treated before sowing with Furadan 35 ST or Promet 666 SCO, therefore, no damages being registered during 2001-2005.

Thrips linarius Uzel.was signalled sporadically in Iaşi and Vaslui counties, in 2001, 2003 and 2005.

Hemp

Septoria cannabis (Lasch.) Sacc. was signalled sporadically in Botoşani and Iaşi counties, with attacks in leaves of 1-5%, in 2001 and 2003.

Grapholita delineana Walker. The hemp crops from private farms in Iaşi, Neamț and Vaslui counties presented attacks with a frequency of 1-9% and 1-2 larvae/plant, to which the attack caused by *Psylliodes attenuata* Koch. was associated at emergence and in vegetation (3-10%), the density of adults being of 3-10 samples/m^2, in 2001, 2003 and 2004.

Poppy

Stenocarus fuliginosus Marsch and *Ceuthorrhynchus macula-alba* Hbst. produced low attacks on roots and heads (1-5%), with 1-2 larvae/root or head (Iaşi County), during 2001-2004.

Rape and Mustard

Meligethes aeneus F., *Phyllotreta atra* F., P. *nemorum* L., *P. undulata* Kut., *P. nigripens* F. and *Colaphellus sophiae* Schall. attacked rape, mustard, cabbage, radish and kohlrabi in untreated crops, with the frequency of 7-22% and 1-3 adults and larvae/plant in Iaşi, Neamț and Vaslui counties.

Athalia colibri Chris. presented low attacks on floral buttons and pods from untreated rape and mustard crops in Iaşi and Neamţ counties. For controlling these pests we applied treatments with Sinoratox 50 CE (1 l/ha), associated to Fastac 100 CE (0.5 l/ha) or to Polytrin 2.5 CE (0.05 l/ha) or only with Regent 200 CS (0.1 l/ha). The treatment was applied at the appearance of adults and first larvae, only at the warning of the plant protection laboratory, with protection measures for bees and humans, during 2001-2005.

FOOD PLANTS

Potato

Potato virus Y, Potato leafroll virus, Potato virus X attacked potato crops from Central and Southern area of Moldavia, and from high humidity counties (Suceava, Neamţ and Bacău). The attack registered values of 3-30%, especially in some varieties like Ostara Désirée and foreign ones. For avoiding the attack, we recommend the reintroduction of planting virosis-free material, produced in close areas by authorized farming units.

Erwinia carotovora pv.atroseptica (van Hall.) Dye attacked potato plants with the frequency of 2-20% in Iaşi and Vaslui counties and 10-30% in Bacău and Vaslui, in 2001 and 2003.

Phytophtora infestans (Mont.) de Bary was signalled in Neamţ, Bacău, Suceava, Vaslui and Vrancea counties, with the frequency of the attack on leaves of 15-20%. Complex treatments were necessary on 1500-3000 ha from the above-mentioned counties, to which insecticides were associated for controlling the Colorado beetle. The attack on tubers was of 2-3%, in 2001 and 2004.

Alternaria porri (Ell.) Say. f. sp. *solani* (Ell. et Mart.) Neerg. produced higher attacks in Bacău, Vaslui, Suceava and Iaşi counties, with the frequency of 15-30%. In untreated crops, yield losses were of 15-18% in Suceava County, in 2001, 2003 and 2004.

Streptomyces scabies (Thaxter) Wakaman et Henrici intensified the attack on tubers. It was found in Bacău, Iaşi, Neamţ and Suceava counties.

Leptinotarsa decemlineata Say.. Potato crops from Moldavia presented mean and high attacks, produced by adults and larvae, in both generations, during 2001-2005: 0.1-2 adults/bush and 10-20 larvae/bush. Treatments were carried out at warning with the following products: Decis 2.5 CE (0.3 l/ha), Sinoratox 50 CE (2 l/ha), associated with Fastac (0.1 l/ha) or Decis (0.1 l/ha). We have also applied the products Polytrin 2.5 CE (0.15 l/ha) and Regent 200 CS (0.1 l/ha), which had the highest efficiency in controlling adults and larvae (90-100% mortality). For controlling the Colorado beetle and other pests, which attacked eggplant, tomato and sweet pepper crops, we recommended the application of treatments with the same insecticides at warning.

Dythylenchus destructor Thorne and *Heterodera rostochiensis* Woll. attacked the potato tubers at rates of 1-12% in Bacău, Botoşani, Iaşi, and Neamţ

counties and 30-50% in Suceava County. The rate of attacks produced by *Melolontha melolontha* L. (1-5%), *Gryllotalpa gryllotalpa* Latr. larvae was of 1-2% and by *Agriotes spp*., of 1-7%, in Iaşi, Bacău, Neamț, and Suceava counties. They produced 3-10 stings/tuber. For the efficient control of these pests, we recommended the application of complex technologies: 4-6 year crop rotations, fertilization with moderate rates of N and higher rates of P and K, growing of resistant varieties, and treatments with efficient insecto-fungicides on soil and in vegetation, during 2001-2005.

Tomato

Clavibacter michiganensis pv. michiganensis David et al.. Low and mean attacks were signalled in protected places and tomato crops from fields, on areas up to 20%, in Iaşi, Botoşani, Neamț and Suceava, during 2001-2005.

Phytophtora infestans (Mont.) de Bary. In untreated crops, it produced low attacks of 10-15% in Iaşi and Vaslui counties, and strong attacks on leaves, at rates of 50-70% in Bacău, Botoşani, Neamț and Vrancea counties. The attack on fruits was of 10-12%. Treatments were applied on areas cultivated with tomatoes, in each county. In untreated crops, yield losses were high (30-60%), in 2001, 2003, and 2004.

Septoria lycopersici Speg. attacked most of tomato crops from Bacău, Botoşani, Iaşi, Neamț, Vaslui and Vrancea counties, with the mean frequency of 7-30%, on 45% of cultivated areas. In tomatoes from greenhouses and solaria, *Sclerotinia sclerotiorum* (Lib.) de Bary, in association with *Verticillium dahliae* and *Fusarium oxysporum* Schlecht, f. sp. *lycopersici* Syd and Hansen, were signalled, producing insignificant damages during 2001-2005.

Fulvia fulvum Cooke produced an attack with the frequency of 3-12% in 2001, 2003 and 2004, to the end of summer and in September, in Bacău, Botoşani, Vaslui, Vrancea and Neamț. In untreated crops, the damages were much greater. In Vrancea County, 100-300 ha were treated each year.

Sweet pepper

Leveillula solanacearum Golov. f. sp. *capsici* (Berger) Golov. was signalled with mean attack of 7-12% in Bacău, Neamț and Vaslui counties, in sweet pepper and tomato, in 2001 and 2004.

Cucumber mosaic virus in peper was signalled in fields (1-3% attacked plants in Iaşi, Neamț and Vrancea). *Verticillium dahliae* Kleb, with the frequency of 1-7% was present in Vaslui and Vrancea, during 2001-2004.

Erwinia carotovora pv. *carotovora* (Jones) Bergey et al. had a weak attack of 3-12% on 20-35% from cultivated areas, in Bacău, Botoşani, Neamț and Vrancea. The atack was found in eggplants, during 2001-2004.

Helicoverpa armigera Hbn. increased its attack in tomato and sweet pepper (5-18%), in field crops and in all the vegetables basins from Moldavia. We

recommended treatments at warning with Regent 200 SC, Decis 25 CE, Decis 12 CERV, Fastac 10CE, Karate Zeon, Polytrin 200 CE, etc., efficient products for vegetables pests, during 2001-2005.

Onion

Erwinia carotovora pv. *carotovora* (Jones) Bergey et al. was signalled in Bacău, Botoşani, Nemț and Vrancea, as mean (20-35%) and low attacks (1-7%), in Iaşi and Vaslui counties. During storing, losses were average (10-25%), in the period 2001-2004.

Peronospora destructor (Berk.) Casp. produced mean and high attacks between 30 and 65% in untreated crops from Bacău, Botoşani, Iaşi, Neamț and Vrancea counties, with the mean frequency of 10-12%. Treatments were applied in all the counties of Moldavia, on areas over 80% from those cultivated during 2001-2005.

Botrytis allii Munn. was signalled with mean attack (10-20%) in Bacău, Botoşani, Iaşi and Neamț counties on areas between 15-50% from those cultivated. The attack was present in storehouses, which were not disinfected.

Delia (hylemyia) antiqua Meig. and *Dytylenchus dipsaci* Kühn. were signalled in onion and garlic, producing attacks in bulbs with the frequency of 1-5%. *Suillia lurida* Meig. şi *Ceuthorrhynehus suturalis* attacked onion and garlic with a frequency of 1-2%, in Bacău, Iaşi, Vaslui and Vrancea counties. We recommended treatments with Fastac 10 CE (0.15 l/ha), Decis 2.5 CE (0.25 l/ha), Sumialpha 2.5 CE (0.5 l/ha) or Regent 200 CS (0.1 l/ha), in association with fungicides, ensuring a very good protection of onion and garlic crops, for the control of pathogens and pests, during 2001-2005.

Garlic

Embellisia allii (Camp.) Simmons sin. *Helminthosporium allii* Capm. presented a low attack (1-7%) in Bacău, Botoşani, Iaşi, Neamț and Vrancea counties.

Scerotinia sclerotiorum (Lib.) de Bary presented low to mean attacks (3-7%) in Bacău, Botoşani, Iaşi, Neamț and Vrancea counties, both in garlic and onion, during 2001-2004.

Cabbage

Erwinia carotovora pv. *carotovora* (Jones) Bergey et al. was signalled with weak attacks (3-10%) in Bacău, Botoşani, Iaşi, Vaslui and Neamț counties, stronger attacks being found on moisture excess fields, during 2001-2003.

Xanthomonas campestris pv. campestris (Bryan et Mc Wosthler) Dye., presented weak attacks (5%) in Bacău County and strong ones in Iaşi and Neamț, during 2001-2004. In the same period, there were also signalled attacks of

Peronospora brasicae Gäumann, *Plasmodiophora brassicae* War. and *Phoma lingam* (Tode et Fr.) Desm. in Iaşi and Neamţ counties (10-20%).

Mamestra brassicae L and *Pieris brassicae* L. attacked cabbage at a rate of 3-18% in untreated fields. In August and September 2001-2005, the attack of *Brevicoryne brassicae* L.was signalled. It has been controlled like the other pests by applying treatments with Sinoratox 50 CE (1 l/ha), in association with Decis 2.5 CE (0.2 l/ha), Fastac (0.1 l/ha), Ephymethrin 10 EC (0.1 l/ha), or Polytrin 2.5 CE (0.05 l/ha). Weak and sporadic attacks were signalled, produced by *Delia brassicae* Bche. (1-5%) and *Gryllotalpa gryllotalpa* Latr., which caused damages in irrigated cabbage, tomato, sweet pepper and onion crops, at rates of 1-15%, especially in storehouses, solaria and nurseries, where soil had not been treated before planting.

Cucumbers

Pseudoperonospora cubensis (Berk. et Curt.) Rost. was signalled in all the counties of Moldavia with the frequency of 7-30% on 20-45% from cultivated areas. In certain counties, treatments were applied on areas of 50-150 ha, during 2001-2005.

Sphaerotheca filiginea (Schlecht. ex. Fr.) Pall. attacked crops from all the counties in the second part of vegetation, with the frequency comprised between 7 and 40% on 10-20% of cultivated areas, resulting in higher yield losses in untreated crops.

Pseudomonas syringae pv. lacrimans (Smith et Bryan.) Young, Dye et Wilkie was signalled in Bacău, Botoşani, Iaşi, Vrancea, Vaslui and Neamţ counties, the frequency of attacks being between 10-45%.

Colletotrichum lagenarium (Pass.) Ell et Halbst. was signalled in Bacău, Botoşani, Neamţ, Vrancea and Vaslui on 10-50% from cultivated areas, with weak to mean attacks. Pests from vegetables crops in field, greenhouse and solarium (sweet pepper, tomato, eggplant and cucumber) generally presented weak attacks. Attacks produced by other pests *Helicoverpa armigera* Hbn, *Cerosipha ghossypii* (Glov.), *Trialeurodes vaporariorum* West. and acarids *Tetranychus urticae*, *Polyphagotarsonemus latus* Bank were also associated. During 2001-2005, we recommended and carried out complex treatments.

Carrot, parsley and celery

These vegetables have been sporadically attacked by *Erwinia* pv. *carotovora* (Jones) Bergey, *Erysiphe umbeliferarum* de By., *Alternaria dauci* (Kühn.) Groves et Skolka, and *Septoria apriicola* Speg. in Neamţ, Bacău and Vrancea counties.

Aethes williana Brahm. produced attacks on carrot stems and roots, at a rate of 7-20%, associated to disease attack. Insecto-fungicides treatments were applied at warning, the damages being insignificant.

FRUIT TREES AND BUSHES

Apple tree-Pear tree

Erwinia amylovora (Burill) Winslow, Broodhorst, Buchanan, Krunwiede, Roger and Smith. were spread in plantations from Moldavia, in county phytosanitary units and Fruit-Tree Growing Research Station of Fălticeni and Iaşi. In Bacău County, the attack was signalled on 1500 ha. in Botoşani , on 700 – 800 ha, in Neamţ -300 ha., in Suceava -300 ha., in Vaslui -390 ha. and in Vrancea – 300 ha. The attack had the frequency between 20 -50%. For preventing the attack, treatments were applied on 300-600 ha, during 2001 – 2005. This dangerous disease extended to pear tree and quince tree, causing high yield losses by clearing the attacked fruit trees.

*Venturia inaequalis (*Cooke) Wint. In plantations from Moldavia counties, the frequency of the attack was of 10 – 30%. In improperly treated orchards, the frequency of the attack reached 30-50% (2001, 2002, and 2004).

Podosphaera leucotricha (Ell.et Ev.) Salm. attacked leaves and shoots with the frequency of 20-55%, affecting 40-55% of the orchard areas from Moldavia. The most affected varieties were Jonathan apples and the new ones from abroad. Treatments were applied on areas between 100 and 1000 ha. in Vrancea, Iaşi,Vaslui and Suceava counties (2001-2005).

Monilinia fructigena (Aderh. et Ruhl.) Honey produced attacks with frequencies comprised between 12% and 60%.

Great pest populations infested fruit tree orchards, especially the untreated ones, during 2001-2005. The most important species were: *Quadraspidiotus perniciosus* Comst., *Laspeyresia - Cydia pomonella* L, with attacks on fruits of 15-60% in Bacău, Iaşi, Neamţ, Suceava, and Vrancea, *Anthonomus pomorum* L., which produced high attacks. *Sciaphobus squalidus* L. produced yield losses between 12-35% in apple tree and 1-12% in pear tree, in Iaşi, Suceava, and Vrancea counties. Due to correct treatments, the attack of these pests has diminished (2001-2005).

Bryobia rubrioculus Scheut., *Panonicus ulmi* Koch. and *Tetranychus viennensis* Zach. attacked orchards of apple, pear and plum trees from Botoşani, Iaşi, Neamţ, Suceava and Vrancea counties, on leaves (8-20%), with 1-3 mobile forms/leaf. Sporadic and low attacks were also signalled in leaves of apple trees, which were produced by species *Phyllonorycter blancardella* Fabr., *Ph. coryfoliella* Hb., *Lyonetia clerkella* L., *Stimella malella* St., *Leucoptera scitella* Z., *Euproctis chrysorrheaea* L., *Malacosoma neustria* L. These attacks were signalled especially in fruit-tree growing basins from Fălticeni - Suceava County and Vrancea and Iaşi counties (2001-2005).

Adoxophyies reticulana Hb. produced attacks in apples with the frequency of 1-20% (Iaşi, Suceava,Vaslui, Vrancea and Neamţ), especially in 2001, 2003 and 2004 .

Aphis pomi De Geer, *Psylla mali* Smid., *Psylla pyricola* Först., and *Psylla pyrisuga* Först. produced weak attacks in all the fruit trees growing basins from Moldavia. In apple and pear trees from fruit-growing basins, where treatments were applied according to the recommendations of county phytosanitary units, damages were diminished under the damaging economic threshold (2001-2005).

Plum tree

Plum pox virus was met in all plum tree orchards from Moldavia, with the frequency of 10-45%, especially in Agean and Vinete româneşti varieties (2001 and 2003).

Polystigma rubrum (Pers.) DC. was found in untreated orchards with a frequency of attacks of 10 – 35%. In monitored orchards, the attack was very low–below 3%.

Monilionia laxa (Aderh. et Ruhl.) Honey was signalled in all the counties from Moldavia. In treated orchards, the attack was minimum, below 5%. In plum tree orchards, treatments were applied on areas comprised between 1200- 300 ha in each county (Iaşi, Neamţ, and Suceava).

Plum tree was attacked during 2001-2005 by *Cydia pomonella* L. with the frequency of 10 – 35% in untreated orchards from Iaşi, Neamţ and Suceava counties. In treated orchards, the attack was low. The presence of *Grapholita molesta* Busck. and *Anarsia lineatella* Zell. was also signalled in peach and apricot trees (Iaşi and Vrancea) with low attacks.

Hoplocampa minuta Christ. produced losses at a rate of 1-8% in plum tree orchards (Iaşi, Bacău, Neamţ, and Suceava counties).

Hyalopterus arundinis F. produced low attacks in June and July in untreated plum trees in villages from all the counties of Moldavia.

Eurytoma schreineri Schr. extended its attack area, presenting values of 12-35% in Neamţ, Iaşi, Suceava, Vaslui and Vrancea counties.

Sweet cherry and sour cherry tree

Monilinia laxa (Aderh. et Ruhl.) Honey attacked sweet cherry and sour cherry trees in all the counties from Moldavia, with the frequency of 20-30%, and fruits at a rate of 1-10%. The attacks in orchards affected areas of 20-35% from their total, where improper treatments were not applied In Vrancea, Vaslui, and Neamţ counties, treatments were applied on areas of 70-500 ha (2001-2005).

Blumeriella jaapii (Rehm.) v.Arx was signalled on areas of 10-50% from sweet cherry tree orchards, with low attacks (1-20%). In treated orchards, the attack was low (below 3%).

Stigmina carpophylla (Lév.) Ellis produced mean attacks in orchards from Iaşi, Neamţ, Botoşani, and Vaslui counties, and strong attacks in untreated fruit trees. The frequency of the attack was of 10-20% (2001 and 2003).

Ragoletis cerasi L. was signalled in the entire Moldavia with attacks in sweet cherry trees of 10 – 20% and 1 – 10% in sour cherry trees, late varieties, especially in Iaşi, Suceava,Vaslui and Vrancea counties (2001 – 2004)

Hyphantria cunea Drury produced an attack during 2001 – 2005 in fruit-growing and forest species from Moldavia (larvae of the second generation), especially in fruit trees from villages and towns. For controlling this pest, treatments conducted by county phytosanitary units were applied.

Nut tree

Xanthomonas campestris pv. juglans (Pierce) Dye. was signalled in Botoşani, Iaşi, Neamţ,Vaslui and Vrancea counties, with attacks comprised between 10-20%.

Gnomonia leptostyla (Fr.) Ces. et de Not. attacked leaves at a rate of 15 – 25%.

Eriophyes tristriatus var.erineus Nal. was signalled in the entire region of Moldavia, with attacks comprised between 10- 20%.

Laspeyresia amplana Hb. produced attacks in fruits (3-10%), in nut trees from villages.

Strawberry plant

Mycosphaerella fragariae (Tul.) Lind**.** produced weak and mean attacks in untreated plantations from Iaşi, Neamţ, and Vaslui counties, with frequencies comprised between 5 - 25%.

Botrytis cinerea Pers. attacked plantations from Botoşani, Iaşi and Vaslui with a frequency of 5 – 25%.

Vine

Plasmopara viticola (Berk. et Curt.) Berl. et de Toni. According to data of Wine- Growing Research Stations from Iaşi and Odobeşti, during 1002 – 2005, conditions for downy mildew of vine grapes were more favourable in 2001, 2002 and 2004, during the vegetation season (April 1–September 30), when greater amounts of rainfall were registered compared to the normal ones (335.5 mm).

The downy mildew attack was weak in treated attacks, in experiments where a large range of fungicides were used: Mikal, Mancozeb, Sandofan, Turdacupral, Antracol, Folicur M or Bordeaux mixture.

Uncinula necator (Schw.) Burr was signalled in 2001, 2003 and 2004. Because of drought and high temperatures, it had favourable conditions of evolution. On untreated areas, the degree of powdery mildew attack reached 12-15% in leaves and 60% in shoots. In grapes, the attack reached 5-15%, according to variety. For the control, the products Anvil, Folicur solo, Karathane, Vectra, and Tilt were used.

Sclerotinia fuckeliana (De By.) Fuck. appeared after the beginning of grapes ripening, because of rainfall from August, during 2001-2004, which created favourable conditions for the attack. According to the observations from September in untreated plots, the frequency of attacks was of 60 – 70%.

Eupoecilia ambiguella Hb., *Lobesia botrana* Den. et Schiff attacked grapes with various frequencies (0.1 – 1.5% in Iaşi County, 0.1-1.7% in Vaslui County and 0.5-1.5% in Vrancea County). *Eupoecilia ambiguella* was a dominant species with 1-3 larvae/bunch of grapes.

Tetranychus urticae Koch., *Eriophyes vitis* Nall. and *Phyllocoptes vitis* Nal. attacked vinestocks, buds and leaves at a rate of 1-20% in Iaşi County, 1-22% in Vaslui County and 1- 17% in Vrancea County. The strongest attacks were found in Aligoté, Aromat de Iaşi and Grasă de Cotnari varieties.

Boarmia rhomboidaria Den. et Schiff. attacked sporadically vine buds and leaves in Iaşi and Vrancea counties, but in Vaslui and Vrancea counties, it was present only in plantations situated near forests.

There were also signalled low attacks produced by *Sparganothis pilleriana* Den. et Schiff. *Hyphantria cunea* Drury, *Pulvinaria vitis* L., and *Phyloxera vitifolii* Planch. On some stocks and hybrids, *Anaphothrips vitis* Priesner (Khnechtel. *Vespa germanica*, *Byctiscus betulae* L., *Sciaphobus aqualidus* Gyll., and *Parthenolecanium corni* Bché .were found in plantations from Iaşi, Vaslui, and Vrancea counties. In new vine plantations and nurseries, *Agriotes* sp. and *Melolontha melolontha* L. attacked young shoots from ridges or hills (1 – 7%), on untreated areas at planting.

As the biological stock of pathogens and pests from vine plantations in Moldavia was maintained at high values, complex treatments were required at the recommendation of forecast and warning stations, by using the most efficient fungicides and insecticides, the damages being found below the limit of damaging economic threshold.

Data presented in this work, for the period 2001-2005, are the results of research units, University of Agricultural Sciences and Veterinary Medicine of Iaşi and Phytosanitary Units from Moldavia, which have brought valuable and efficient contributions to the activity of plant protection.