

قسم : الرقابة الصحية على الأغذية .
كلية : الطب البيطري - جامعة أسيوط .
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دراسة عن تواجد الفطريات في روث الحيوانات المذبوحة
في مصر العليا وعلاقتها بصحة اللحوم مع الأخذ في الاعتبار

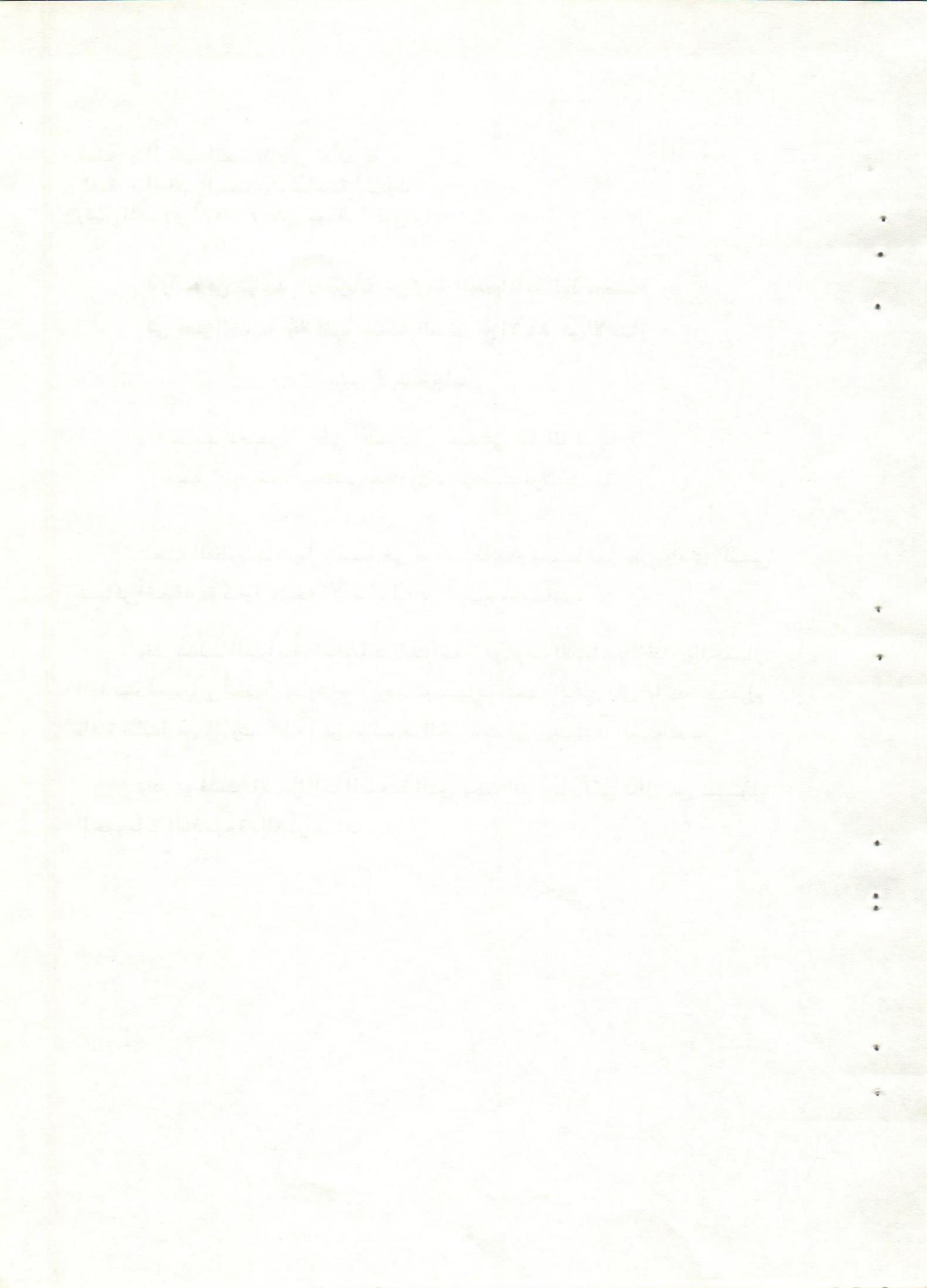
جنس الاسبرجلس

سعد نصر ، على لطفي ، حسني عبد اللطيف ،
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تلعب الفطريات دوراً رئيسياً في فساد اللحوم ومنتجاتها مما يؤدي إلى خسائر اقتصادية كبيرة نتيجة الاعدام لتلك اللحوم ومنتجاتها .

وقد شملت الدراسة الفطريات المتواجدة في روث الابقار والاغنام والجمال المذبوحة بمجازر أسيوط وسوهاج ، وقد تم حساب العدد الكلي لكل واحد جرام مادة صلبة من الروث كما تم عزل وتصنيف الفطريات من روث تلك الحيوانات .

وقد نوقشت الاجراءات الصحية التي يجب اتباعها لكي تقلل من تلوث الحيوانات المذبوحة بالفطريات .



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**INCIDENCE OF MOULDS IN THE INTESTINAL TRACT OF
SLAUGHTERED ANIMALS IN RELATION TO MEAT HYGIENE**

(With 4 Tables)

By

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SUMMARY

120 faecal samples obtained from slaughtered cattle, sheep and camel were subjected for mycological examination. The average mould count/g faeces were 8000, 137000 and 90000 in the winter time while in summer the average were 1.2 million, 2 million and 1 million in the examined samples of cattle, sheep and camel respectively. The following mould genera could be isolated, Aspergillus, Penicillium Mucor, Rhizopus, Absidia, Geotrichum, Cladosporium, Alternaria, Pithomyces, Fusarium and Paecilomyces. Moreover the genus Aspergillus could be identified into the following species, A.niger, A.terreus, A.flavus link, A.flavus var. columnaris, A.parasiticus, A.oryzae, A.sydowi, A.amstelddami, A.chevalieri, A.ruber, A.nidulans, A.ornatus and A.versicolor.

Suggested measures for improvement the Hygienic standard in the slaughter houses and to minimize the risk of mould contamination of fresh meat were discussed.

INTRODUCTION

Moulds are widely distributed in the nature and contaminate meat and meat products through several ways. The intestinal contents of the slaughtered animals were considered as an important source of mould contamination of fresh meat, these were studied by several authors, ROLLE & KOLB, 1954; AINWORTH & AUSTWICK, 1955 a,b; VAN UDEN & SOUSA, 1957; BATISTA, et al. 1961; SIVERS, 1962; MEHNERT, 1965; HADLOCK, 1964; KLARE, 1971; LUND, 1974; ROLLE & MAYER, 1967 and ABDEL-RAHMAN, 1981. Moreover LEISTNER & AYRES, 1967; MOSSEL, et al. 1968; HADLOCK, et al. 1976, 1977; BEUCHAT, 1978; ABDEL-RAHMAN, et al. 1984; ABDEL-RAHMAN and EL-BASSIONY, 1984 stated that the genus Aspergillus and Penicillium were the most predominant mould genera in fresh, stored, cured and processed meat. This work was planned to determine the incidence of the moulds in the intestinal contents of the slaughtered cattle, sheep and camel in Upper Egypt in order to establish the quality and the quantity estimation of mould with their taxonomic position.

MATERIAL and METHODS

120 faecal samples obtained from slaughtered cattle, sheep and camel during the winter and summer times and examined mycologically according to the methods recommended by KLARE (1971) and ABDEL-RAHMAN (1981). The identification of isolates were carried out according to ROPER & FENNEL (1965); ROPER & THOM (1949); SAMSON (1979); ZYCHA, et al. (1969); BARNNETT & HUNTER (1972).

RESULTS

The results were recorded in tables 1, 2, 3 and 4.

DISCUSSION

a) Total mould count:

The results given in table (1) revealed that the total mould count/g total solid of the examined faecal samples of cattle ranged from 1953 to 400000 with mean value of about 77000 in the winter time, while in summer the count ranged from 110000 to 4.2 million with a mean value of 1.2 million. These findings showed a high count in summer and low count in winter than those which are recorded by KLARE (1971) and ABDEL-RAHMAN (1981). The count in the sheep samples in winter laid between 4500 and 625000 with an average of 137000, while in summer the count ranged from 36000 and 17 million with an average of 2.3 million. The examined faecal samples of camel in winter revealed a count ranged from 3000 to 300000 with an average of 95000, while in summer lied between 84000 and 6.3 million with an average of about 1 million. From the results obtained its clear that the count in summer time is high than those in winter and was attributed the nature and hygiene of the ration.

b) Total Aspergillus count:

The average Aspergillus count/g total solid faeces of the examined samples of cattle given in table (2) were about 27000 and 700000, in sheep 39000 and 1.3 million and in camel 28000 and 515000 in winter and summer times respectively. These findings are nearly similar in their incidence but differ in their percentage to those which are recorded by BATISTA, et al. (1961); KLARE (1971) and ABDEL-RAHMAN (1981).

c) Mould genera:

Cattle: The results given in table (3) showed that the average count and percentage of mould genera in winter and summer were: Aspergillus 26878 (35.1%), 702990 (56.7%), Penicilium 31685 (41.41%), 155225 (12.6%), Mucor 2619 (3.4%), 119468 (9.6%), Absidia 3625 (4.7%), 100675 (8.1%), Rhizopus 4445 (5.8%), 59533 (4.8%), Geotrichum 2793 (3.7%), 13212 (1.1%), Cladosporium 2724 (3.6%), 23580 (1.9%), Fuzarium, Pithomyces, Paecilomyces and unidentified mould genera in percentage less than 1.4%. These findings are nearly similars in the incidence but differed in the percentage to those which are recorded by VAN UDEN and SAUSA (1957); BATISTA, et al. (1961); HADLOK (1964); KLARE (1971) and ABDEL-RAHMAN (1981).

Sheep: The following mould genera could be isolated: Aspergillus, Penicillium, Mucor, Absidia, Rhizopus, Geotrichum, Cladosporium and Fuzarium in the following count and percentage in winter and summer 40000 (28.8%), 1.4 million (60.0%), 40000 (32.2%), 300000 (13.4%), 18000 (12.8%), 130000 (5.6%), 14000 (10.2%), 220000 (9.7%), 603 (0.4%), 58000 (2.5%), 12000 (9.0%),

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82000 (3.6%), 5000 (3.6%), 3000 (0.1%), 3900 (2.8%), 50000 (2.2%), while Pithomyces and unidentified mould genera in percentage of 2.9% in summer and 0.2% in winter respectively.

Camel: The isolated mould genera from the examined faecal samples of camel in winter and summer were in the following average count and percentage: Aspergillus 28000 (29%), 520000 (51.8%), Penicillium, 25000 (26.4%), 160000 (6.2%), Absidia 20000 (21.4%), 85000 (8.7%), Rhizopus 1700 (2.0%), 57000 (5.8%), Geotrichum 11000 (12.0%), 4300 (4.3%), Cladosporium 1600 (2.0%), ---, Fuzarium, 3000 (3.0%), ---, Alternaria 1325 (1.1%), 12000 (1.2%), Paecilomyces 354 (0.1%), 54000 (5.5%), unidentified mould genera 83 (0.04%), 140 (0.02%) respectively.

C) Aspergillus species:

The results given in table (4), showed that A.niger, A.terreus, A.flavus link, A.flavus var columnaris and A.nidulans could be from the examined samples of cattle, sheep and camels in the winter and summer times, while the percentage of the identified Aspergillus species in cattle in winter and summer were: A.niger (27.4-36.5%), A.terreus (21.5%-8.2%), A.flavus link (15.2%-14.7%), A.flavus var columnaris (3.3%-12.2%), A.nidulans (13.3%-7.3%), A.fumigatus Fres. (8.0%-5.4%), A.amstelodami (5.3%-5.2%), A.Candidus (0.01%-2.8%), while A.parasiticus & A.ruber could be only isolated during the summer times with percentage of 4.8% and 2.9% respectively. A.oryzae A.sydowi in winter time with percentage of 5.7% and 0.3% respectively.

In the examined samples of the sheep the percentage in winter and summer were: A.rige, A.terreus, A.flavus link, A.flavus var columnaris, A.nidulans, A.amstelodami and A.sydowi in percentage of (22.9%-27.1%), (34.6-11.3%), (13.5%-12.3%), (3.9%-18.5%), (0.1%-1.2%), (5.2-11.8%) and (10.6-10.3%) respectively. While A.fumigatus and A.parasiticus could be isolated only in summer time with percentage of 6.9% and 0.6%, A.oryzae, A.chevalieri and A.ruber isolated only in winter time with percentage of 7.2, 0.5 and 1.5% respectively. The camels samples revealed the following Aspergillus species: A.niger, A.terrurus, A.flavus link, A.flavus var columnaris, A.parasiticus, A.oryzae, A.nidulans and A.candidus in the following percentages in winter and summer: (30.0-38.2%), (8.4-20.9%), (20.0-13.9%), (17.4-3.6%), (4.4-2.1%), (7.8-1.3%), 3.9-7.6% and (2.0-1.6%), while A.amstelodami, A.sydowi and A.versicolor could isolated only during the summer times in percent. of 1.8, 2.1 and 6.9% respectively. A.fumigatus, A.ornatus with percentage of 0.9% and 5.1% in the winter times.

From the meat hygiene standpoint the main sources of contamination of fresh meat with moulds are air, water, soil, hand of attendants, utensils and skin, while the major source of contamination which constitutes the public health hazard are the intestinal contents of the slaughtered animals which contaminate the fresh meat with a wide variety of mould species, following neglected sanitary measures during meat preparation.

Therefor the results achieved reported herein, drew the attention to the hygienic measures and instructions in the slaughter houses in addition to special attention to the ration hygiene in order to minimize the risk of mould contamination of fresh meat.

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Table (1)
Total mould count/g total solid

	Cattle		Sheep		Camel	
	winter	summer	winter	summer	winter	summer
Minimum	1953	110000	4500	35500	3125	84000
Maximum	400000	4186000	625000	17010000	300300	6375000
Mean	70510	1241228	137159	2309840	94990	992825

Table (2)
Total Aspergillus count/g total solid

	Cattle		Sheep		Camel	
	winter	summer	winter	summer	winter	summer
Minimum	126	23600	1320	12750	1665	47600
Maximum	132600	218400	282200	11970000	115000	3250000
Mean	26800	702990	39400	1386740	27536	515155

Table (5)
The mean and percentage of isolated mould genera in cattle, sheep and camels

Mould genera	CATTLE				SHEEP				CAMELS			
	winter		summer		winter		summer		winter		summer	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
Aspergillus	26875	35.1	702990	56.7	39441	28.8	1386743	60.0	27536	29.0	515155	51.8
Penicillium	31685	41.4	155225	12.6	44167	32.2	308905	13.4	25160	26.4	164190	16.5
Mucor	2619	3.4	119468	9.6	17538	12.8	129568	5.6	2792	3.0	61820	6.2
Absidia	3625	4.7	100675	8.1	13929	10.2	223394	9.7	20375	21.4	85380	8.7
Rhizopus	4445	5.8	59533	4.8	603	0.4	50300	2.5	1735	2.0	57600	5.8
Geotrichum	2793	3.7	13212	1.1	12411	9.0	82318	3.6	11013	12.0	42870	4.3
Cladosporium	2724	3.6	23580	1.9	4948	3.6	3128	0.1	1653	2.0	-	-
Fusarium	685	0.9	250	0.02	3891	2.8	51050	2.2	2921	3.0	-	-
Alternaria	1054	1.4	-	-	-	-	-	-	1325	1.1	12010	1.2
Pithomyces	-	-	65800	5.3	-	-	66440	2.9	-	-	-	-
Paecilomyces	-	-	-	-	-	-	-	-	354	0.1	53660	5.5
Unidentified genera	-	-	415	0.03	215	0.2	-	-	63	0.04	140	0.02

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Table (4)
The mean and percentage of the identified Aspergillus species in cattle, sheep and camels

Aspergillus species	CATTLE				SHEEP				CAMELS			
	winter		summer		winter		summer		winter		summer	
	Mean	%										
<i>A. niger</i>	7336	27.4	265503	36.5	9028	22.9	374848	27.1	8142	30	196420	38.2
<i>A. terreus</i>	5783	21.5	59678	8.2	13650	34.6	156193	11.3	2280	8.4	107654	20.9
<i>A. flavus</i> link	4068	15.2	106570	14.7	5270	13.5	150952	12.3	5442	20	71703	13.9
<i>A. flavus</i> var.colum naris	881	3.3	88400	12.2	1531	3.9	256609	18.5	4728	17.4	18473	3.6
<i>A. parasiticus</i>	-	-	34875	4.8	-	-	7807	0.6	1192	4.4	10940	2.1
<i>A. oryzae</i>	1537	5.7	-	-	2845	7.2	-	-	2110	7.8	6595	1.3
<i>A. nidulans</i>	3567	13.3	52745	7.3	46	0.1	16750	1.2	1060	3.9	39155	7.6
<i>A. amstelodami</i>	1408	5.3	37835	5.2	2056	5.2	164060	11.8	-	-	8935	1.8
<i>A. fumigatus</i>	2139	8.0	39505	5.4	-	-	96160	6.9	256	0.9	-	-
<i>A. sydowi</i>	69	0.3	-	-	4150	10.6	143338	10.3	-	-	10435	2.1
<i>A. candidus</i>	3	0.01	19965	2.8	-	-	-	-	536	2.0	8455	1.6
<i>A. chevalieri</i>	-	-	-	-	205	0.5	-	-	-	-	-	-
<i>A. ornatus</i>	-	-	-	-	-	-	-	-	1377	5.1	-	-
<i>A. ruber</i>	-	-	21225	2.9	570	1.5	-	-	-	-	-	-
<i>A. versicolor</i>	-	-	-	-	-	-	-	-	-	-	3533	6.9

chiqueros que tienen el menor número de visitantes y los que tienen el mayor número de visitantes.

Nombre del chiquero	Número de visitantes	Porcentaje de visitantes
Chiquero 1	1000	100%
Chiquero 2	1500	150%
Chiquero 3	2000	200%
Chiquero 4	2500	250%
Chiquero 5	3000	300%
Chiquero 6	3500	350%
Chiquero 7	4000	400%
Chiquero 8	4500	450%
Chiquero 9	5000	500%
Chiquero 10	5500	550%
Chiquero 11	6000	600%
Chiquero 12	6500	650%
Chiquero 13	7000	700%
Chiquero 14	7500	750%
Chiquero 15	8000	800%
Chiquero 16	8500	850%
Chiquero 17	9000	900%
Chiquero 18	9500	950%
Chiquero 19	10000	1000%
Chiquero 20	10500	1050%
Chiquero 21	11000	1100%
Chiquero 22	11500	1150%
Chiquero 23	12000	1200%
Chiquero 24	12500	1250%
Chiquero 25	13000	1300%
Chiquero 26	13500	1350%
Chiquero 27	14000	1400%
Chiquero 28	14500	1450%
Chiquero 29	15000	1500%
Chiquero 30	15500	1550%
Chiquero 31	16000	1600%
Chiquero 32	16500	1650%
Chiquero 33	17000	1700%
Chiquero 34	17500	1750%
Chiquero 35	18000	1800%
Chiquero 36	18500	1850%
Chiquero 37	19000	1900%
Chiquero 38	19500	1950%
Chiquero 39	20000	2000%
Chiquero 40	20500	2050%
Chiquero 41	21000	2100%
Chiquero 42	21500	2150%
Chiquero 43	22000	2200%
Chiquero 44	22500	2250%
Chiquero 45	23000	2300%
Chiquero 46	23500	2350%
Chiquero 47	24000	2400%
Chiquero 48	24500	2450%
Chiquero 49	25000	2500%
Chiquero 50	25500	2550%
Chiquero 51	26000	2600%
Chiquero 52	26500	2650%
Chiquero 53	27000	2700%
Chiquero 54	27500	2750%
Chiquero 55	28000	2800%
Chiquero 56	28500	2850%
Chiquero 57	29000	2900%
Chiquero 58	29500	2950%
Chiquero 59	30000	3000%
Chiquero 60	30500	3050%
Chiquero 61	31000	3100%
Chiquero 62	31500	3150%
Chiquero 63	32000	3200%
Chiquero 64	32500	3250%
Chiquero 65	33000	3300%
Chiquero 66	33500	3350%
Chiquero 67	34000	3400%
Chiquero 68	34500	3450%
Chiquero 69	35000	3500%
Chiquero 70	35500	3550%
Chiquero 71	36000	3600%
Chiquero 72	36500	3650%
Chiquero 73	37000	3700%
Chiquero 74	37500	3750%
Chiquero 75	38000	3800%
Chiquero 76	38500	3850%
Chiquero 77	39000	3900%
Chiquero 78	39500	3950%
Chiquero 79	40000	4000%
Chiquero 80	40500	4050%
Chiquero 81	41000	4100%
Chiquero 82	41500	4150%
Chiquero 83	42000	4200%
Chiquero 84	42500	4250%
Chiquero 85	43000	4300%
Chiquero 86	43500	4350%
Chiquero 87	44000	4400%
Chiquero 88	44500	4450%
Chiquero 89	45000	4500%
Chiquero 90	45500	4550%
Chiquero 91	46000	4600%
Chiquero 92	46500	4650%
Chiquero 93	47000	4700%
Chiquero 94	47500	4750%
Chiquero 95	48000	4800%
Chiquero 96	48500	4850%
Chiquero 97	49000	4900%
Chiquero 98	49500	4950%
Chiquero 99	50000	5000%
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Chiquero 101	51000	5100%
Chiquero 102	51500	5150%
Chiquero 103	52000	5200%
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Chiquero 105	53000	5300%
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Chiquero 129	65000	6500%
Chiquero 130	65500	6550%
Chiquero 131	66000	6600%
Chiquero 132	66500	6650%
Chiquero 133	67000	6700%
Chiquero 134	67500	6750%
Chiquero 135	68000	6800%
Chiquero 136	68500	6850%
Chiquero 137	69000	6900%
Chiquero 138	69500	6950%
Chiquero 139	70000	7000%
Chiquero 140	70500	7050%
Chiquero 141	71000	7100%
Chiquero 142	71500	7150%
Chiquero 143	72000	7200%
Chiquero 144	72500	7250%
Chiquero 145	73000	7300%
Chiquero 146	73500	7350%
Chiquero 147	74000	7400%
Chiquero 148	74500	7450%
Chiquero 149	75000	7500%
Chiquero 150	75500	7550%
Chiquero 151	76000	7600%
Chiquero 152	76500	7650%
Chiquero 153	77000	7700%
Chiquero 154	77500	7750%
Chiquero 155	78000	7800%
Chiquero 156	78500	7850%
Chiquero 157	79000	7900%
Chiquero 158	79500	7950%
Chiquero 159	80000	8000%
Chiquero 160	80500	8050%
Chiquero 161	81000	8100%
Chiquero 162	81500	8150%
Chiquero 163	82000	8200%
Chiquero 164	82500	8250%
Chiquero 165	83000	8300%
Chiquero 166	83500	8350%
Chiquero 167	84000	8400%
Chiquero 168	84500	8450%
Chiquero 169	85000	8500%
Chiquero 170	85500	8550%
Chiquero 171	86000	8600%
Chiquero 172	86500	8650%
Chiquero 173	87000	8700%
Chiquero 174	87500	8750%
Chiquero 175	88000	8800%
Chiquero 176	88500	8850%
Chiquero 177	89000	8900%
Chiquero 178	89500	8950%
Chiquero 179	90000	9000%
Chiquero 180	90500	9050%
Chiquero 181	91000	9100%
Chiquero 182	91500	9150%
Chiquero 183	92000	9200%
Chiquero 184	92500	9250%
Chiquero 185	93000	9300%
Chiquero 186	93500	9350%
Chiquero 187	94000	9400%
Chiquero 188	94500	9450%
Chiquero 189	95000	9500%
Chiquero 190	95500	9550%
Chiquero 191	96000	9600%
Chiquero 192	96500	9650%
Chiquero 193	97000	9700%
Chiquero 194	97500	9750%
Chiquero 195	98000	9800%
Chiquero 196	98500	9850%
Chiquero 197	99000	9900%
Chiquero 198	99500	9950%
Chiquero 199	100000	10000%

2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 20100 20101 20102 20103 20104 20105 20106 20107 20108 20109 20110 20111 20112 20113 20114 20115 20116 20117 20118 20119 20120 20121 20122 20123 20124 20125 20126 20127 20128 20129 20130 20131 20132 20133 20134 20135 20136 20137 20138 20139 20140 20141 20142 20143 20144 20145 20146 20147 20148 20149 20150 20151 20152 20153 20154 20155 20156 20157 20158 20159 20160 20161 20162 20163 20164 20165 20166 20167 20168 20169 20170 20171 20172 20173 20174 20175 20176 20177 20178 20179 20180 20181 20182 20183 20184 20185 20186 20187 20188 20189 20190 20191 20192 20193 20194 20195 20196 20197 20198 20199 20200 20201 20202 20203 20204 20205 20206 20207 20208 20209 202010 202011 202012 202013 202014 202015 202016 202017 202018 202019 202020 202021 202022 202023 202024 202025 202026 202027 202028 202029 202030 202031 202032 202033 202034 202035 202036 202037 202038 202039 202040 202041 202042 202043 202044 202045 202046 202047 202048 202049 202050 202051 202052 202053 202054 202055 202056 202057 202058 202059 202060 202061 202062 202063 202064 202065 202066 202067 202068 202069 202070 202071 202072 202073 202074 202075 202076 202077 202078 202079 202080 202081 202082 202083 202084 202085 202086 202087 202088 202089 202090 202091 202092 202093 202094 202095 202096 202097 202098 202099 2020100 2020101 2020102 2020103 2020104 2020105 2020106 2020107 2020108 2020109 2020110 2020111 2020112 2020113 2020114 2020115 2020116 2020117 2020118 2020119 2020120 2020121 2020122 2020123 2020124 2020125 2020126 2020127 2020128 2020129 2020130 2020131 2020132 2020133 2020134 2020135 2020136 2020137 2020138 2020139 2020140 2020141 2020142 2020143 2020144 2020145 2020146 2020147 2020148 2020149 2020150 2020151 2020152 2020153 2020154 2020155 2020156 2020157 2020158 2020159 2020160 2020161 2020162 2020163 2020164 2020165 2020166 2020167 2020168 2020169 2020170 2020171 2020172 2020173 2020174 2020175 2020176 2020177 2020178 2020179 2020180 2020181 2020182 2020183 2020184 2020185 2020186 2020187 2020188 2020189 2020190 2020191 2020192 2020193 2020194 2020195 2020196 2020197 2020198 2020199 2020200 2020201 2020202 2020203 2020204 2020205 2020206 2020207 2020208 2020209 2020210 2020211 2020212 2020213 2020214 2020215 2020216 2020217 2020218 2020219 2020220 2020221 2020222 2020223 2020224 2020225 2020226 2020227 2020228 2020229 2020230 2020231 2020232 2020233 2020234 2020235 2020236 2020237 2020238 2020239 2020240 2020241 2020242 2020243 2020244 2020245 2020246 2020247 2020248 2020249 2020250 2020251 2020252 2020253 2020254 2020255 2020256 2020257 2020258 2020259 2020260 2020261 2020262 2020263 2020264 2020265 2020266 2020267 2020268 2020269 2020270 2020271 2020272 2020273 2020274 2020275 2020276 2020277 2020278 2020279 2020280 2020281 2020282 2020283 2020284 2020285 2020286 2020287 2020288 2020289 2020290 2020291 2020292 2020293 2020294 2020295 2020296 2020297 2020298 2020299 2020300 2020301 2020302 2020303 2020304 2020305 2020306 2020307 2020308 2020309 2020310 2020311 2020312 2020313 2020314 2020315 2020316 2020317 2020318 2020319 2020320 2020321 2020322 2020323 2020324 2020325 2020326 2020327 2020328 2020329 2020330 2020331 2020332 2020333 2020334 2020335 2020336 2020337 2020338 2020339 2020340 2020341 2020342 2020343 2020344 2020345 2020346 2020347 2020348 2020349 2020350 2020351 2020352 2020353 2020354 2020355 2020356 2020357 2020358 2020359 2020360 2020361 2020362 2020363 2020364 2020365 2020366 2020367 2020368 2020369 2020370 2020371 2020372 2020373 2020374 2020375 2020376 2020377 2020378 2020379 2020380 2020381 2020382 2020383 2020384 2020385 2020386 2020387 2020388 2020389 2020390 2020391 2020392 2020393 2020394 2020395 2020396 2020397 2020398 2020399 2020400 2020401 2020402 2020403 2020404 2020405 2020406 2020407 2020408 2020409 2020410 2020411 2020412 2020413 2020414 2020415 2020416 2020417 2020418 2020419 2020420 2020421 2020422 2020423 2020424 2020425 2020426 2020427 2020428 2020429 2020430 2020431 2020432 2020433 2020434