

2023 STATISTICAL INFORMATION COMMITTEE REPORT (2022 DATA)

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Data from 115 surveys including 180 embryo practitioners, 138 AETA certified Embryo Transfer Businesses (ETBs) are summarized below.

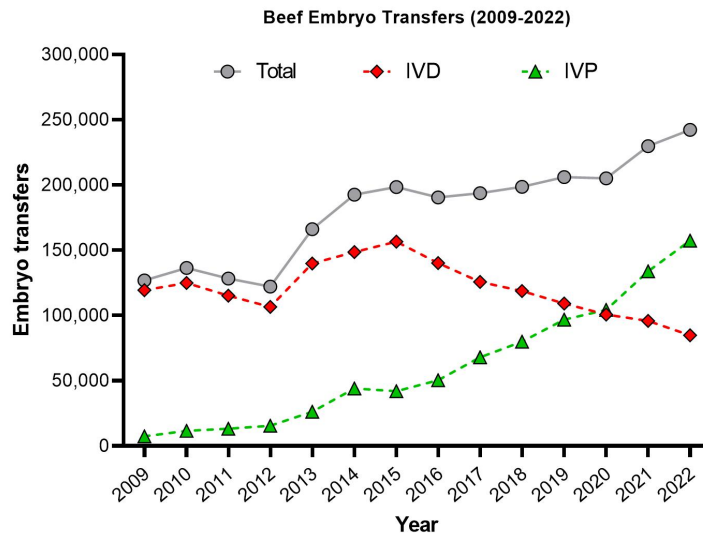
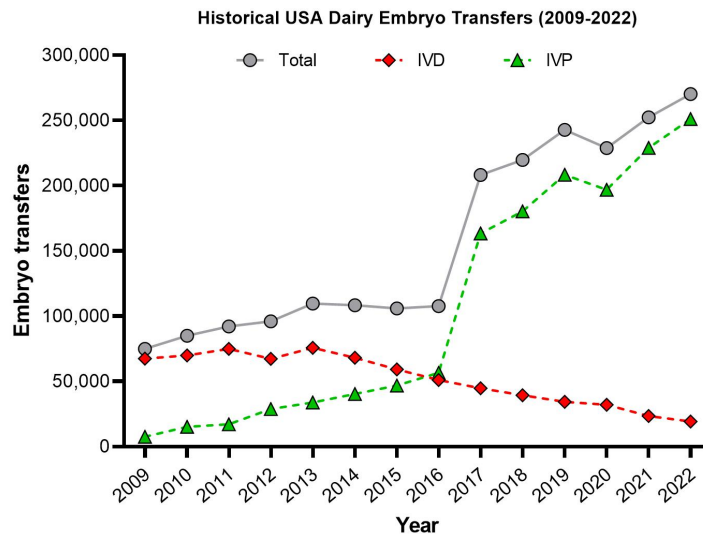
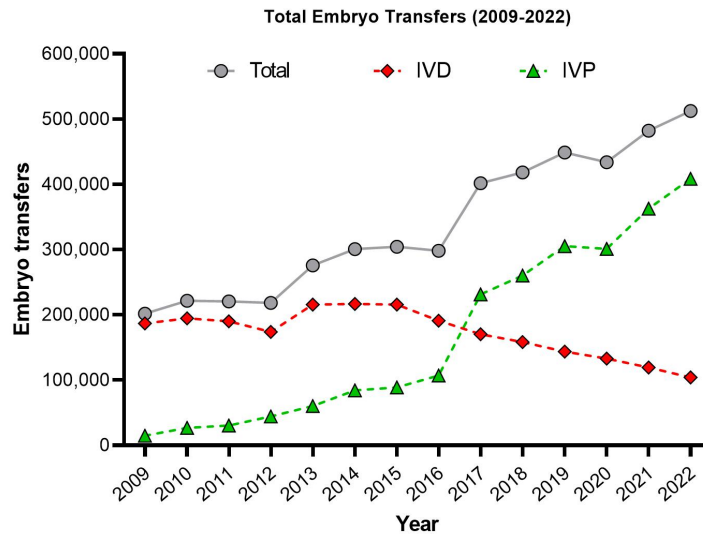
113 ETBs transferred bovine embryos.

- The number of IVP embryo transfers continue to grow, 6% increase over last year.
- 30 ETBs reported beef on dairy embryo transfers.
- 99- ETBs flushed cows.
- 36 ETBs performed OPU's.
- 26 ETBs reported embryo work with different species other than bovine (16 ETBs reported embryo work with ovine, caprine or cervid; 10 ETBs reported work with equine).
- 42 ETBs exported 36,225 bovine embryos to 31 countries.
 - There was an increase of 54% from 2021.
 - 62% of the embryos were exported to China.
- 10 ETBs transferred 198 bovine embryos imported from Australia (Wagyu and Jersey), Canada (Red Angus, Holstein and Jersey), France (Normande) and Switzerland (Brown Swiss)
- 1 ETB transferred 6 sheep embryos imported from New Zealand
- 12 IVP labs (fertilized oocytes and cultured embryos *in vitro*) reported data (some ETBs have labs in different States but were reported as one).
- 13% increase in IVP embryo production.

2022 USA BOVINE EMBRYO TRANSFERS

		<i>IN VIVO</i>			<i>IN VITRO</i>			<i>TOTAL</i>		
		<i>FRESH</i>	<i>FROZEN</i>	<i>TOTAL</i>	<i>FRESH</i>	<i>FROZEN</i>	<i>TOTAL</i>	<i>FRESH</i>	<i>FROZEN</i>	<i>TOTAL</i>
DAIRY	<i>TOTAL</i>	10,143	9,065	19,208	156,985	94,096	251,081	167,128	103,161	270,289
	<i>%</i>	53	47	7	63	37	93	62	38	53
BEEF	<i>TOTAL</i>	30,591	54,171	84,762	56,816	100,639	157,455	87,407	154,810	242,217
	<i>%</i>	36	64	35	36	64	65	36	64	47
TOTAL	<i>TOTAL</i>	40,734	63,236	103,970	213,801	194,735	408,536	254,535	257,971	512,506
	<i>%</i>	39	61	20	52	48	80	50	50	

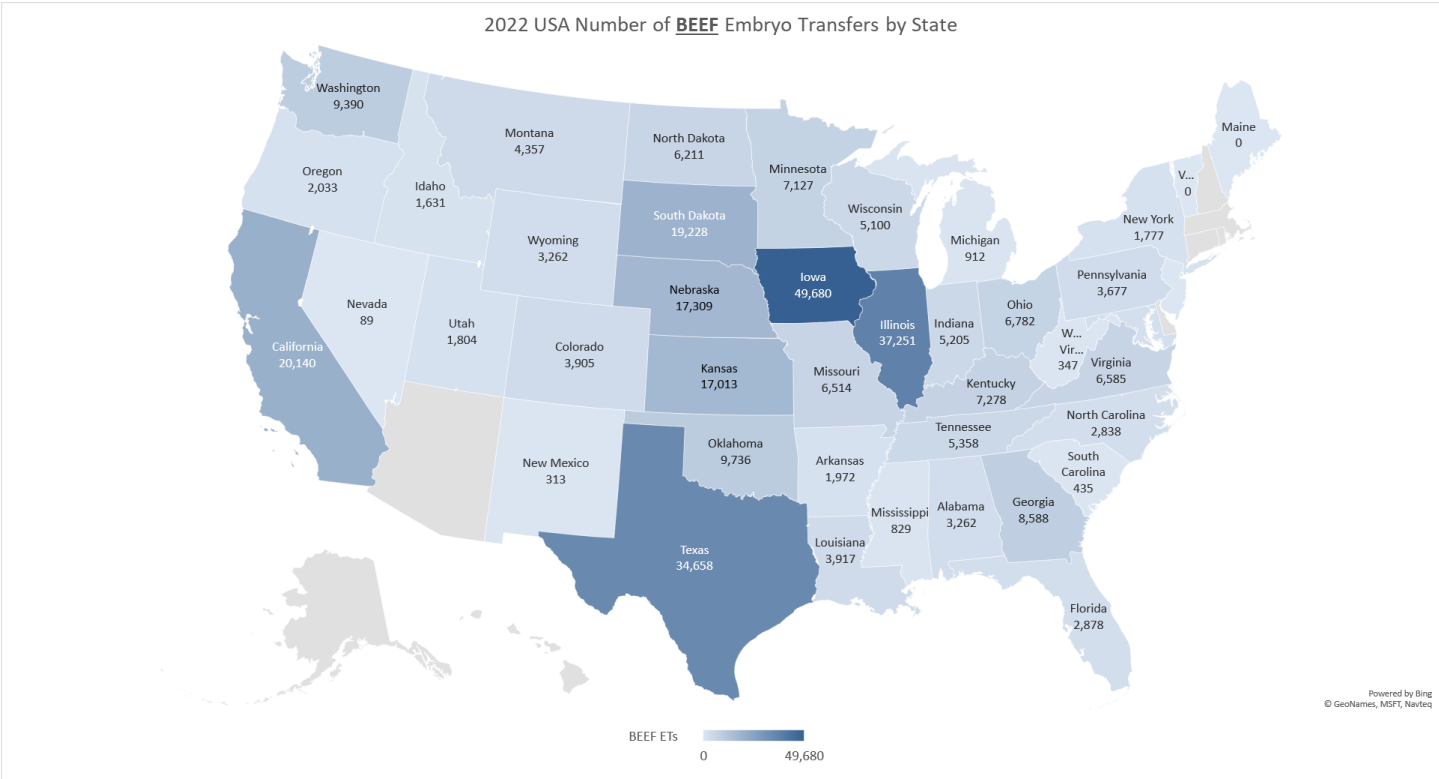
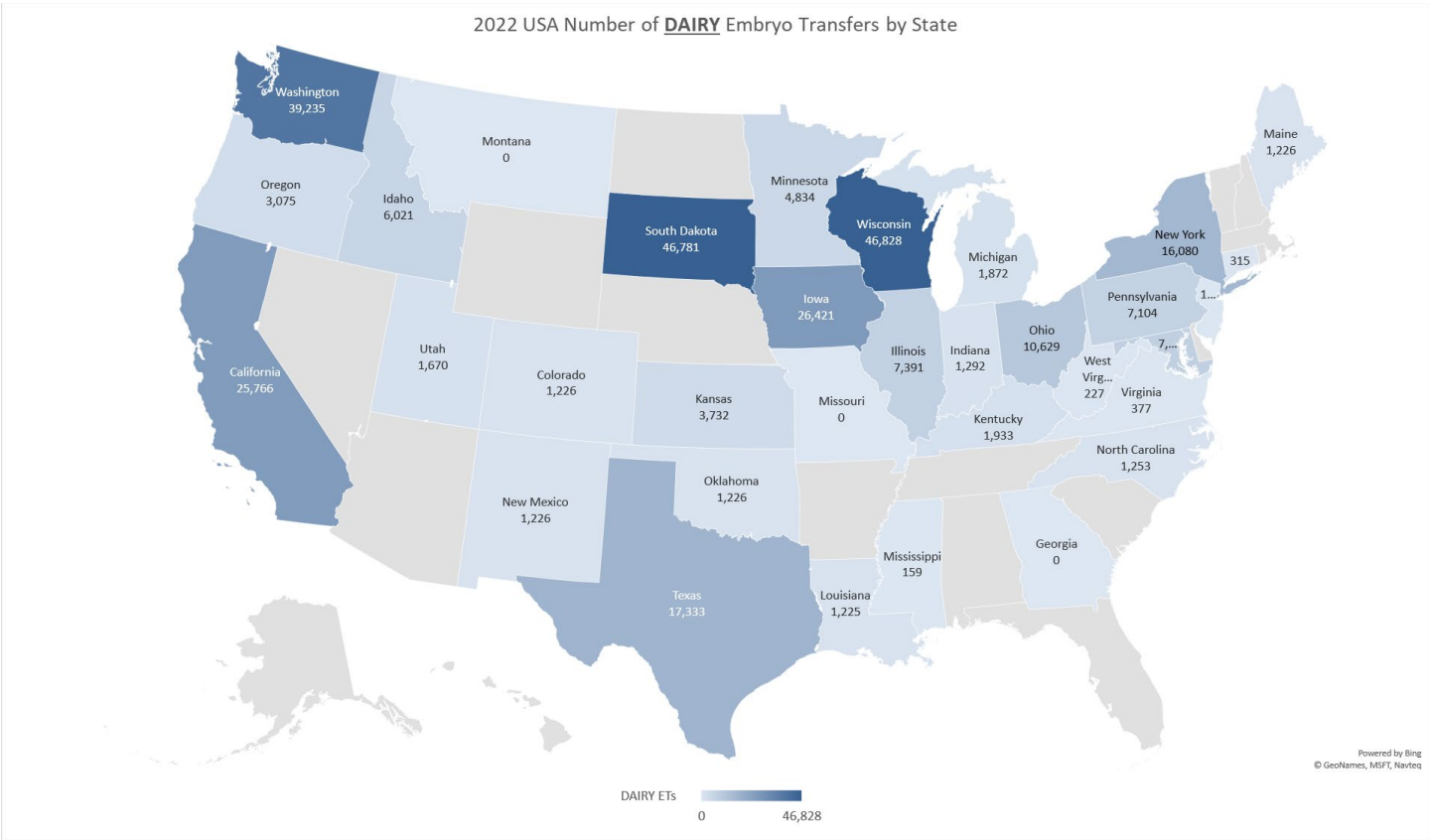
The graphs below illustrate the number of Total, Dairy and Beef *in vivo* (IVD) and *in vitro* (IVP) embryo transfers in the USA from 2009 to 2022.



2022 USA BOVINE EMBRYO TRANSFERS BY STATE AND NUMBER OF ETBS

Embryo transfer numbers per State were calculated based on the % of work provided by members on the survey. The 3 highest numbers per State in each category are highlighted (ETBs, Dairy or Beef). (I PASTED THE TABLE IN PICTURE FORMAT SO IT WOULD FIT IN THIS PAGE)

STATE	ETBs	DAIRY ETs		BEEF ETs		TOTAL ETs	
		TOTAL	%	TOTAL	%	TOTAL	%
Alabama	8	0	0.00	3,262	1.35	3,262	0.64
Arkansas	4	0	0.00	1,972	0.81	1,972	0.38
California	8	25,766	9.53	20,140	8.31	45,906	8.96
Colorado	4	1,226	0.45	3,905	1.61	5,131	1.00
Connecticut	1	315	0.12	0	0	315	0.06
Florida	5	0	0.00	2,878	1.19	2,878	0.56
Georgia	11	1,226	0.45	8,588	3.55	9,814	1.91
Idaho	7	6,021	2.23	1,631	0.67	7,652	1.49
Illinois	8	7,391	2.73	37,251	15.4	44,642	8.71
Indiana	8	1,292	0.48	5,205	2.15	6,497	1.27
Iowa	11	26,421	9.78	49,680	20.5	49,680	9.69
Kansas	8	3,732	1.38	17,013	7.02	20,745	4.05
Kentucky	8	1,933	0.72	7,278	3	9,211	1.60
Louisiana	3	1,225	0.45	3,917	1.62	5,143	1.59
Maine	1	1,226	0.45	1,226	0.51	2,452	0.48
Maryland	6	7,628	2.82	2,712	1.12	10,340	2.02
Michigan	3	1,872	0.69	912	0.38	2,785	0.54
Minnesota	7	4,834	1.79	7,127	2.94	11,961	2.33
Mississippi	2	159	0.06	829	0.34	988	0.19
Missouri	5	1,226	0.45	6,514	2.69	7,740	1.51
Montana	6	1,226	0.45	4,357	1.8	5,583	1.09
Nebraska	12	0	0.00	17,309	7.15	17,309	3.38
Nevada	1	0	0.00	89	0.04	89	0.02
New Jersey	1	169	0.06	121	0.05	290	0.06
New Mexico	3	1,226	0.45	313	0.13	1,539	0.30
New York	8	16,080	5.95	1,777	0.73	17,857	3.48
North	7	1,253	0.46	2,838	1.17	4,091	0.80
North Dakota	6	0	0.00	6,211	2.56	6,211	1.21
Ohio	12	10,629	3.93	6,782	2.8	17,411	3.40
Oklahoma	8	1,226	0.45	9,736	4.02	10,962	2.14
Oregon	7	3,075	1.14	2,033	0.84	5,108	1.00
Pennsylvania	14	7,104	2.63	3,677	1.52	10,781	2.10
South	4	0	0.00	435	0.18	435	0.08
South Dakota	8	46,781	17.30	19,228	7.94	66,009	12.90
Tennessee	7	0	0.00	5,358	2.21	5,358	1.05
Texas	11	17,333	6.41	34,658	14.3	51,991	10.14
United States	3	3,199	1.18	2,719	1.12	5,918	1.15
Utah	4	1,670	0.62	1,804	0.74	3,474	0.68
Vermont	2	0	0.00	189	0.08	189	0.04
Virginia	9	377	0.14	6,585	2.72	6,962	1.36
Washington	6	39,235	14.50	9,390	3.88	48,625	9.49
West Virginia	6	227	0.08	347	0.14	574	0.11
Wisconsin	17	46,828	17.30	5,100	2.11	51,928	10.13
Wyoming	5	0	0.00	3,262	1.35	3,262	0.64
TOTAL		270,289		242,217		512,506	



2022 USA BOVINE IN VIVO EMBRYO PRODUCTION (SUPERVOVULATION/FLUSH)

	ETBs	COLLECTIONS		TOTAL OVA		VIABLE EMBRYOS			FRESH ETs		FROZEN	
		#	% using Sexed Semen	#	Average	#	Average	%	#	%	#	%
DAIRY	49	5,351	60	40,156	7.5	28,271	5.28	70	8,932	32	19,339	68
BEEF	84	15,839	12	185,242	11.7	105,369	6.65	57	25,803	24	79,566	76
TOTAL	133	21,190	36	225,398	9.6	133,640	5.97	64	34,735	28	98,905	72

2022 USA BOVINE IN VITRO EMBRYO PRODUCTION

ALL ETBs that performed OPU	DAIRY	BEEF	TOTAL
Number of ETBs	31	36	39
Total OPUs	99,164	64,846	164,010
Total oocytes recovered	1,935,382	1,663,822	3,599,204
Recovered oocytes per OPU	19.5	25.6	21.9
% of OPUs stimulated with FSH	72.7	71.7	72.2
% of OPUs fertilized with sexed semen	64.3	35.3	49.8
ONLY ETBs with IVF labs	DAIRY	BEEF	TOTAL
Number of ETBs	12	12	12
Total OPUs	82,252	57,753	140,005
Total oocytes recovered	1,722,778	1,555,120	3,277,898
Oocytes per OPU	20.9	26.9	23.4
Fertilized oocytes	1,438,173	1,316,174	2,754,347
Fertilized oocytes per OPU	17.5	22.7	19.7
Total viable embryos	333,256	412,428	745,684
Viable embryos per OPU	4.1	7.1	5.3
% Viable embryos (viable/recovered)	19.3	26.5	22.7
% Viable embryos (viable/fertilized)	23.2	31.3	27.1
Total frozen (in the production lab)	105,122	183,819	288,941
% Frozen	32	45	39
Total transferred fresh or discarded	228,134	228,609	456,743
% Transferred fresh or discarded	68	55	61

Definitions:

Fertilized oocytes – oocytes that went to fertilization or cleaved.

Viable embryos – Day 6 embryos sent from the lab to a practitioner (not necessarily will be transferred or frozen on day 7) and/or Day 7 embryos transferred fresh, frozen, or discarded.

Unfortunately, we were not able to separate the data by FSH usage this year since there were several practitioners that were using for 40-50% of the donors.

2022 USA BOVINE EMBRYOS EXPORTED BY COUNTRY

Country	DAIRY		BEEF		TOTAL
	IN VIVO	IN VITRO	IN VIVO	IN VITRO	
Argentina	18	3	186		207
Australia	1,808	170	964	470	3,412
Belgium			60		60
Brazil	167		226		393
Canada	209	39	327	1,180	1,755
China	21,126		1,382		22,508
Colombia	149	33			182
Czech Republic	10				10
Ecuador				245	245
EU (not specified)	50				50
France	140	200	73		413
Germany	290	568	228	62	1,148
Honduras				126	126
Ireland	6	28		9	43
Israel			27		27
Italy	14	8			22
Japan	1,282				1,282
Korea	169				169
Netherlands	1,078	881	42	17	2,018
New Zealand	74			23	97
Pakistan	475				475
Philippines		15			15
Portugal			14	6	20
Russia	47				47
South Africa			24		24
Spain		11	77		88
Sweden			27		27
Switzerland	19	16	17	17	69
Tanzania	200				200
Thailand			3		3
United Kingdom	354	378	241	117	1,090
TOTAL	27,685	2,350	3,918	2,272	36,225

2022 USA BOVINE EMBRYOS EXPORTED BY BREED

DAIRY BREEDS	IN VIVO	IN VITRO	TOTAL
Ayrshire	6		6
Brown Swiss	19	7	26
Guernsey	25	27	52
Holstein	27,555	2,224	29,779
Jersey	80	77	157
Milking Shorthorn		15	15
TOTAL DAIRY	27,685	2,350	30,035

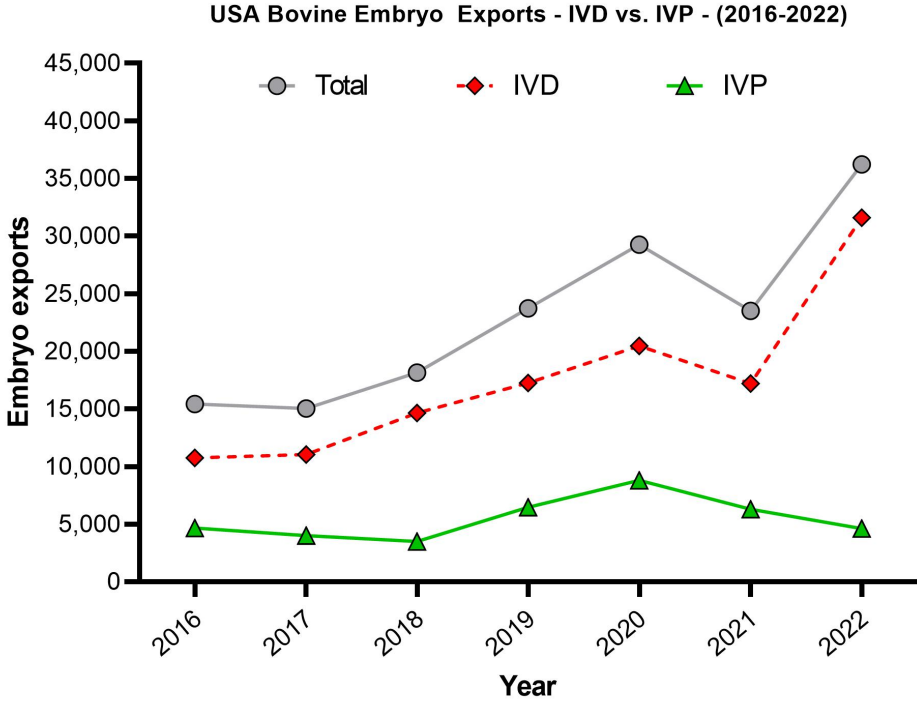
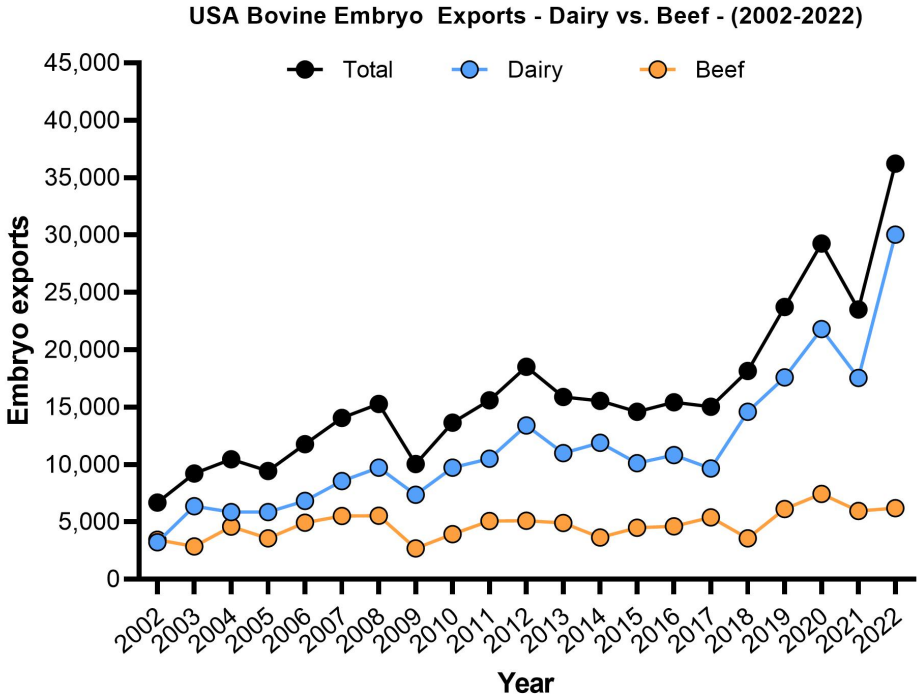
BEEF BREEDS	IN VIVO	IN VITRO	TOTAL
American Bucking	109	24	133
Angus	1,725	1,028	2,753
Beefmaster	84		84
Brangus	40	509	549
Charolais		23	23
Galloway	11		11
Gelbvieh	26		26
Hereford	141	37	178
Limousin	24	39	63
Maine-Anjou		7	7
Red Angus		46	46
Red Brahman	3		3
Santa Gertrudis	12	87	99
Shorthorn	9	11	20
Simmental	1,074	118	1,192
Speckle Park	5	34	39
Texas Longhorn	24	62	86
Wagyu	545	184	729
XX	86	63	149
TOTAL BEEF	3,918	2,272	6,190

2022 EMBRYOS IMPORTED INTO THE USA

COUNTRY	BOVINE DAIRY	BOVINE BEEF
Australia	8	42
Canada	16	106
France		9
Switzerland	17	
TOTAL	41	157



The graphs below illustrate 21 Years of USA Bovine Embryo Export (2002 to 2022).



2022 USA Equine Embryo Transfer / In-Vitro Embryo Production**Number of Submissions: 10 (2 AETA Members)**

Embryo recovery from mares via uterine flush (in vivo recovery)	
Number of recovery procedures performed	1,672
Number of recovered embryos	976
Average	0.6
Transfer of IN-VIVO RECOVERED embryos to recipient mares	
Number of FRESH embryos (recovered at your facility or shipped to you by others) transferred to recipient mares at your facility	904
Number of CRYOPRESERVED / warmed embryos (recovered at your facility or shipped to you by others) transferred to recipient mares at your facility	40
Total Transfers	944
Oocyte recovery procedures (TVA, OPU, flank) for in vitro embryo production	
Number of oocyte recovery procedures performed	1676
Number of immature oocytes recovered (oocytes recovered from diestrus/subordinate follicles)	14,081
Number of in vivo-matured oocytes recovered (recovered from the stimulated dominant follicle)	732
If separation by oocyte type is not possible) Number of mixed oocytes	--
Embryo production via ICSI at your facility	
Number of cases (mare aspiration sessions) on which ICSI was performed	2,525
Number of oocytes on which ICSI was performed	15,018
Number of transferrable IVP blastocysts produced via ICSI	2,979
Transfer of IVP embryos at your facility	
Number of FRESH IVP blastocysts transferred to the uteri of recipient mares at your facility (including fresh shipped IVP blastocysts)	517
Number of CRYOPRESERVED /warmed IVP blastocysts transferred to the uteri of recipient mares at your facility (including shipped cryopreserved IVP blastocysts)	498
Total Transfers	1,015

A separate survey is conducted for Equine to allow collection of detailed equine embryo transfer data from practitioners that are not associated to the AETA. We express our gratitude to Dr Katrin Hinrichs (University of Pennsylvania) and Dr Robert Foss (Equine Medical Services, Colombia, MO) who created the survey form and contributed to its distribution among equine practitioners around the country.

2022 USA OTHER SPECIES IN VIVO EMBRYO PRODUCTION

Species	ETBs	Collection data							Transfer Data		
		Collections	Total Ova	Viable	Average Ova	Average Viable	% Viable	Frozen	Fresh	Frozen	Total
Ovine	12	1,990	17,497	11,322	8.8	5.7	64.7%	838	10,484	551	11,035
Caprine	12	1,896	25,317	14,605	13.4	7.7	57.7%	1,578	13,027	985	14,012
Cervids	1	17	4	4	0.2	0.2	100%	0	4	0	4

2022 USA OTHER SPECIES IN VITRO EMBRYO PRODUCTION

Species	ETBs	OPUs	Total Oocytes	Oocytes per OPU	Viable Embryos	Embryos per OPU	% Viable	Frozen	Fresh ET
Ovine	3	228	1,777	7.8	176	0.8	9.9%	145	89
Caprine	4	320	6,605	20.6	2,147	6.7	32.5%	602	1146
Cervine	NR	NR	NR	NR	NR	NR	NR	NR	NR
Water buffalo	NR	NR	NR	NR	NR	NR	NR	NR	NR

Survey data is only as good as the quality and integrity of the data submitted by people. Before submitting your survey, please take a second look and make sure everything is correct. There are a lot of minor errors that can probably be fixed without us having to contact you for clarification.

Thank you for taking the time to submit your data, it benefits the whole embryo industry. A special thanks to non-certified members and non-members that voluntarily submitted data.

All the submitted data is analyzed by the Statistical Information Committee members and combined with the other submissions to be summarized. Individual embryo production data remain confidential at all times.

For any questions or suggestions for next year's survey, please contact:

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