

Commercial Embryo Transfer Activity in Europe 2018

Collated on behalf of AETE by Marja Mikkola (marja.mikkola@geno.no).

Data collection request was sent to 38 countries on February 6th, 2019. Among these, 32 countries submitted data (82%).

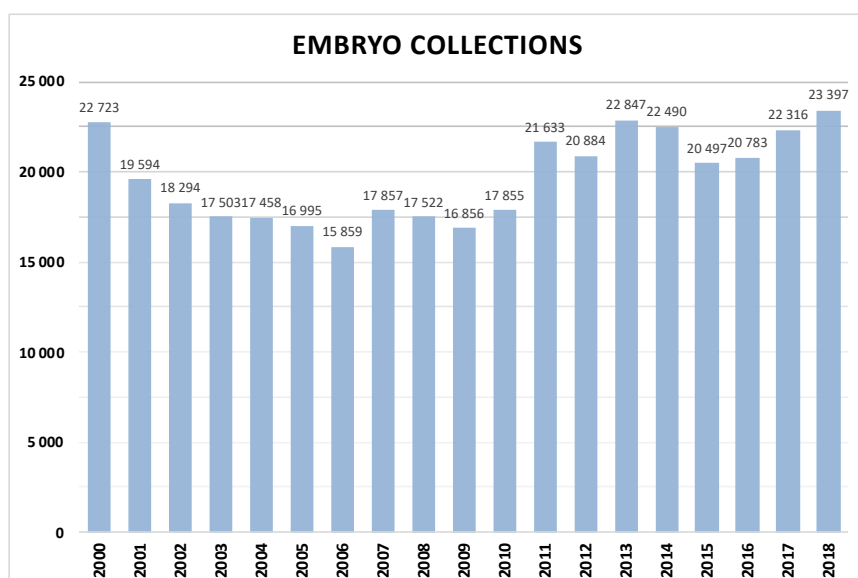
National data collectors in 2019

Country	Collector
Austria	Friedrich Führer
Belgium	Peter Vercauteren, Isabelle Donnay
Bosnia Herzegovina	Teodor Markovic
Croatia	Mario Matkovic
Czech Republic	Pavel Bucek
Denmark	Henrik Callesen
Estonia	Jevgeni Kurykin
Finland	Seija Vahtiala
France	Serge Lacaze
Germany	Hubert Cramer
Greece	Foteini Samartzi
Hungary	Istvan Pentek
Ireland	Patrick Lonergan
Israel	Amir Shifman, Yoel Zeron
Italy	Giovanna Lazzari
Latvia	Vita Antane
Lithuania	Rasa Nainiene
Luxembourg	Marianne Vaessen
Macedonia	Toni Dovenski
The Netherlands	Helga Flapper, Hilde Aardema
Norway	Marja Mikkola
Poland	Jędrzej Jaśkowski
Portugal	João Nestor Chagas e Silva
Romania	Stefan Ciornei
Russian Federation	Denis Knurow, Viktor Madison
Serbia	Aleksandar Milovanovic
Slovakia	Jozef Bires, Dalibor Polak
Slovenia	Janko Mrkun
Spain	Daniel Martinez Bello
Sweden	Renée Båge
Switzerland	Rainer Saner
Turkey	Ebru Emsen
Ukraine	Viktor Madison
United Kingdom	Roger Sturmey, Brian Graham

Bovine *In vivo* embryo production

The number of reported embryo collections (23,397) showed a slight increase compared to year 2017 (22,316). The number of transferable *in vivo* derived (IVD) embryos recovered per collection was 6.0 (6.4 in 2017). Dairy breeds represented 79% of the collections and beef breeds 21%. Use of sex-sorted semen was reported by 15 countries. In total, use of sex-sorted semen was reported for 10% of donors.

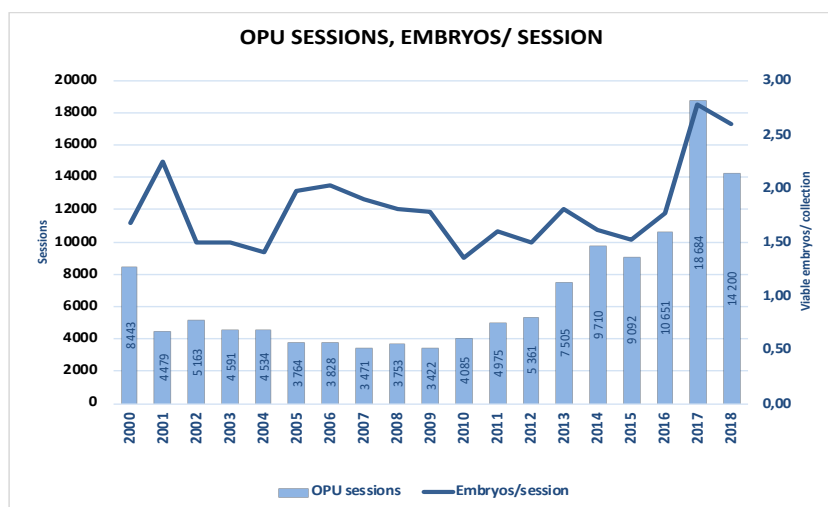
Country	Dairy				Beef				All		
	Collections conv semen	Collections sexed semen	Embryos & ova	Transferable embryos	Collections conv semen	Collections sexed semen	Embryos & ova	Transferable embryos	Collections total	Transferable Embryos total	Embryos/ collection
Austria	335	11	3 357	2 488	17	1	95	138	364	2 626	7,2
Belgium	121	8	813	543	875	0	5 656	4 198	1 004	4 741	4,7
Bosnia and Herzegovina	0	0	0	0	1	0	5	5	1	5	5,0
Croatia	0	0	0	0	0	0	0	0	0	0	
Denmark	716	0	6 179	4 161	54	0	593	392	770	4 553	5,9
Estonia	0	0	0	0	0	0	0	0	0	0	
Finland	431	55	4 007	2 714	3	0	24	4	489	2 718	5,6
France	4 497	1 053	50 792	29 275	1 242	94	13 825	7 494	6 886	36 769	5,3
Germany	3 166	0	31 472	21 100	464	0	4 654	2 499	3 630	23 599	6,5
Greece	0	0	0	0	0	0	0	0	0	0	
Hungary	7	11	124	116	36	6	385	255	60	371	6,2
Ireland	664	0	8 190	3 904	0	0	0	0	664	3 904	5,9
Israel	41	1	239	156	1	0	6	6	43	162	3,8
Italy	2 432	0	28 397	19 418	150	0	1 575	1 083	2 582	20 501	7,9
Latvia	11	0	52	43	0	0	0	0	11	43	3,9
Lithuania	0	0	0	0	0	0	0	0	0	0	
Macedonia	0	0	0	0	0	0	0	0	0	0	
Netherlands	2 735	16	20 847	15 675	0	0	0	0	2 751	15 675	5,7
Norway	87	0	888	586	11	0	155	54	98	640	6,5
Poland	131	138	2 193	1 493	0	0	0	0	269	1 493	5,6
Portugal	60	50	572	352	10	0	103	38	120	390	3,3
Romania	9	0	48	40	0	0	0	0	9	40	4,4
Russian Federation	109	442	5 205	2 682	1 530	4	13 143	11 416	2 085	14 098	6,8
Serbia	5	0	22	14	0	0	0	0	5	14	2,8
Slovakia	0	0	0	0	0	0	0	0	0	0	
Slovenia	12	2	52	26	0	0	0	0	14	26	1,9
Spain	102	374	4 030	2 626	272	15	1 382	2 002	763	4 628	6,1
Sweden	127	0	864	562	3	0	4	2	130	564	4,3
Switzerland	212	147	3 615	2 129	16	1	149	67	376	2 196	5,8
Turkey	0	0	0	0	0	0	0	0	0	0	
Ukraine	10	8	261	209	8	4	175	125	30	334	11,1
United Kingdom	116	15	970	709	112	0	216	572	243	1 281	5,3
Grand Total	16 136	2 331	173 189	111 021	4 805	125	42 145	30 350	23 397	141 371	6,0



Bovine *In vitro* embryo production (OPU-IVP)

The number of OPU sessions was 14,200 and IVP embryos produced 36,832 (2.6 embryos/session). OPU activity decreased compared to a peak in 2017. However, it is worth to mention, that for most countries, there was no considerable changes in the activity. Two countries accounted for most of the fluctuation in the activity between 2017 and 2018. These were The Netherlands, increasing OPU activity by 3,184 sessions, and Russian Federation, where the activity decreased by 6,627 sessions from year 2017 to 2018. In general, the activity has an increasing trend, despite annual fluctuations. OPU was performed mainly for dairy breeds, only 3% of sessions were performed on beef breeds. The frequency of reported use of sex-sorted semen was similar as for *in vivo* production, being 10% of OPU sessions.

Country	Dairy								Beef								All			
	Non-stimulated				Stimulated				Non-stimulated				Stimulated				Sessions	Oocytes	Embryos	
	OPU Conv semen	OPU Sexed semen	Oocytes	Embryos	OPU Conv semen	OPU Sexed semen	Oocytes	Embryos	OPU Conv semen	OPU Sexed semen	Oocytes	Embryos	OPU Conv semen	OPU Sexed semen	Oocytes	Embryos				
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	74	24	8	74	24
Finland	368	0	1 809	67	315	0	2 946	385	0	0	0	0	0	0	0	0	0	683	4 755	452
France	206	13	924	214	277	80	3 928	831	0	0	0	0	46	0	456	166	622	5 308	1 211	
Germany	809	0	11 844	2 621	0	0	0	0	20	0	337	89	0	0	0	0	829	12 181	2 710	
Italy	119	0	1 327	188	0	0	0	0	0	0	0	0	0	0	0	0	119	1 327	188	
Netherlands	694	85	11 300	2 502	9 750	0	104 103	27 300	0	0	0	0	0	0	0	0	10 529	115 403	29 802	
Poland	4	10	112	62	0	33	324	128	0	0	0	0	0	0	0	0	47	436	190	
Romania	0	0	0	0	4	0	5	1	0	0	0	0	0	0	0	0	4	5	1	
Russian Federation	0	831	4 621	936	0	0	0	0	0	300	2 461	723	0	0	0	0	1 131	7 082	1 659	
Serbia	11	7	76	28	8	15	128	32	0	0	0	0	0	0	0	0	41	204	60	
Spain	0	0	0	0	0	50	770	151	68	0	473	239	0	0	0	0	118	1 243	390	
Switzerland	40	29	841	145	0	0	0	0	0	0	0	0	0	0	0	0	69	841	145	
Grand Total	2 251	975	32 854	6 763	10 354	178	112 204	28 828	88	300	3 271	1 051	46	8	530	190	14 200	148 859	36 832	



Bovine *In vitro* embryo production – abattoir

Country	Dairy			Beef		
	Donors abattoir	Oocytes	Embryos	Donors abattoir	Oocytes	Embryos
Greece	8	0	30	0	0	0
Italy	0	0	0	5	168	28
Netherlands	84	2 350	705	0	0	0
Poland	86	695	166	0	0	0
Portugal	0	0	0	1 144	5 088	0
Romania	4	160	48	0	0	0
Spain	8	51	26	63	1 178	436
Grand Total	190	3 256	975	1 212	6 434	464

Bovine *In vivo* embryo transfer

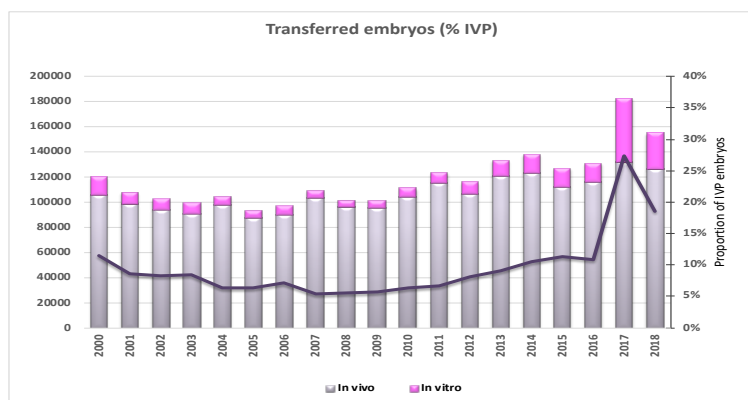
The reported number of IVD embryo transfers decreased from 132,170 in 2017 to 126,162 in 2018.

Country	Dairy breeds			Beef breeds			Non-separated breeds			Total transfers
	Fresh	Frozen	Frozen Foreign	Fresh	Frozen	Frozen foreign	Fresh	Frozen	Frozen foreign	
Austria	1 000	1 402	15	14	90	13	0	0	0	2 534
Belgium	111	451	578	614	2 295	16	0	0	0	4 065
Denmark	2 386	1 102	0	92	96	0	0	0	0	3 676
Finland	789	1 938	165	4	23	50	0	0	0	2 969
France	14 604	13 153	654	2 344	4 333	170	43	90	12	35 403
Germany	8 983	11 680	0	689	1 246	0	0	0	0	22 598
Greece	0	0	7	0	0	0	0	0	0	7
Hungary	60	58	0	29	129	0	0	0	0	276
Ireland	1 565	1 904	0	0	0	0	0	0	0	3 469
Israel	146	19	0	6	0	0	0	0	0	171
Italy	0	0	0	0	0	0	7 750	0	0	7 750
Netherlands	4 381	14 332	0	0	0	0	1 634	0	0	20 347
Norway	31	75	143	15	61	52	0	0	0	377
Poland	667	705	438	0	0	0	0	0	0	1 810
Portugal	87	423	0	14	23	17	0	0	0	564
Romania	23	17	0	0	0	46	0	0	0	86
Russian Federation	220	1 005	91	885	10 072	105	0	0	0	12 378
Serbia	5	0	7	0	0	0	0	0	0	12
Slovenia	24	2	0	0	0	4	0	0	0	30
Spain	1 130	1 005	110	570	404	4	0	0	0	3 223
Sweden	0	0	0	0	0	0	142	396	103	641
Switzerland	729	810	422	3	38	21	0	0	0	2 023
Ukraine	12	74	0	61	58	0	0	0	0	205
United Kingdom	51	45	4	81	309	349	340	327	42	1 548
Grand Total	37 004	50 200	2 634	5 421	19 177	847	9 909	813	157	126 162

Bovine *In vitro* embryo transfer

The number of reported IVP embryo transfers decreased from previous year, due to the lower OPU-activity reported in 2018. In total, there was a decrease in the number of reported embryo transfers; from 181,922 in 2017 to 154,966 in 2018. However, the number is higher than in any other year before 2017.

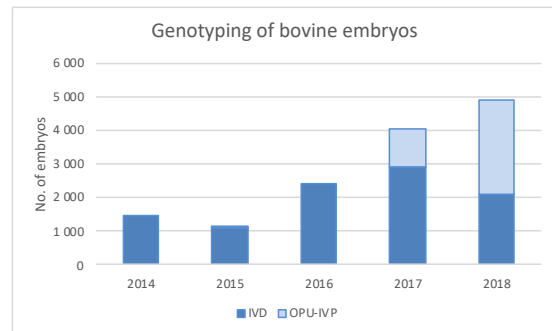
Country	OPU				Abattoir		Total transfers IVP
	Fresh	Frozen	Frozen foreign	OPU Exports	Fresh	Frozen	
Belgium	0	0	1 315	0	0	0	1 315
Estonia	17	0	0	0	0	0	17
Finland	19	457	0	0	0	0	476
France	369	348	54	88	0	0	859
Germany	2 007	909	0	0	0	0	2 916
Hungary	0	0	105	0	0	0	105
Italy	126	15	0	0	0	0	141
Netherlands	11 124	10 354	0	0	0	0	21 478
Poland	23	17	0	0	0	0	40
Romania	0	1	0	0	12	3	16
Russian Federation	111	521	0	0	0	0	632
Serbia	12	37	0	0	0	0	49
Spain	59	158	0	0	49	282	548
Switzerland	0	14	81	0	0	0	95
United Kingdom	0	117	0	0	0	0	117
Grand Total	13 867	12 948	1 555	88	61	285	28 804



Bovine embryo technologies

Four countries reported genotyping of embryos. A total of 4882 embryo were genotyped. The proportion of OPU-IVP embryos genotyped (57%) increased compared to year 2017 (27%).

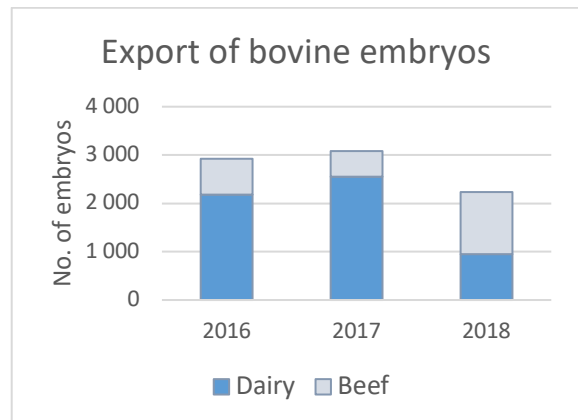
Country	Sexed embryos		Genotyped embryos	
	In vivo	In vitro	In vivo	In vitro
Finland	0	33	38	33
France	3 054	0	1 642	0
Germany	0	0	310	55
Netherlands	0	0	101	2 708
Total	3 054	33	2 086	2 796



Embryo exports

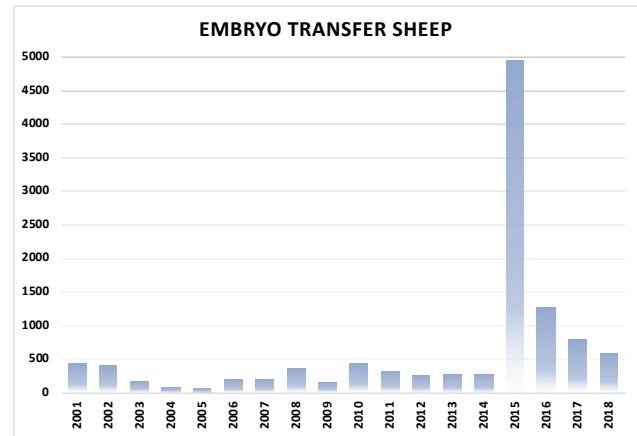
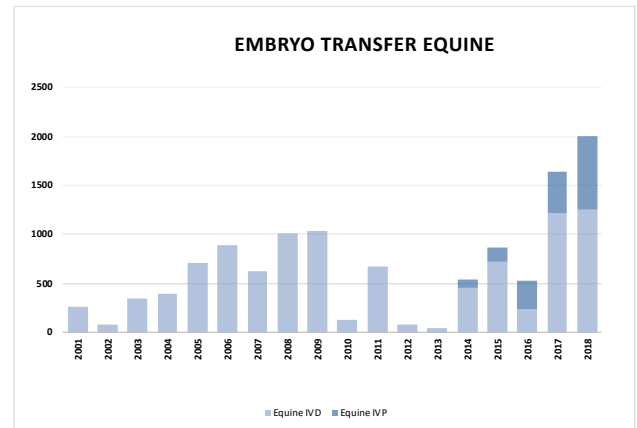
There were 9 countries reporting export of bovine embryos. All exports were IVD, there was no report on export of IVP embryos.

Country	Dairy	Beef	Non-separated breeds	Total exported
Austria	40	9	0	49
Belgium	20	900	0	920
Denmark	36	0	0	36
France	637	351	0	988
Germany	81	0	0	81
Norway	18	38	0	56
Spain	50	0	0	50
Switzerland	61	0	0	61
United Kingdom	0	0	63	63
Total	943	1 298	63	2 304



Embryo production and transfer in other species – *In vivo*

Country	Embryo collection		Embryo transfer		
	Collect ions	Viable embryos	Fresh embryos	Frozen domestic	Frozen foreign
SHEEP					
France	7	25	0	0	0
Hungary	5	39	0	0	45
Italy	12	58	58	0	0
Serbia	3	16	0	0	0
Spain	56	160	34	0	0
Sweden	20	67	0	67	365
United Kingdom	537	3 296	3 247	116	0
Total	640	3 661	3 339	183	410
GOAT					
Spain	25	201	0	0	0
United Kingdom	3	26	26	0	0
Total	28	227	26	0	0
HORSE					
France	1 315	736	818	0	0
Italy	309	211	0	0	0
Netherlands	281	157	160	0	0
Poland	5	4	2	0	0
Portugal	211	84	76	8	0
Russian Federation	26	18	8	3	0
Spain	170	93	91	0	0
Sweden	23	15	15	0	0
Switzerland	90	42	22	1	0
United Kingdom	65	35	43	0	0
Total	2 495	1 395	1 235	12	0
BUFFALO					
Romania	3	6	0	0	0



Embryo production and transfer in other species – *In vitro*

Country	Oocyte collection			Embryo transfer IVP			Embryo exports
	OPU	Oocytes	Embryos	Fresh embryos	Frozen domestic	Frozen foreign	
SHEEP							
Spain	39	909	457	303	0	0	0
GOAT							
Spain	6	1 710	158	108	50	0	0
HORSE							
Italy	1 062	12 605	1 431	65	352	0	858
Netherlands	456	5 933	664	38	20	273	0
Switzerland	68	191	12	0	4	0	0
Total	1 586	18 729	2 107	0	0	0	0
BUFFALO							
Italy	2	49	21	27	0	0	0

Conclusions

- There was a slight increase in the reported number of *in vivo* embryo collections. A slight increase has been now recurring for three consecutive years.
- There was a decrease in the number of OPU sessions (bovine) reported, compared to previous year 2017. However, this was due to fluctuation in the activity of only two countries, most of the countries having relatively steady activity. When scrutinizing the activity for a longer time period, the *in vitro* production of bovine embryos shows an increasing trend.
- Consequently, because of decrease in OPU activity, there was a decrease in the number of embryo transfers. A slight decrease was also observed in the number of IVD embryos transferred. Despite a higher number of embryo collections compared to previous year, the success rate of embryo collections showed a slight decrease (6.0 viable embryos/collection in 2018 vs. 6.4 in 2017).
- Activity in embryo technologies, i.e. genotyping of embryos, continued to increase. Also, more IVP embryos were genotyped than before.

Acknowledgements

Those wishing to use tables, can contact the AETE data collection to request for a more practical format in an excel-sheet.

I would like to acknowledge all national data collectors, and also persons not mentioned on the list of collectors but have been contributing behind the scenes. I also want to express my gratitude and acknowledge all the practitioners and ET-teams, who provided their data. There is still space for improvement, regarding the completeness of the data, with some countries being able to submit close to 100% of their data, but others showing a remarkable gap between the reported and true activity. The data is collected mostly via national data collectors, but any practitioner/ team/ company, who prefers to submit their data anonymously to the database, are encouraged to use this way of reporting. Personal credentials for the IETS Data Retrieval System are provided by email request from the AETE data collector.

In 2020, the data for 2019 will be collected by H el ene Quinton, France, new AETE Data Collector. The new contact email for AETE data collection is statistics@aete.eu