RESEARCH ON THE EVOLUTION OF *Lymantria monacha* L. (LEPIDOPTERA, LYMANTRIIDAE) DURING THE YEARS 2011-2020 WITHIN THE MIERCUREA SIBIULUI FOREST DISTRICT (ROMANIA)

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Abstract. This work is a summary carried out following the centralization of all the collection data of the defoliator *Lymantria monacha,* produced with feromonal traps from 2011 to 2020 in the Sibiului forest site. This forest fund in the county of Sibiu is made up of the following production units: UP Bistra, UP IV Ciban, UP V Pode, which covers an area of 14,911 ha. As a result of the centralization of the collection data from the years 2011 to 2020, 18,663 specimens were taken from the 81 collection points. In 2020, 2,905 specimens have been taken, the highest value of the last ten years, which is why we are proposing to increase the number of feromonal traps and their location, especially in the affected areas, in order to avoid a massive pest attack in 2021.

Keywords: *Lymantria monacha* L., the sylvic bypassing of Miercurea Sibiului (Sibiu, Romania), ferromonal traps.

Rezumat. Cercetări privind evoluția *Lymantria monacha* L. (Lepidoptera, Lymantriidae) în perioada anilor 2011-2020 în cadrul ocolului silvic Miercurea Sibiului (România). Prezenta lucrare este o sinteză realizată în urma centralizării tuturor datelor de colectare ale defoliatorului *Lymantria monacha,* realizate cu ajutorul capcanelor pheromonee începând cu anul 2011 și până în anul 2020 în cadrul ocolului silvic Miercurea Sibiului. Acest fond forestier de pe raza județului Sibiu are în componență următoarele unități de producție: UP Bistra, UP IV Ciban, UP V Pode, ce se întinde pe o suprafață de 14,911 ha. În urma centralizării datelor de colectare din intervalul cuprins între anii 2011-2020, au rezultat un număr de 18,663 de exemplare capturate din cele 81 de puncte de colectare. În anul 2020 s-au înregistrat cele mai multe capturi din ultimii zece ani – 2,905 exemplare, de aceea propunem creșterea numărului de curse pheromonee și a punctelor de amplasare a acestora, mai ales în zonele afectate, pentru a evita un atac masiv al dăunătorului în anul 2021.

Cuvinte cheie: *Lymantria monacha* L., ocolul silvic Miercurea Sibiului (Sibiu, România), capcane pheromone.

INTRODUCTION

The study of this invasive species of *Lymantria monacha* Linnaeus, 1758 there has been a continuing concern for researchers worldwide and numerous specialist articles have been published over time (ALTENKIRCH et al., 1986; BEJER, 1998; BEXA et al., 2013, DZIADOWIEC et al., 1985; FUESTER et al., 1975; GRUBER et al., 1978; HUMPHREYS & ALLEN, 2002; KEENA, 2003; MOREWOOD et al., 2000; PENG et al., 2016, SCHWERDTFEGER, 1981; WITHERS & KENNA, 2001). *L. monacha* iis considered to be a widely distributed trans-palearctic species from Japan, Korea, China, Russia, East and West Siberia, South East and European countries (BARANCHIKOV et al., 1997). From the latest data published in 2021 by CABI.org, the global presence of this defoliator is the next in Europe to affect 32 countries (Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Slovenia, Balearic Islands, Sweden, Switzerland, Ukraine, United Kingdom), and in Asia the species was reported in 25 countries (https://www.cabi.org/isc/datasheet/31811).

In Romania specialized articles on the knowledge, distribution and evolution of this species have been published over time by different groups of researchers (MIHALCIUC et al., 1988; MIHALCIUC & SIMIONESCU,1989; MIHALCIUC et al., 1997, 1998, 2000; OLTEAN et al., 2003; ANTONIE, 2015).

The research, observations and monitoring of the species *Lymantria monacha* in the Miercurea Sibiului forest area started in 2011; some of the results of these studies were published in the following articles (STANCĂ-MOISE & BLAJ, 2017a; STANCĂ-MOISE et al., 2017b; STANCĂ-MOISE, 2014; 2016; 2019; STANCĂ-MOISE & BRERETON, 2020; STANCĂ-MOISE & BLAJ, 2020a, 2020b). During the ten years of studies on the perimeter of the bypass, feromonal traps were set up at 81 points, out of the three production units (Tables 1, 2 and Fig. 1). With the help of these we have monitored the evolution of the defoliator, the degree of attack, the application of measures and means of combating on an annual basis, as well as the proposal of the number of traps for the next year depending on the catches of the previous year. In our research around the world, studies have been carried out and results were published regarding the monitoring of other species harmful to forestry, such as choleoptera (*Hylobius abietis* and *Ips typographus*) (STANCĂ-MOISE et al., 2018c).

Figure 1. The map of the Miercurea Sibiului Forest area (orig.).

MATERIAL AND METHODS

A monitoring system comprising three steps was proposed in the Miercurea Sibiului forestry district (Fig. 1) along the ten-year period 2011-2020, to determine the evolution of the *Lymantria monacha* pest and propose methods of control population. The 81 capture points with the help of pheromonepheromone traps were placed in a monitoring system (1:20,000) so that there is a control point at about 200 ha covering the entire area that can be infested. The administrative unit, geographical coordinates, altitude, slope position, exposure, slope, type of resort, type of forest, composition of the tree, age of the trees, served area and number of catches were recorded at each control point (Tables 1, 2).

Warning traps with AntraLymon feromones mounted on plastic panel traps with adhesives (caterpillar glue), produced by the "Raluca Ripan" Institute of Chemistry Cluj-Napoca, were used annually to study the population dynamics of this pest (Fig. 2). Once installed, pheromone traps were installed in mid June or in early July depending on the flight period of adults and climatic conditions. They were followed regularly, inventorying the number of males caught to check on the species and avoid reaching a critical damage threshold. Depending on the number of specimens collected, we were able to determine the damage forecast each year and the need for treatments for the following year.

In the III Bistra production unit, where spruce (Mo) is found in proportion of 70%, the age of the trees is between 45-160 years, a number of 29 pheromone traps were placed in the time interval between June and July of the years 2011-2020. Within the perimeter of this production unit, the distribution of traps was as follows (10 inside the forest, 18 in the middle, 1 in the upper area).

In the IV Ciban production unit, where spruce (Mo) prevails in a proportion of 99%, the trees are aged between 30-170 years, a number of 30 pheromone traps were placed in the time interval between June and July 2011-2020. Within this production unit (Table 1, 2), the distribution of traps was as follows (13 inside the forest, 10 in the middle, 5 in the upper area, 1 in the massif area and 1 at the edge of the massif).

In the V Pode production unit, where spruce (Mo) prevails in a proportion of 100%, the age of the trees is between 20-150 years, 22 pheromone traps were placed at the middle of July of the years 2011-2020. Within this production unit (Tables 1, 2), the distribution of traps was as follows (1 inside the forest, 8 in the middle, 4 in the upper area, 7 in the massif area and 2 at the edge of the massif).

Figure 2. Production unit III Bistra, pheromone panels installed in 2020 (orig.).

RESULTS AND DISCUSSIONS

The results of the surveillance and monitoring of changes in the species *Lymantria monacha* during the years 2011-2020 (Table 1, 2), after analysing the inventory field and centralizing the results, totalled a number of 18,633 specimens captured in the three production units (III Bistra, IV Ciban and V Pode). The data obtained were: 2011 – 1,978 specimens; 2012 – 2,476 specimens; 2013 – 2,106 specimens; 2014 – 779 specimens; 2015 – 1,160 specimens; 2016 – 1,431 specimens; 2017 – 1,805 specimens; 2019 – 2,011 specimens and 2020 – 2,905 specimens.

In the III Bistra production unit, the pest was monitored in 29 points in 29 administrative units, the geographical coordinates are passed for each collection point. The altitude is between 700-1600 m, the exposure of the slopes is SW, SE, N, S, E and V, the slopes have inclinations between 7-50, the current composition is 5Fa3Mo2Br but most administrative units have spruce in proportion of 100%, and the trees are 45-160 years old. Following the centralization of data collection during the years 2011-2020 we obtained the following results: 2011 – 837 specimens; 2012 – 923 specimens; 2013 – 661 specimens; 2014 – 417 specimens; 2015 – 634 specimens; 2016 – 636 specimens; 2017 – 890 specimens; 2018 – 840 specimens; 2019 – 872 specimens; 2020 – 1,184 specimens (Fig. 3).

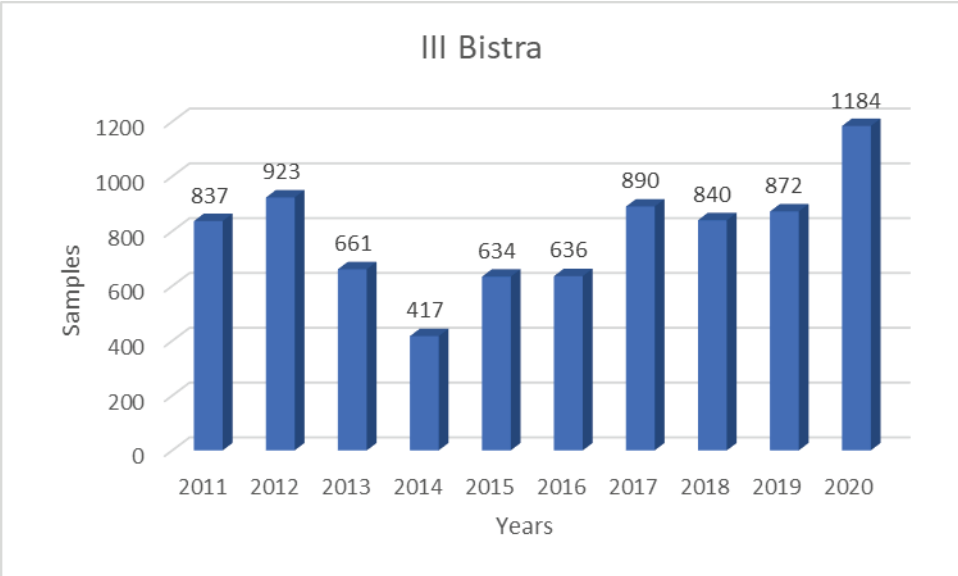

Figure 3. The evolution of the *Lymantria monacha* pest in the time interval 2011-2020, in the III Bistra production unit.

In the IV Ciban production unit, the pest was monitored in 30 points in 30 administrative units, the geographical coordinates are passed for each collection point. The altitude is between 1150-1600 m, the exposure of the slopes is SV, NV, SE, N, S, E and V, the slopes have slopes between 11-38, the current composition is 8Mo1Br1Fa but for most administrative units about 90% the dominant species is spruce, and the trees are 30-170 years old. After centralizing the data collection during the years 2011-2020 we obtained the following results: 2011 – 615 specimens; 2012 – 761specimens; 2013 – 858 specimens; 2014 – 317 specimens; 2015 – 391 specimens; 2016 – 588 specimens; 2017 – 480 specimens; 2018 – 811 specimens; 2019 – 724 specimens; 2020 – 1,160 specimens (Fig. 4).

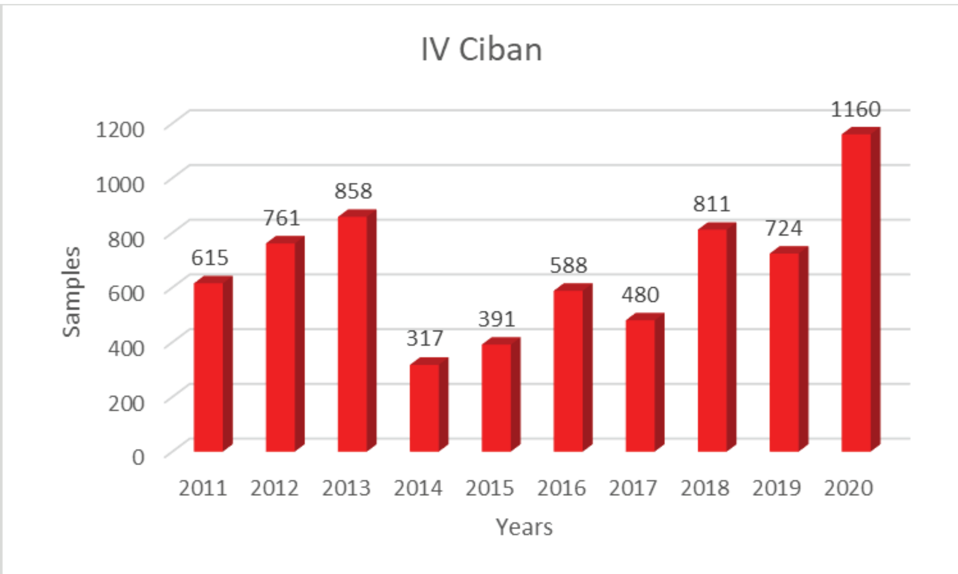

Figure 4. Evolution of the pest *Lymantria monacha* in the period 2011-2020, in the production unit IV Ciban.

In the V Pode production unit, the pest was monitored in 22 points in 22 administrative units, the geographical coordinates are passed for each collection point. The altitude is between 1151-1154 m, the exposure of the slopes is NW, SE, N, S and V, the slopes have inclinations between 15-38, the current composition consists of 100% spruce, and the trees are aged 20-150 years. Following the centralization of data collection during the years 2011-2020 we obtained the following results: 2011 – 526 specimens; 2012 – 792 specimens; 2013 – 587 specimens; 2014 – 45 specimens; 2015 – 135 specimens; 2016 – 207 specimens; 2017 – 435 specimens; 2018 – 361 specimens; 2019 – 415 specimens; 2020 – 561 specimens (Fig. 5).

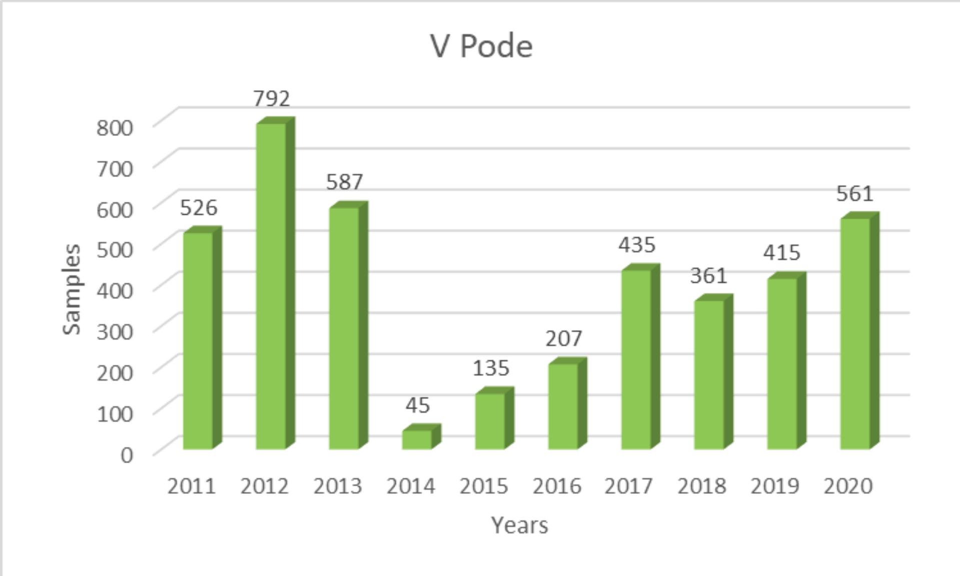

Figure 5. The evolution of the *Lymantria monacha* pest in the time interval 2011-2020, in the V Pode production unit.

CONCLUSIONS

Research on the development of the *Lymantria monacha* pest around the forest of Miercurea Sibiului was conducted from 2011 to 2020, based on an annual centralization of data collections selecting specific control measures against the attack of FIEC. Some of the research results were published during 2017 (STANCĂ-MOISE & BLAJ, 2017a; STANCĂ-MOISE et al., 2017b); 2018 (STANCĂ-MOISE C.& BLAJ R. 2018b), and 2020 (STANCĂ-MOISE & BLAJ, 2020 b, c), but the present paper aims at a synthesis of these data from the last ten years. Following the evolution of catches during the ten years, we observed a decrease in the number of collections in 2014 - 779 samples in all three administrative units (III Bistra, IV, Ciban, V Pode), and then the number gradually increased by 2020, with the highest number of samples taken in and the last ten years in all three administrative units.

According to data published in the literature and the legislation on forest protection, the excess of the threshold of 2000-3000 specimens caught in a season flight (MARKOV, 1999) is a warning threshold in terms of the outbreaks in the coming year, during the detour in 2021. Therefore, as control measures for 2021, it was proposed to increase the number of pheromone traps and collection points in the forest perimeter, in order to avoid the extension of outbreaks.

In order to limit the spread of the harmful *Lymantria monacha* in around the forest of Miercurea Sibiului we propose to continue with this system of monitoring and control in the future and if a strong attack will occur, we won't discard the application of chemical treatments.

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Table 1. Data on the evolution of the species *Lymantria monachal* L., 1758 in the time interval between the years 2011-2015.

Number of checkpoints	UUUPP	Administrative unit	Geographical coordinates		Altitude (m)	Position on the slope	Exhibition	Tilt	Forest resort type	The type of forest	The current composition of the forest	The current age of the trees years	Served area (ha)	Total catches recorded in the year:				
			North	East										2011	2012	2013	2014	2015
1	III Bistra	16	45 °71'25.8"	23° 60'34.5"	700	B	SV	50	3120	4191	5Fa 3Mo2Br	145	200	18	14	13	16	11
2	III Bistra	20	45 °70'50.7"	23° 58'24.6"	730	M	NV	50	3120	1342	7Fa 1Mo 2Br	155	200	21	18	12	14	16
3	III Bistra	22B	45 °69'05.0"	23° 61'35.5"	850	B	SV	30	3332	4114	6Fa 4Mo	55	200	14	13	15	22	15
4	III Bistra	34A	45 °68'29.0"	23° 69'56.4"	1250	M	SV	16	2332	1121	10Mo	75	200	19	15	13	10	12
5	III Bistra	31A	45 °68'30.9"	23° 68'06.7"	1300	M	SV	18	2332	1151	10Mo	75	200	15	21	17	7	10
6	III Bistra	36A	45 °68'42.2"	23° 67'88.5"	1300	M	SE	26	2333	1111	10Mo	60	200	11	67	20	16	17
7	III Bistra	40A	45 °67'06.4"	23° 68'79.9"	1250	M	S	20	3333	1311	4Mo4Br2Fa	150	200	15	26	31	14	18
8	III Bistra	45B	45 °67'77.9"	23° 69'70.1"	1400	M	E	21	2333	1111	10Mo	45	200	28	17	19	8	5
9	III Bistra	46C	45 °67'97.4"	23° 71'47.7"	1300	M	S	18	2321	1142	10Mo	20	200	10	26	15	5	11
10	III Bistra	61A	45 °66'34.9"	23° 72'61.2"	1350	M	V	23	2332	1121	10Mo	50	200	21	32	14	5	4
11	III Bistra	70	45 °66'23.3"	23° 72'97.9"	1400	B	S	20	2332	1121	10Mo	65	200	18	24	9	3	6
12	III Bistra	77B	45 °65'27.2"	23° 74'25.2"	1600	M	S	12	2332	1151	10Mo	60	200	12	10	9	4	10
13	III Bistra	85B	45 °64'98.5"	23° 73'54.1"	1550	M	V	10	2510	1172	10Mo	45	200	11	5	9	3	11
14	III Bistra	107A	45 °63'80.8"	23° 73'52.0"	1550	B	SV	18	2311	1122	10Mo	60	200	13	8	10	2	14
15	III Bistra	110C	45 °64'16.0"	23° 71'72.6"	1600	B	NV	7	2510	1172	10Mo	45	200	9	8	8	5	12
16	III Bistra	116B	45 °63'94.5"	23° 70'37.8"	1550	M	NV	16	2332	1151	10Mo	40	200	14	15	11	4	12
17	III Bistra	118C	45 °63'34.1"	23° 68'94.5"	1500	B	NE	10	2311	1153	10Mo	125	200	10	6	12	3	14
18	III Bistra	124A	45 °64'94.1"	23° 70'12.2"	1500	M	E	25	2332	1121	10Mo	80	200	15	17	11	5	16
19	III Bistra	129A	45 °64'71.1"	23° 69'85.0"	1500	M	NE	30	2333	1111	10Mo	85	200	40	47	11	18	40
20	III Bistra	134	45 °66'44.7"	23° 68'53.9"	1500	B	NE	20	2333	1111	10Mo	90	200	65	68	50	27	45
21	III Bistra	145	45 °65'10.8"	23° 68'26.9"	1500	M	NV	21	2332	1151	10Mo	75	200	72	65	58	35	38
22	III Bistra	154A	45 °65'68.7"	23° 67'78.3"	1400	M	N	27	2333	1111	8MO2BR	105	200	40	38	42	24	30
23	III Bistra	160	45 °67'41.0"	23° 66'90.5"	1300	B	NV	30	2333	1111	8Mo1Br1Fa	100	200	63	49	25	27	45
24	III Bistra	162B	45 °67'68.3"	23° 66'62.6"	1300	M	NV	35	2333	1111	10Mo	100	200	67	62	30	31	50
25	III Bistra	164B	45 °67'46.2"	23° 66'62.2"	1200	M	NV	27	2333	1111	10Mo	105	200	45	69	53	30	48
26	III Bistra	168B	45 °67'66.5"	23° 64'39.7"	1200	M	NV	28	2332	1121	10Mo	125	200	43	55	45	28	38
27	III Bistra	170B	45 °67'33.7"	23° 63'89.6"	1300	C	NE	25	2333	1111	10Mo	115	200	52	52	53	16	40
28	III Bistra	181A	45 °68'25.3"	23° 60'70.1"	1050	B	N	36	3332	1341	7Fa 3Mo	150	200	48	48	28	23	28
29	III Bistra	184B	45 °67'49.7"	23° 59'43.6"	1050	B	NE	38	3311	1422	8Fa 2Mo	160	200	28	28	18	12	18
30	IV Ciban	15/16	45 °65'31.6"	23° 63'18.5"	1300	B	S	38	3332	1413	10Mo	150	200	30	36	41	19	16

31	IV Ciban	17B	45 °65'40.0"	23° 64'04.0"	1400	B	SV	38	2332	1114	10Mo	75	200	41	33	30	23	49
32	IV Ciban	26/27	45 °64'94.8"	23° 64'52.0"	1400	M	S	38	3332	1413	8Mo1Br1Fa	170	200	38	38	39	16	18
33	IV Ciban	34A	45 °63'33.6"	23° 67'18.5"	1400	M	S	22	2332	1151	10Mo	75	200	38	39	28	18	21
34	IV Ciban	30B	45 °64'06.0"	23° 66'44.0"	1300	B	SE	22	2332	1151	10Mo	80	200	43	48	37	20	22
35	IV Ciban	29B	45 °64'15.0"	23° 60'41.2"	1400	M	S	30	2332	1114	10Mo	80	200	47	47	34	15	20
36	IV Ciban	12B	45 °66'30.0"	23° 64'73.0"	1200	B	S	20	2332	1114	10Mo	70	200	30	30	22	16	19
37	IV Ciban	72A	45 °62'14.7"	23° 68'31.8"	1300	M	SV	26	2312	1151	10Mo	70	200	18	26	42	6	5
38	IV Ciban	63A	45 °60'15.4"	23° 66'24.1"	1200	B	S	15	2312	1121	10Mo	95	200	16	25	41	9	7
39	IV Ciban	48A	45 °63'27.6"	23° 64'73.8"	1500	B	S	42	2332	1114	10Mo	145	200	12	24	39	11	7
40	IV Ciban	42B	45 °62'37.5"	23° 66'56.1"	1250	B	E	18	2332	1151	10Mo	70	200	18	32	40	9	4
41	IV Ciban	68	45 °61'39.1"	23° 68'07.7"	1300	B	S	26	2312	1121	10Mo	70	200	11	33	44	7	5
42	IV Ciban	54A	45 °61'25.9"	23° 64'12.9"	1300	C	SV	38	2332	1114	10Mo	60	200	11	24	35	4	7
43	IV Ciban	97A	45 °61'10.3"	23° 72'11.1"	1300	B	SE	12	2312	1121	10Mo	55	200	8	8	31	5	6
44	IV Ciban	119A	45 °61'40.3"	23° 73'67.4"	1400	M	NV	21	2312	1121	10Mo	50	200	9	18	23	7	9
45	IV Ciban	85A	45 °62'60.3"	23° 74'37.7"	1500	M	NV	10	2510	1172	10Mo	50	200	6	6	18	5	2
46	IV Ciban	93B	45 °61'36.7"	23° 69'14.2"	1300	M	SV	41	2311	1153	10Mo	95	200	7	27	27	8	6
47	IV Ciban	103B	45 °62'13.5"	23° 73'36.0"	1550	M	SV	11	2510	1172	10Mo	100	200	2	24	23	4	5
48	IV Ciban	127A	45 °60'21.7"	23° 74'99.6"	1500	B	N	15	2311	1153	10Mo	35	200	2	26	31	5	4
49	IV Ciban	131B	45 °60'28.3"	23° 73'93.1"	1500	M	N	25	2311	1153	10Mo	30	200	8	19	40	3	8
50	IV Ciban	135	45 °60'55.3"	23° 71'90.5"	1500	B	NV	26	2311	1153	10Mo	50	200	9	17	32	3	2
51	IV Ciban	154A	45 °60'12.1"	23° 70'54.9"	1400	B	E	20	2312	1151	10Mo	60	200	14	23	24	2	6
52	IV Ciban	157C	45 °61'05.2"	23° 68'01.3"	1450	B	N	28	2312	1151	10Mo	50	200	4	9	30	1	5
53	IV Ciban	175A	45 °59'94.7"	23° 65'31.4"	1150	M	N	30	2332	1114	10Mo	60	200	16	20	17	19	27
54	IV Ciban	195A	45 °59'01.6"	23° 64'62.2"	1250	M	NV	42	2311	1153	10Mo	110	200	41	28	21	16	31
55	IV Ciban	182B	45 °58'77.0"	23° 65'80.1"	1450	M	NV	20	2312	1151	10Mo	55	200	36	28	13	13	25
56	IV Ciban	179B	45 °59'02.8"	23° 67'54.5"	1600	C	NV	20	1310	1154	10Mo	135	200	28	28	19	20	23
57	IV Ciban	199A	45 °58'78.8"	23° 63'30.5"	1350	C	NV	36	2312	1151	10Mo	110	200	49	27	24	16	19
58	IV Ciban	158C	45 °61'47.2"	23° 68'72.5"	1450	M	V	25	2312	1151	10Mo	60	200	23	18	13	17	13
59	V Pode	6/7	45 °56'87.4"	23° 62'19.8"	1350	M	V	24	2312	1151	10Mo	110	200	8	30	18	1	3
60	V Pode	14A	45 °55'60.7"	23° 62'98.1"	1350	M	SE	24	2312	1151	10Mo	45	200	12	32	21	2	2
61	V Pode	20D	45 °55'63.2"	23° 63'89.1"	1500	M	NV	15	2312	1151	10Mo	20	200	7	35	18	1	2
62	V Pode	22	45 °55'16.9"	23° 62'74.0"	1300	M	V	20	2312	1151	10Mo	40	200	11	32	22	1	3
63	V Pode	25	45 °54'18.3"	23° 63'73.6"	1250	M	V	38	2311	1153	10Mo	35	200	14	30	23	2	2

64	V Pode	183B	45 °57'66.0"	23° 62'71.5"	1300	M	N	20	2312	1151	10Mo	60	200	12	30	18	1	3
65	V Pode	175A	45 °56'46.4"	23° 68'87.3"	1550	M	S	25	2311	1153	10Mo	145	200	11	28	20	1	2
66	V Pode	43A	45 °55'03.9"	23° 66'49.1"	1450	C	SV	22	2312	1151	10Mo	55	200	42	36	36	1	2
67	V Pode	63	45 °56'65.6"	23° 67'75.3"	1550	M	V	20	2312	1151	10Mo	40	200	37	55	35	2	3
68	V Pode	75D	45 °54'40.8"	23° 67'98.2"	1400	C	V	20	2311	1153	10Mo	65	200	40	24	37	0	7
69	V Pode	95A/96	45 °54'65.2"	23° 69'27.1"	1550	C	N	20	2510	1172	10Mo	95	200	31	42	43	1	5
70	V Pode	82B	45 °56'35.5"	23° 70'11.1"	1550	M	S	28	2311	1153	10Mo	100	200	34	26	22	1	4
71	V Pode	109B	45 °54'03.1"	23° 66'39.0"	1400	C	N	18	2311	1153	10Mo	105	200	42	52	23	2	10
72	V Pode	113A	45 °53'86.9"	23° 64'47.7"	1300	B	N	22	2312	1151	10Mo	50	200	27	47	25	0	3
73	V Pode	126A	45 °52'79.5"	23° 66'28.4"	1500	M	S	26	2312	1151	10Mo	135	200	40	53	30	2	8
74	V Pode	88A	45 °56'50.3"	23° 71'74.2"	1500	M	NV	22	2311	1153	10Mo	130	200	24	49	28	3	8
75	V Pode	106A	45 °53'85.9"	23° 67'35.7"	1550	M	N	26	2311	1153	10Mo	50	200	52	52	32	0	6
76	V Pode	134B	45 °51'33.9"	23° 65'45.1"	1450	M	S	31	2312	1151	10Mo	75	200	9	26	24	4	8
77	V Pode	143E	45 °52'61.4"	23° 68'36.9"	1600	M	S	24	2311	1153	10Mo	66	200	12	21	25	5	8
78	V Pode	174A	45 °54'80.9"	23° 74'71.2"	1550	M	S	25	2311	1153	10Mo	150	200	16	22	24	1	13
79	V Pode	151B	45 °54'05.2"	23° 71'34.8"	1500	M	SV	22	2311	1153	10Mo	105	200	13	24	27	4	12
80	V Pode	159A	45 °53'93.1"	23° 69'72.5"	1600	M	V	20	1310	1154	10Mo	145	200	15	22	21	6	8
81	V Pode	169C	45 °54'98.3"	23° 73'57.1"	1600	M	SV	25	1311	1153	10Mo	135	200	17	24	15	4	13
	TOTAL												**16200**	**1978**	**2476**	**2106**	**779**	**1160**

Table 2. Data on the evolution of the species *Lymantria monachal* L., 1758 in the time interval between the years 2016-2020.

Number of checkpoints	**Production unit**	**Administrative unit**	**Geographical coordinates**		**Altitude (m)**	**Position on the slope**	**Exhibition**	**Tilt**	**Forest resort type**	**The type of forest**	**The current composition of the forest**	**The current age of the trees years**	**Served area (ha)**	**Total catches recorded in the year:**				
			N	**E**	**m**									**2016**	**2017**	**2018**	**2019**	**2020**
1	III Bistra	16	45 °71'25.8"	23° 60'34.5"	700	B	SV	50	3120	1342	5Fa 3Mo2Br	150	200	10	11	13	12	18
2	III Bistra	20	45 °70'50.7"	23° 58'24.6"	730	M	NV	50	3120	1342	7Fa 1Mo 2Br	160	200	15	14	14	11	13
3	III Bistra	22B	45 °69'05.0"	23° 61'35.5"	850	B	SV	30	3332	4114	9MO1PI	60	200	15	15	12	15	16
4	III Bistra	34A	45 °68'29.0"	23° 69'56.4"	1250	M	SV	16	2332	1121	10Mo	80	200	14	27	21	38	48
5	III Bistra	31A	45 °68'30.9"	23° 68'06.7"	1300	M	SV	18	2332	1151	10Mo	80	200	16	25	18	40	50
6	III Bistra	36A	45 °68'42.2"	23° 67'88.5"	1300	M	SE	26	2333	1111	10Mo	80	200	12	18	35	38	42
7	III Bistra	40A	45 °67'06.4"	23° 68'79.9"	1250	M	S	20	3333	1311	2Mo6Br2Fa	160	200	18	20	34	36	38
8	III Bistra	45B	45 °67'77.9"	23° 69'70.1"	1400	M	E	21	2333	1111	10Mo	60	200	10	19	21	15	24
9	III Bistra	46C	45 °67'97.4"	23° 71'47.7"	1450	M	S	18	2321	1142	10Mo	20	200	8	13	12	12	16
10	III Bistra	61A	45 °66'34.9"	23° 72'61.2"	1250	M	V	23	2332	1121	10Mo	55	200	12	10	15	15	14
11	III Bistra	70	45 °66'23.3"	23° 72'97.9"	1400	B	S	20	2332	1121	10Mo	70	200	10	5	6	12	12

12	III Bistra		77B	45 °65'27.2"	23° 74'25.2"	1600	M	S	12	2311	1153	10Mo	65	200	6	18	12	23	20
13	III Bistra		85B	45 °64'98.5"	23° 73'54.1"	1550	M	V	10	2510	1172	10Mo	50	200	8	20	15	20	17
14	III Bistra		107A	45 °63'80.8"	23° 73'52.0"	1550	B	SV	18	2311	1122	10Mo	65	200	11	26	21	24	19
15	III Bistra		110C	45 °64'16.0"	23° 71'72.6"	1600	B	NV	7	2510	1172	10Mo	50	200	8	23	22	18	25
16	III Bistra		116B	45 °63'94.5"	23° 70'37.8"	1550	M	NV	16	2332	1151	10Mo	40	200	11	26	29	30	22
17	III Bistra		118C	45 °63'34.1"	23° 68'94.5"	1500	B	NE	10	2311	1153	10Mo	130	200	9	21	17	28	32
18	III Bistra		124A	45 °64'94.1"	23° 70'12.2"	1500	M	E	25	2332	1121	10Mo	90	200	9	22	12	31	22
19	III Bistra		129A	45 °64'71.1"	23° 69'85.0"	1500	M	NE	30	2333	1111	10Mo	95	200	25	41	32	24	35
20	III Bistra		134A	45 °66'44.7"	23° 68'53.9"	1500	B	NE	20	2333	1111	9Mo1Fa	95	200	45	74	46	47	52
21	III Bistra		145A	45 °65'10.8"	23° 68'26.9"	1300	M	NV	21	2332	1151	10Mo	80	200	40	65	45	49	**135**
22	III Bistra		154A	45 °65'68.7"	23° 67'78.3"	1400	M	N	27	2333	1111	9MO1BR	110	200	39	40	48	30	84
23	III Bistra		160A	45 °67'41.0"	23° 66'90.5"	1300	B	NV	30	2333	1111	8Mo1Br1Fa	100	200	30	75	52	32	64
24	III Bistra		162B	45 °67'68.3"	23° 66'62.6"	1300	M	NV	35	2333	1111	10Mo	105	200	**64**	58	54	44	58
25	III Bistra		164B	45 °67'46.2"	23° 66'62.2"	1200	M	NV	27	2332	1114	10Mo	110	200	52	61	49	49	64
26	III Bistra		168B	45 °67'66.5"	23° 64'39.7"	1200	M	NV	28	2332	1121	8Mo2DT	130	200	57	**84**	**70**	**64**	86
27	III Bistra		170B	45 °67'33.7"	23° 63'89.6"	1300	C	NE	25	2333	1111	8Mo1Br1Fa	120	200	27	20	54	54	74
28	III Bistra		181A	45 °68'25.3"	23° 60'70.1"	1050	B	N	36	3332	1341	7Fa 3Mo	170	200	18	18	28	28	48
29	III Bistra		184	45 °67'49.7"	23° 59'43.6"	1050	B	NE	38	3311	1342	5Fa 5Mo	160	200	37	21	33	33	36
30	IV Ciban		15/16	45 °65'31.6"	23° 63'18.5"	1300	B	S	38	3332	1413	7Fa 3Mo	160	200	21	22	37	54	42
31	IV Ciban		17B	45 °65'40.0"	23° 64'04.0"	1400	B	SV	38	2332	1114	10Mo	75	200	27	49	43	47	51
32	IV Ciban		26/27	45 °64'94.8"	23° 64'52.0"	1400	M	S	38	3332	1413	8Mo1Br1Fa	180	200	21	34	34	37	49
33	IV Ciban		34A	45 °63'33.6"	23° 67'18.5"	1400	M	S	22	2312	1151	10Mo	85	200	26	18	28	40	32
34	IV Ciban		30B	45 °64'06.0"	23° 66'44.0"	1300	B	SE	22	2312	1151	10Mo	85	200	27	21	29	41	48
35	IV Ciban		29B	45 °64'15.0"	23° 60'41.2"	1400	M	S	30	2332	1114	10Mo	85	200	17	26	28	33	39
36	IV Ciban		12B	45 °66'30.0"	23° 64'73.0"	1350	B	S	20	2332	1114	10Mo	75	200	20	28	45	36	39
37	IV Ciban		72A	45 °62'14.7"	23° 68'31.8"	1300	M	SV	26	2312	1151	10Mo	75	200	24	14	42	12	36
38	IV Ciban		63A	45 °60'15.4"	23° 66'24.1"	1300	B	S	15	2312	1121	10Mo	100	200	20	12	37	14	24
39	IV Ciban		48A	45 °63'27.6"	23° 64'73.8"	1250	B	S	42	2332	1114	10Mo	150	200	23	13	38	13	18
40	IV Ciban		42B	45 °62'37.5"	23° 66'56.1"	1450	B	E	18	2332	1151	10Mo	75	200	23	17	40	16	16
41	IV Ciban		68	45 °61'39.1"	23° 68'07.7"	1300	B	S	26	2312	1121	10Mo	100	200	24	23	38	12	27
42	IV Ciban		54A	45 °61'25.9"	23° 64'12.9"	1300	C	SV	38	2332	1114	10Mo	65	200	23	13	37	15	88
43	IV Ciban		97A	45 °61'10.3"	23° 72'11.1"	1300	B	SE	12	2312	1121	10Mo	60	200	19	9	11	19	33
44	IV Ciban		119A	45 °61'40.3"	23° 73'67.4"	1400	M	NV	21	2311	1153	10Mo	55	200	20	11	9	22	32
45	IV Ciban		85A	45 °62'60.3"	23° 74'37.7"	1500	M	NV	10	2510	1172	10Mo	55	200	13	11	10	7	23
46	IV Ciban		93B	45 °61'36.7"	23° 69'14.2"	1300	M	SV	41	2311	1153	10Mo	100	200	16	7	13	19	23
47	IV Ciban		103B	45 °62'13.5"	23° 73'36.0"	1550	M	SV	11	2510	1172	10Mo	110	200	14	5	15	12	31

48	IV Ciban	127A	45 °60'21.7"	23° 74'99.6"	1500	B	N	15	2311	1153	10Mo	40	200	20	7	13	12	30
49	IV Ciban	131B	45 °60'28.3"	23° 73'93.1"	1500	M	N	25	2311	1153	10Mo	20	200	19	6	9	15	28
50	IV Ciban	135	45 °60'55.3"	23° 71'90.5"	1500	B	NV	26	2311	1153	10Mo	55	200	17	6	16	9	31
51	IV Ciban	154A	45 °60'12.1"	23° 70'54.9"	1400	B	E	20	2312	1151	10Mo	65	200	13	6	10	18	24
52	IV Ciban	157C	45 °61'05.2"	23° 68'01.3"	1450	B	N	28	2312	1151	10Mo	50	200	16	8	19	11	47
53	IV Ciban	175A	45 °59'94.7"	23° 65'31.4"	1150	M	N	30	2332	1114	10Mo	65	200	19	33	43	47	61
54	IV Ciban	195A	45 °59'01.6"	23° 64'62.2"	1250	M	NV	42	2311	1153	10Mo	115	200	26	25	40	35	83
55	IV Ciban	182B	45 °58'77.0"	23° 65'80.1"	1450	M	NV	20	2312	1151	10Mo	65	200	20	13	38	29	57
56	IV Ciban	179A	45 °59'02.8"	23° 67'54.5"	1500	C	NV	20	1310	1154	10Mo	65	200	25	19	41	41	47
57	IV Ciban	199A	45 °58'78.8"	23° 63'30.5"	1350	C	NV	36	2312	1151	10Mo	120	200	21	9	9	29	42
58	IV Ciban	158C	45 °61'47.2"	23° 68'72.5"	1450	M	V	25	2312	1151	10Mo	65	200	14	15	39	29	59
59	V Pode	6/7B	45 °56'87.4"	23° 62'19.8"	1350	M	V	24	2312	1151	10Mo	120	200	2	12	12	22	30
60	V Pode	14A	45 °55'60.7"	23° 62'98.1"	1350	M	SE	24	2312	1151	10Mo	50	200	3	15	12	21	38
61	V Pode	20D	45 °55'63.2"	23° 63'89.1"	1500	M	NV	15	2312	1151	10Mo	25	200	2	19	10	23	38
62	V Pode	22	45 °55'16.9"	23° 62'74.0"	1300	M	V	20	2312	1151	10Mo	50	200	12	22	10	22	28
63	V Pode	25	45 °54'18.3"	23° 63'73.6"	1250	M	V	38	2311	1153	10Mo	40	200	6	20	8	20	30
64	V Pode	183B	45 °57'66.0"	23° 62'71.5"	1300	M	N	20	2312	1151	10Mo	60	200	8	18	11	24	25
65	V Pode	175A	45 °56'46.4"	23° 68'87.3"	1550	M	S	25	2311	1153	10Mo	145	200	12	13	13	24	29
66	V Pode	43A	45 °55'03.9"	23° 66'49.1"	1450	C	SV	22	2312	1151	10Mo	55	200	2	11	8	15	7
67	V Pode	63	45 °56'65.6"	23° 67'75.3"	1550	M	V	20	2312	1151	10Mo	45	200	4	16	11	17	5
68	V Pode	75D	45 °54'40.8"	23° 67'98.2"	1400	C	V	20	2311	1151	10Mo	100	200	5	13	9	9	11
69	V Pode	95A/96	45 °54'65.2"	23° 69'27.1"	1550	C	N	20	2510	1172	10Mo	100	200	8	21	6	18	23
70	V Pode	82B	45 °56'35.5"	23° 70'11.1"	1550	M	S	28	2311	1153	10Mo	105	200	7	14	22	16	19
71	V Pode	109B	45 °54'03.1"	23° 66'39.0"	1400	C	N	18	2311	1153	10Mo	110	200	10	25	23	17	24
72	V Pode	113A	45 °53'86.9"	23° 64'47.7"	1300	B	N	22	2312	1151	10Mo	55	200	9	17	25	18	19
73	V Pode	126A	45 °52'79.5"	23° 66'28.4"	1500	M	S	26	2312	1151	10Mo	145	200	12	27	30	20	30
74	V Pode	88A	45 °56'50.3"	23° 71'74.2"	1500	M	NV	22	2311	1153	10Mo	140	200	7	27	28	19	32
75	V Pode	106A	45 °53'85.9"	23° 67'35.7"	1550	M	N	26	2311	1153	10Mo	55	200	6	24	32	18	31
76	V Pode	134B	45 °51'33.9"	23° 65'45.1"	1450	M	S	31	2312	1151	10Mo	80	200	13	17	11	13	26
77	V Pode	143E	45 °52'61.4"	23° 68'36.9"	1600	M	S	24	2311	1153	10Mo	65	200	11	23	13	11	23
78	V Pode	174A	45 °54'80.9"	23° 74'71.2"	1550	M	S	25	2311	1153	10Mo	155	200	13	16	18	13	29
79	V Pode	151B	45 °54'05.2"	23° 71'34.8"	1500	M	SV	22	2311	1153	10Mo	100	200	18	21	19	18	20
80	V Pode	159B	45 °53'93.1"	23° 69'72.5"	1600	M	V	20	1310	1154	10Mo	150	200	19	21	18	19	24
81	V Pode	169C	45 °54'98.3"	23° 73'57.1"	1600	M	SV	25	1311	1153	10Mo	140	200	18	23	12	18	20
	TOTAL OCOL PADURE DE STAT												**16200**	**1431**	**1805**	**2012**	**2011**	**2905**