ELISA Titers in Georgia Poultry Flocks

2021-2022

GPLN

Georgia Poultry Laboratory Network

ELISA Titers in Georgia Poultry Flocks

Every year, GPLN aggregates biennial ELISA titers by poultry production type and age ranges covering the data from the previous 2 years. This report summarizes the 2021 and 2022 data.

General Comments:

- This report only includes flocks from Georgia complexes.
- The poultry industry monitors flocks for the presence/absence of disease and for vaccination monitoring. Included in this report are monitored flocks only. No diagnostic case data is included.
- All flock results are verified. They have valid kit and internal reference control (IRC) values. The IRC is a field sample with an expected titer range that is diluted just like the field samples in the test, as opposed to the kit controls that are pre-diluted.
- Kit used: IDEXX.
- All data is in the graphs, regardless of the number of flocks represented. The number of flocks represented for each data point is between parentheses next to the age range on the x axis. Please note that a few data points represent only 1 or 2 flocks.

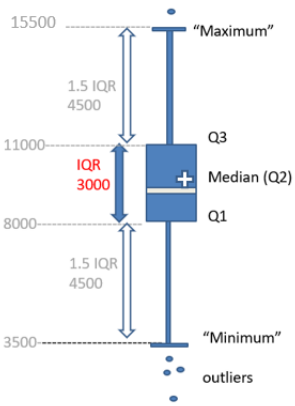
BAR GRAPHS:

- Each bar represents the average GMT of all flocks in the data base for that bird type and age range.
- The cv's found under the x axis are the average of all coefficients of variation for all flocks in the database for the corresponding bird type and age range.
- The positive cutoff for an individual bird sample (397 for most kits) is represented on the graph as a horizontal line (for reference).
- The last 5 graphs on this report show yearly trends (one year, not two) for IBV, REO, AE and IBD for critical age ranges in breeders and broilers.

BOX PLOTS:

- The box plots display the data in a manner that gives a better understanding of the variability of the average flock titers within a population of flocks. A detailed explanation is below.

Tukey Box and Whisker plot explained



- The median (line in the box) is the middle value of the dataset.
- The cross is the mean.
- The box contains 50% of the values.
- The IQR (inter quantile range) is the difference between the values on top and bottom of the box.
- The minimum and maximum (whiskers) are calculated at 1.5X the IQR
- Any values higher or lower than the min and max (whiskers) are the outliers.
- If the distribution is normal (it often is not), the outliers are <1% (0.70%) of the data.

ELISA Titers in GA Poultry Flocks

Uses:

- Flock managers can utilize this data by comparing their own serological results against Georgia data for flocks falling within the same age ranges. They can also compare their own company baselines to GPLN's.
- Students can use this report to compare what is theoretically expected of flock responses to vaccination and field exposure versus what is observed from Georgia flocks.
- The GA baselines should not be expected to reflect titers found in other areas of the US or in other countries.
- GPLN can compare serological response data between vaccination strategies, programs or between vaccine types. These results will appear in the "Chick papers" newsletter.

ENJOY!
Len Chappell and Dr Louise Dufour-Zavala

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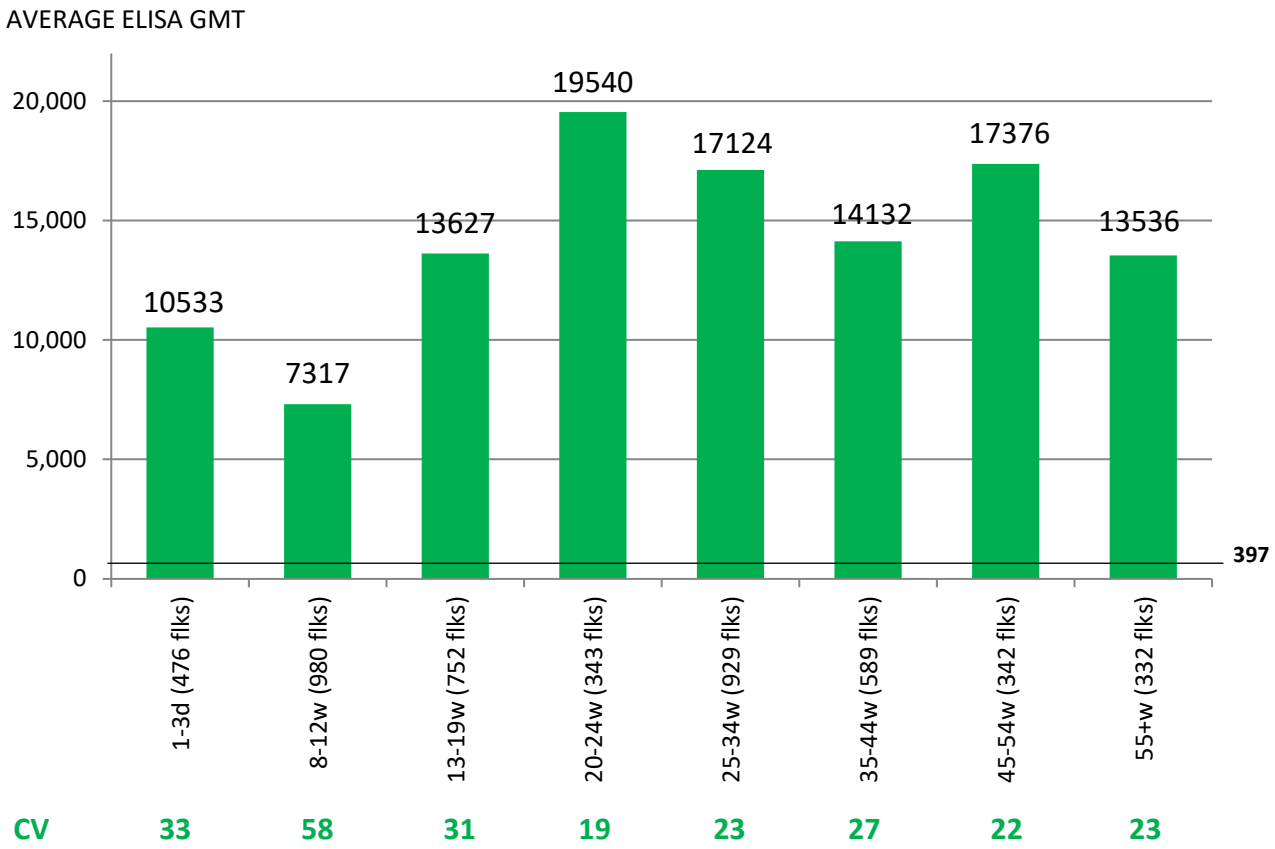
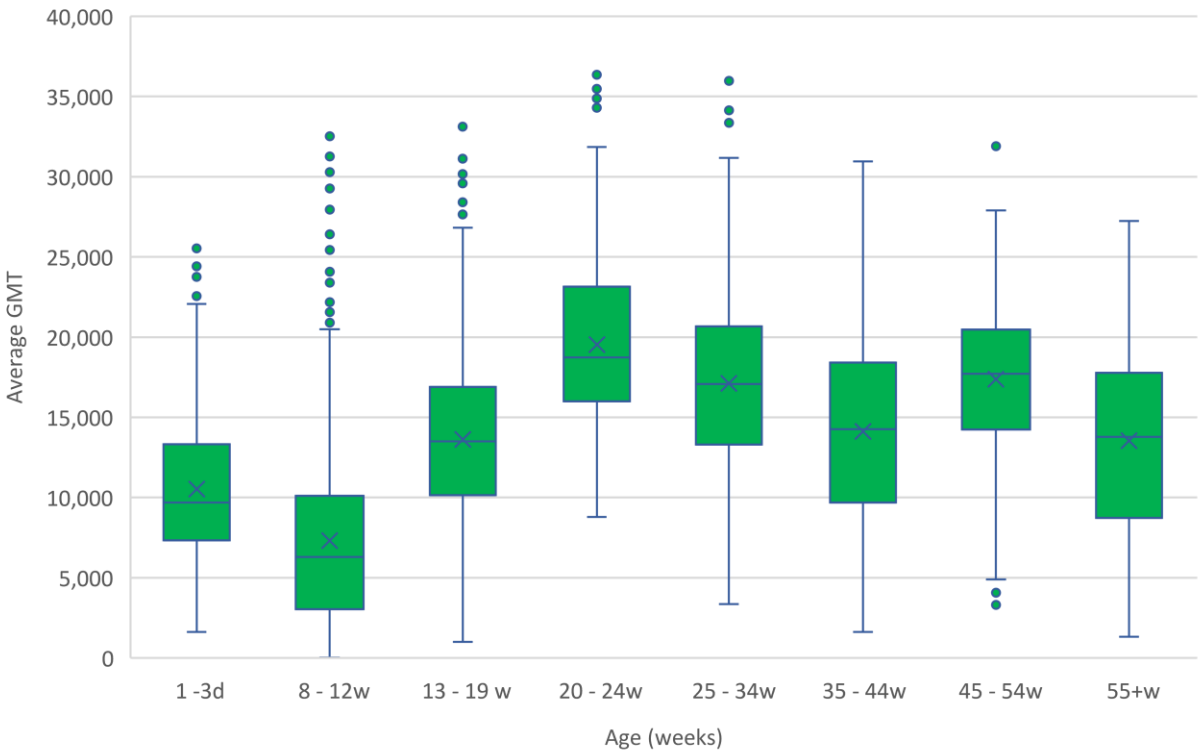
ELISA Titers in Broiler Breeders

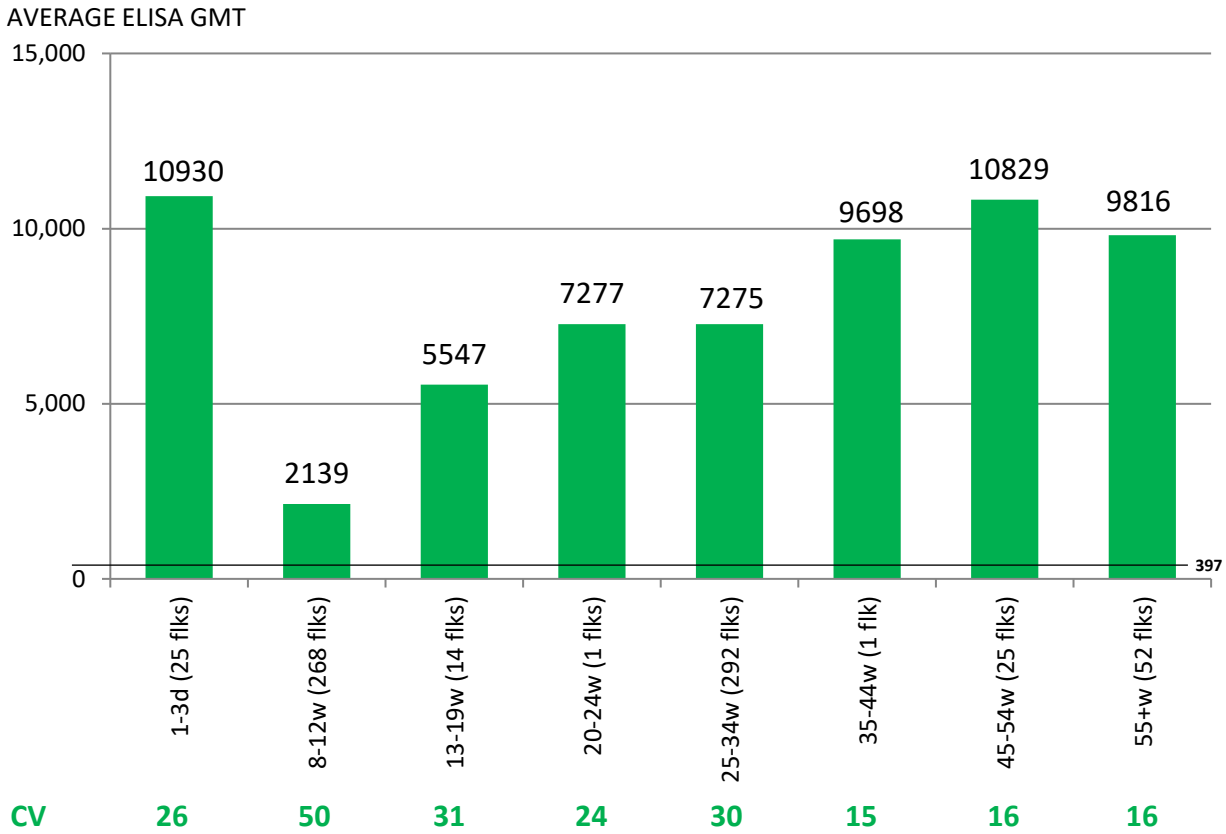
- Age ranges are the same as for recent reports. They fit the functional ages in the life of a breeder and fit the timing of the vaccination responses as explained below.
  - *1d represents the level of maternal antibodies in day old pullets and cockerels coming from the grandparent flocks.*
  - *GPLN receives very few, if any samples from young pullet flocks between 1 and 8 weeks of age. During that period of time, the following would be expected: at 2-4 weeks of age, titers would be very low due to the decline of maternal antibodies. After 4 weeks of age, titers would be steadily increasing due to live vaccinations and field exposure.*
  - *8-12w represents the response to natural exposure in pullets, as well as the response to vaccinations with live primers.*
  - *13-19w represents the response to natural exposure in pullets, as well as the response to vaccinations with live primers and to the first inactivated vaccination, given at or around 12 weeks of age.*
  - *20-24w represents the response to natural exposure in pullets, as well as the response to vaccinations with live primers and to the first inactivated vaccination, given at or around 12 weeks of age plus the response to the second inactivated vaccination given at or around 18 weeks of age.*
  - *The rest of the life of breeder flocks is split in 10-week increments.*
- All complexes represented in this report are vaccinating their pullets twice with inactivated vaccines.
- The breeder NDV and IBV data is split between 3 vaccination strategies:
  1. complexes that vaccinate pullets only with live vaccines (L-PO for LIVE-PULLETS ONLY),
  2. complexes that vaccinate pullets with live vaccines, followed by vaccinating breeders in production with live vaccines (L-LP for LIVE vaccines in pullets, followed by LIVE vaccines in PRODUCTION)
  3. complexes that use live vaccines followed by inactivated vaccines in pullets (L-K for LIVE and KILLED vaccines in pullets).
- The CAV data is presented in tabular form and the % positive birds are included in the tables.
- The number of samples per flock in this series is 10 or greater.
- Note that the Y axis range of values may be different on the bar graph and on the box plot found on the same page.

Breeder **IBD-XR** titers and CVs by age

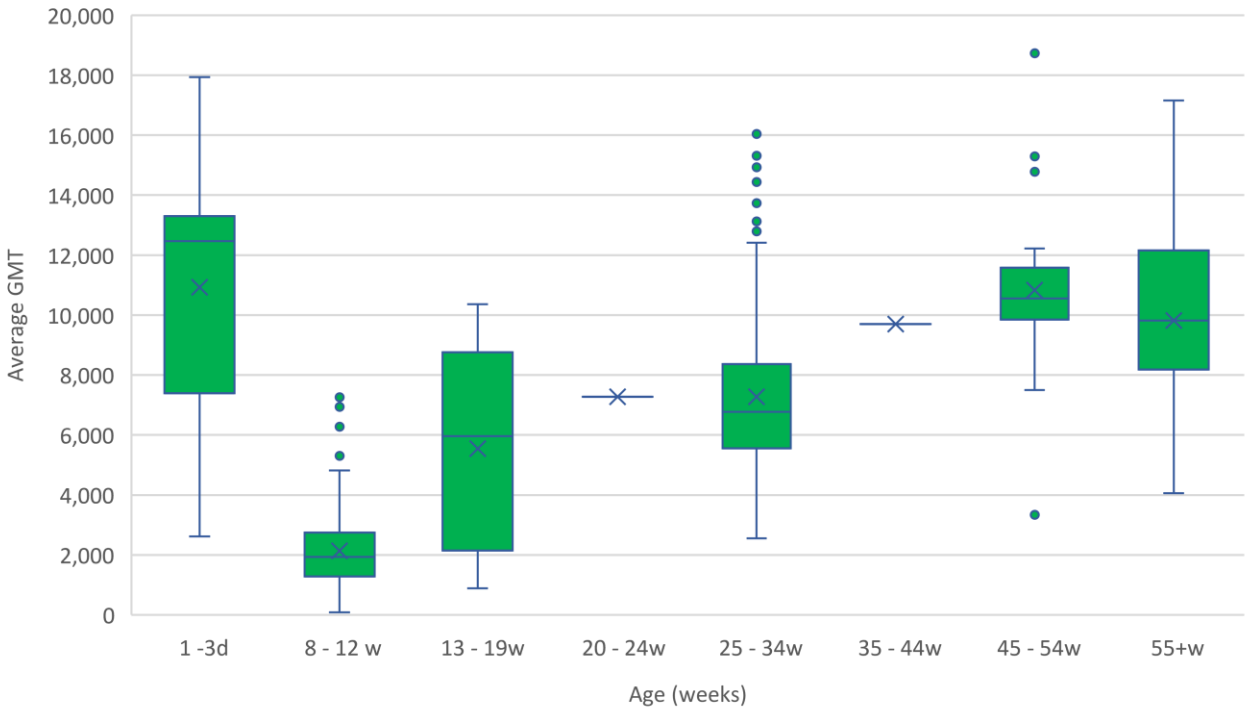




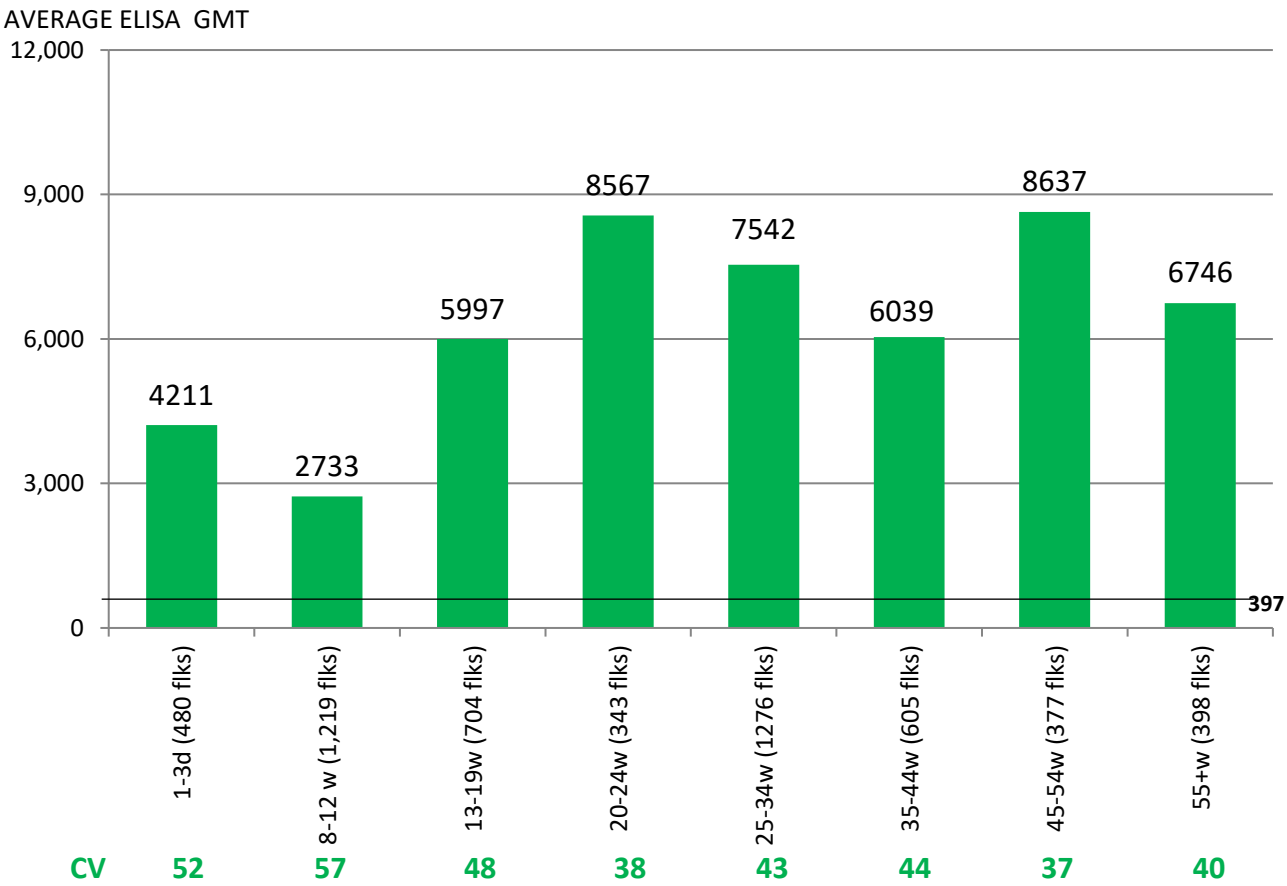
Breeder **IBD-Classic** titers and CVs by age

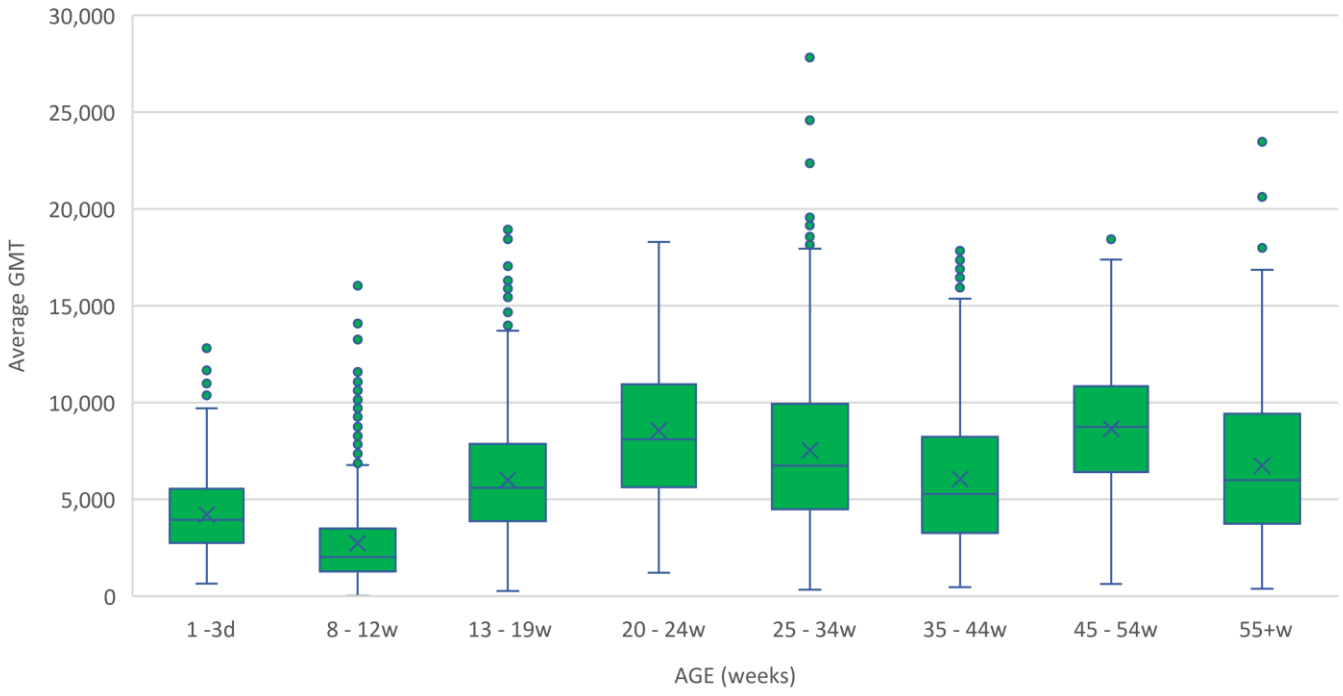


CV	26	50	31	24	30	15	16	16



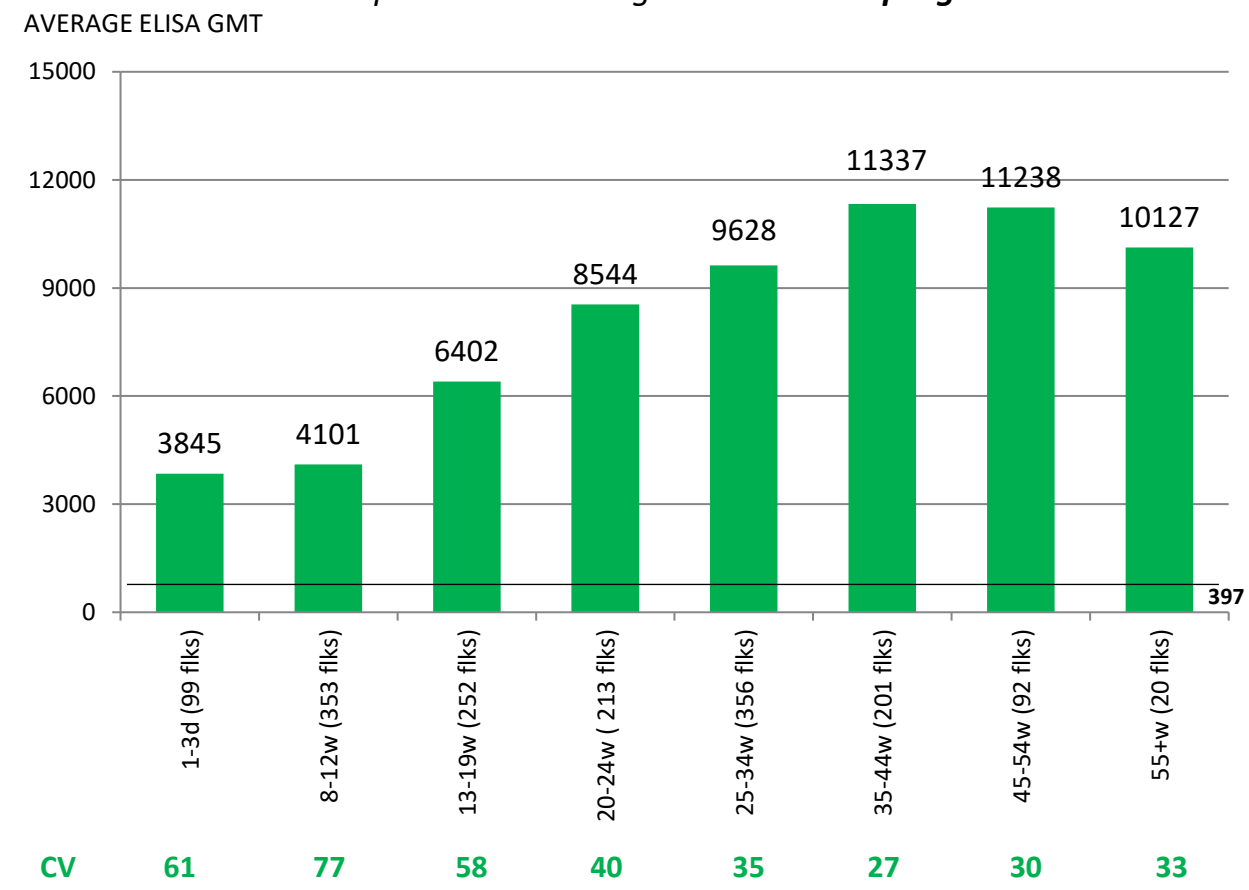
Breeder REO titers and CVs by age

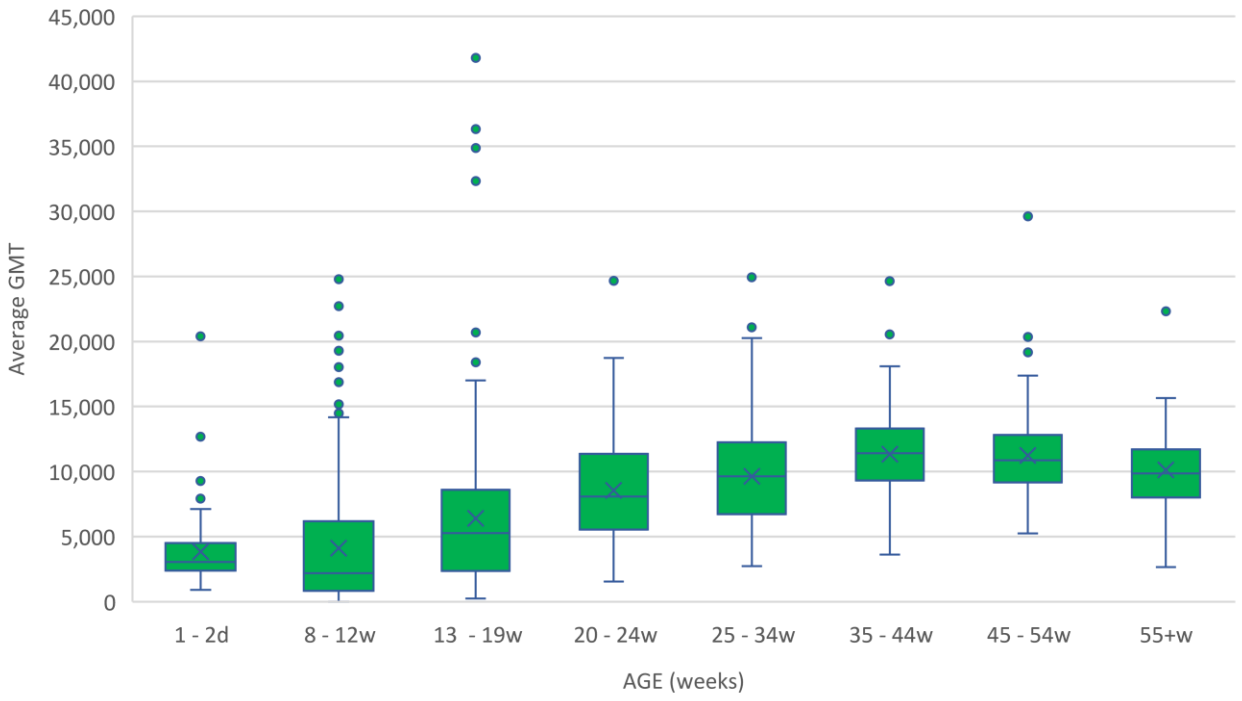




Breeder IBV titers and CVs by age

*Complexes Vaccinating with the L-PO **prog**rams*

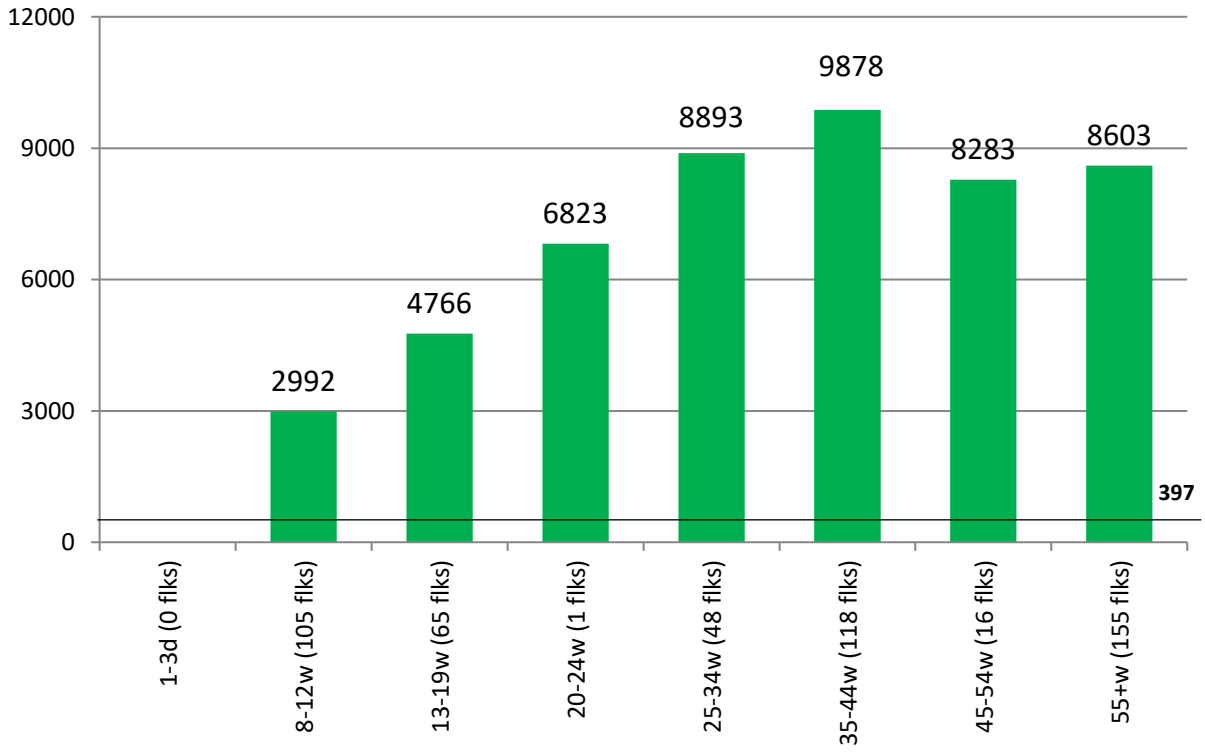




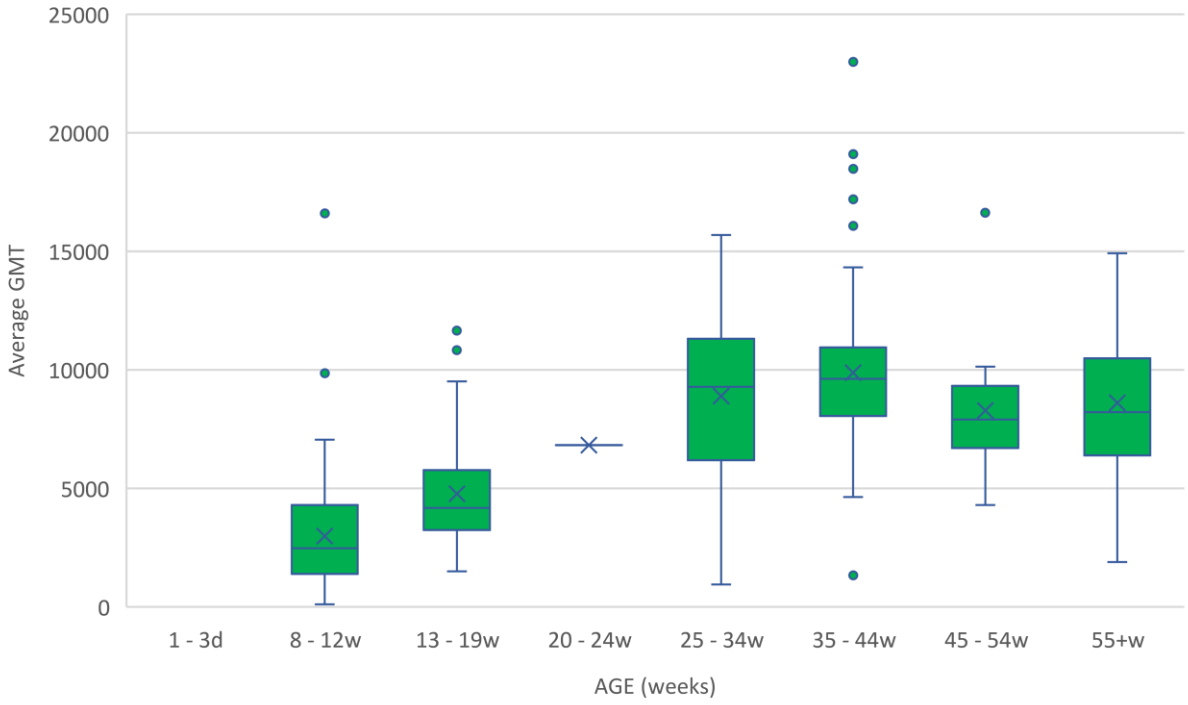
Breeder **IBV** titers and CVs by age

*Complexes Vaccinating with the **L-LP** programs*

AVERAGE ELISA GMT

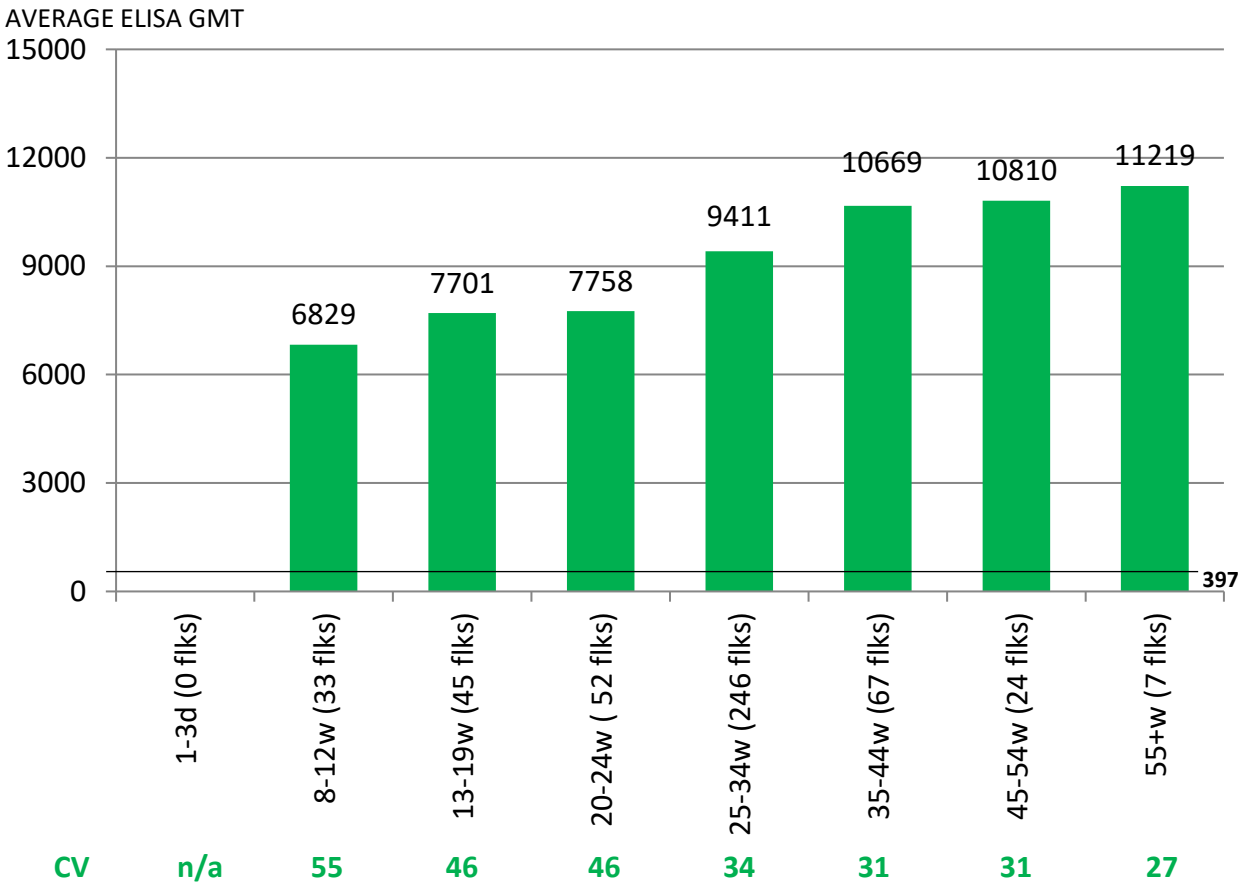


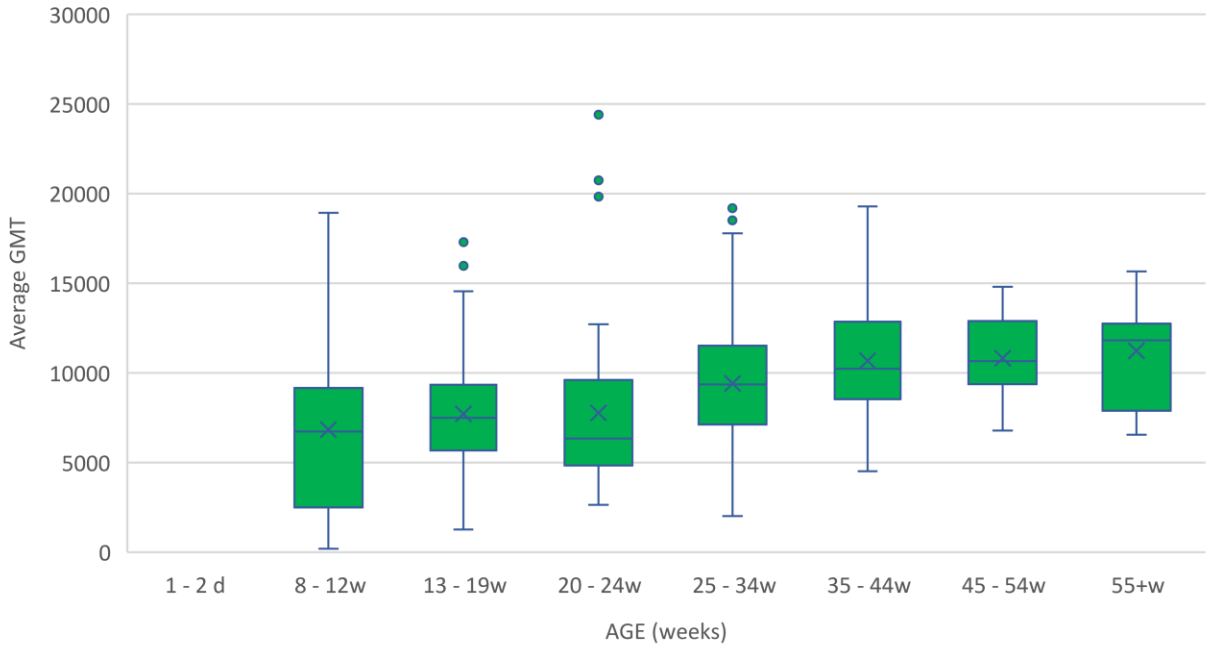
CV	n/a	67	55	37	41	25	34	33



Breeder IBV titers and CVs by age

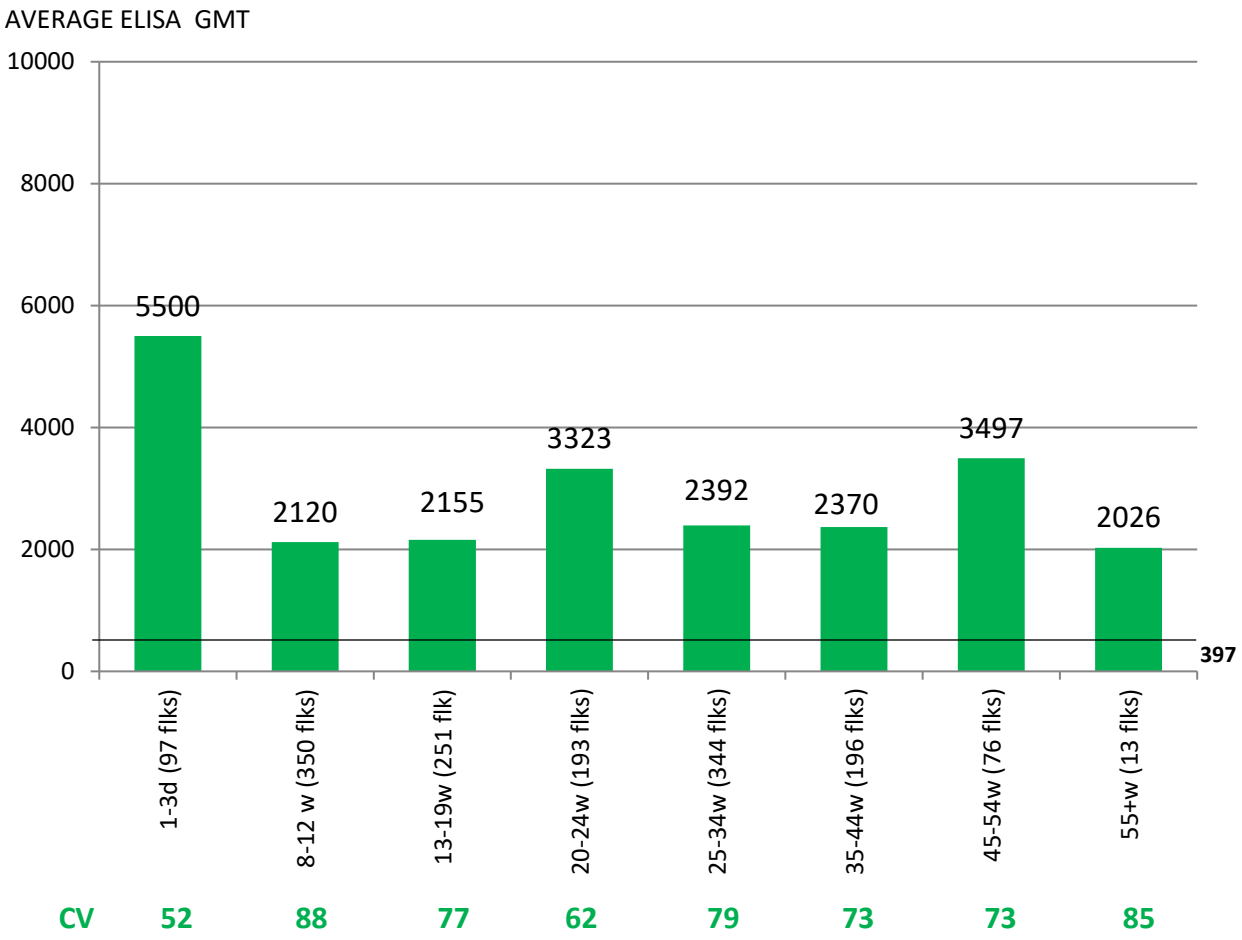
Complexes Vaccinating with the L-K programs

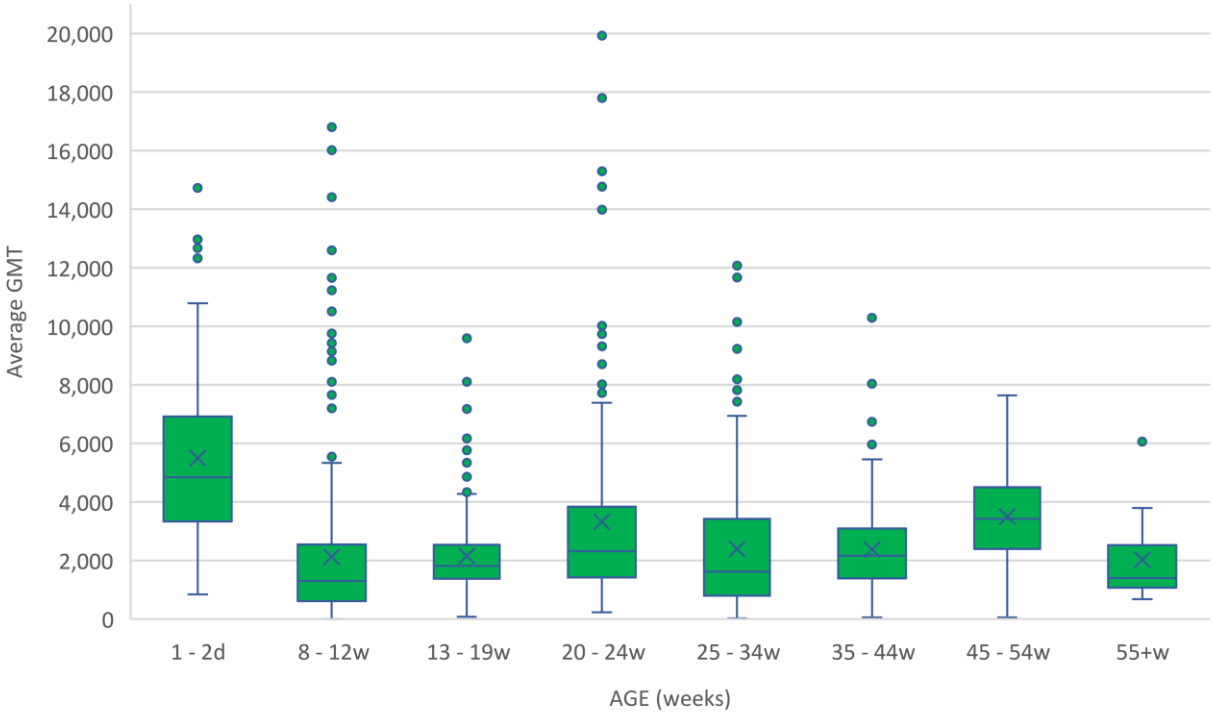




Breeder **NDV** titers and CVs by age

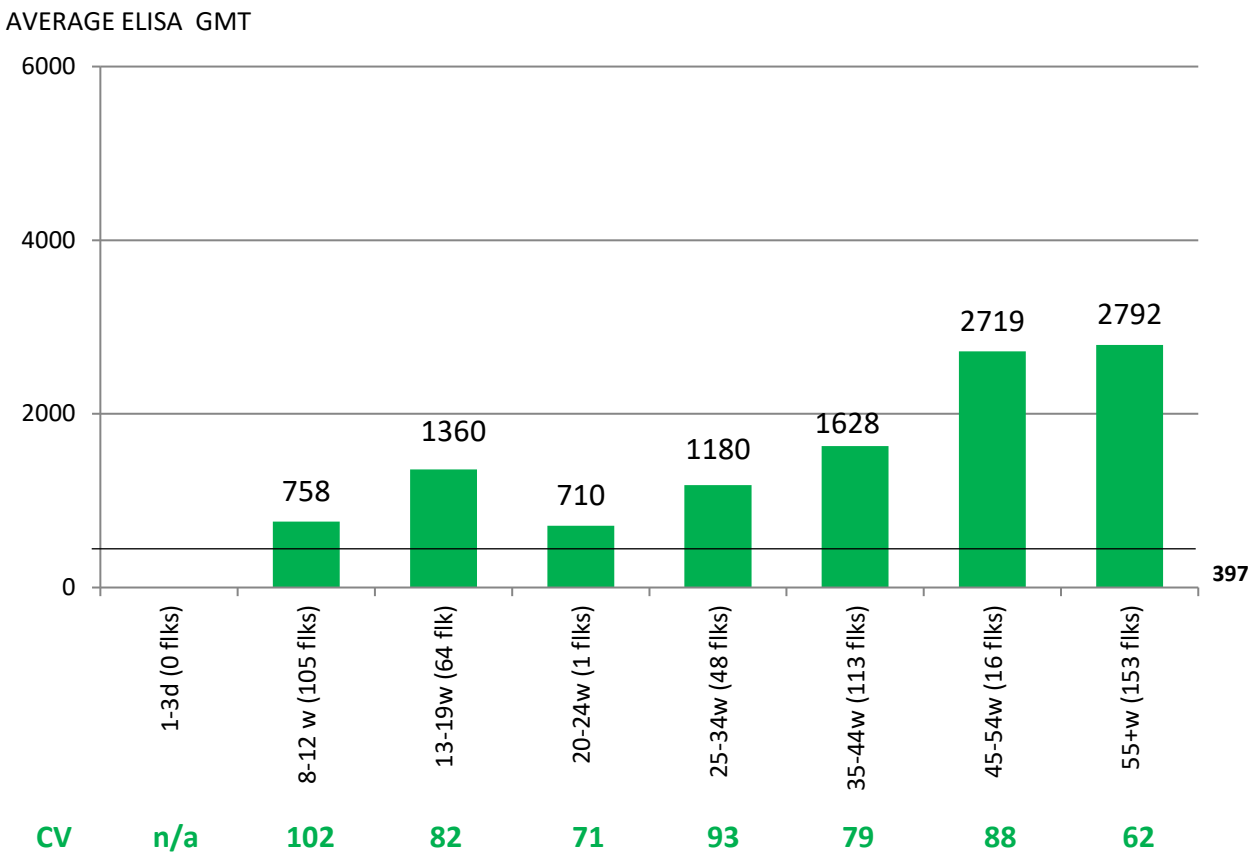
*Companies Vaccinating with the **L-PO** programs*

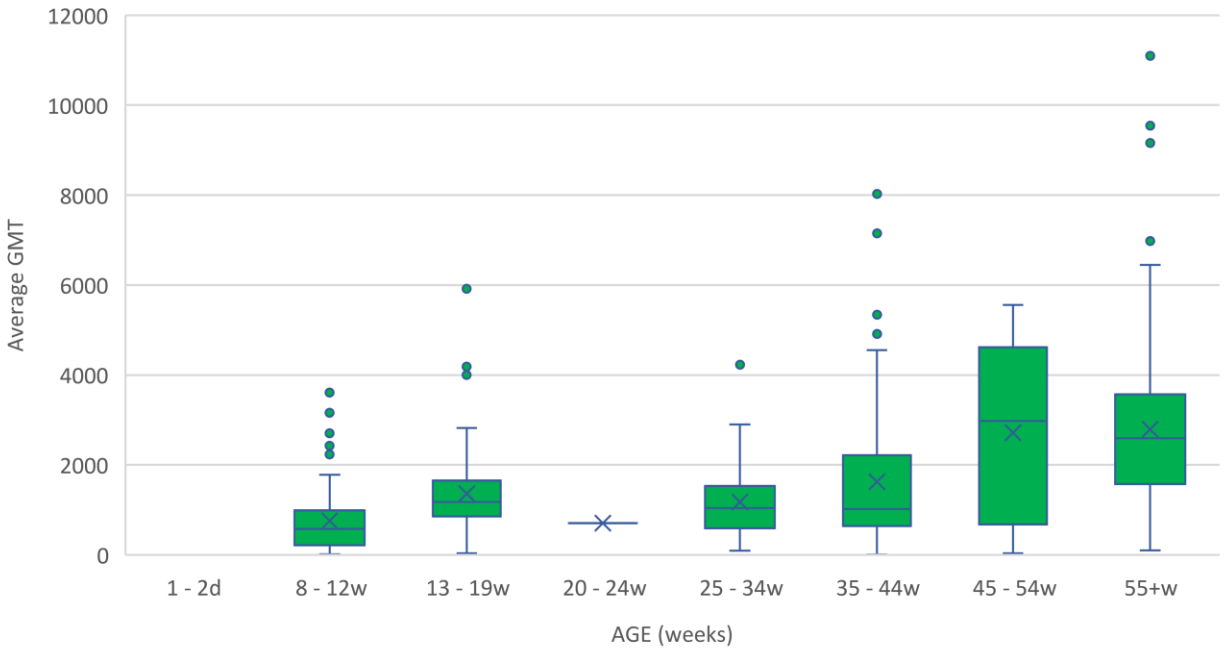




Breeder **NDV** titers and CVs by age

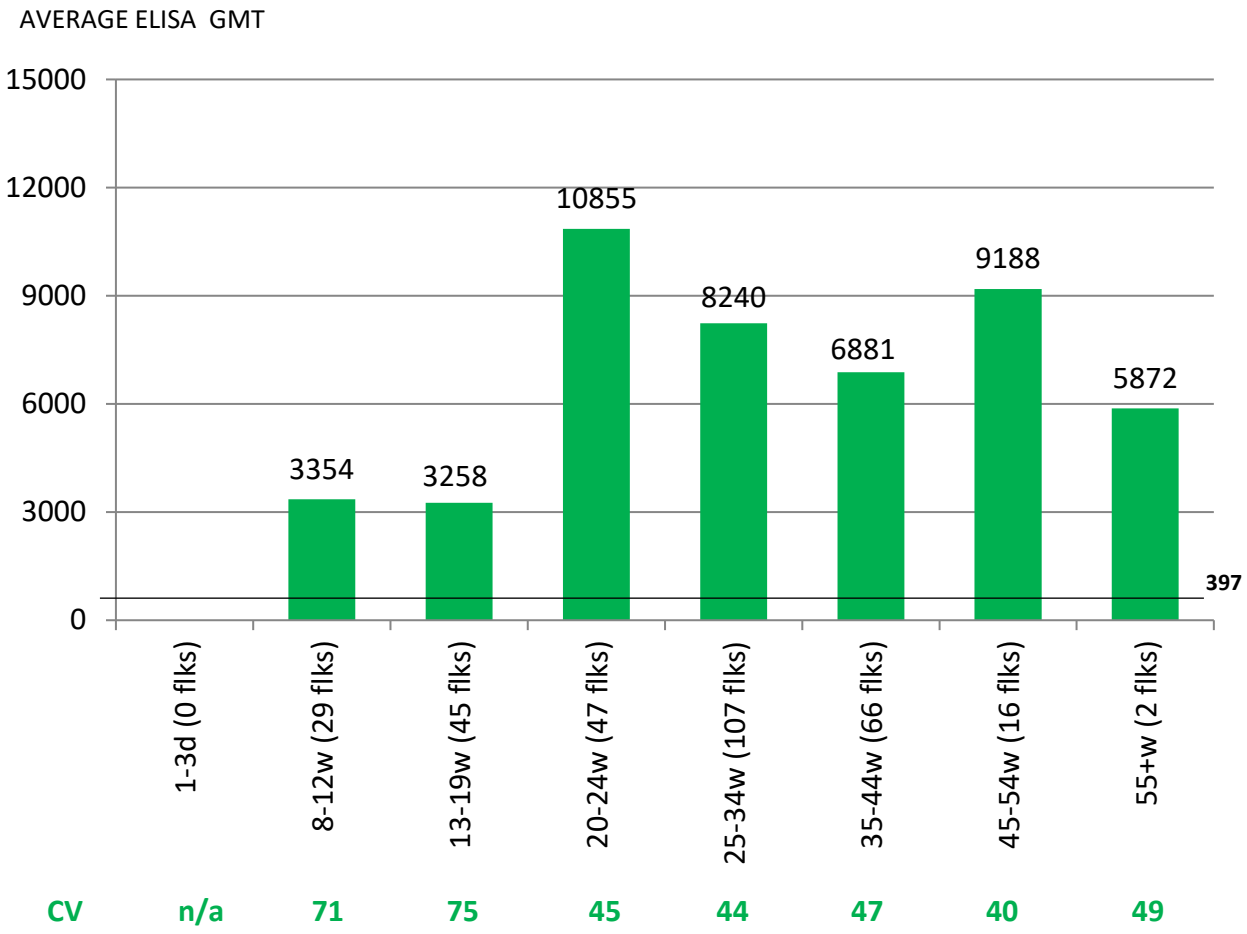
*Companies Vaccinating with the **L-LP** programs*

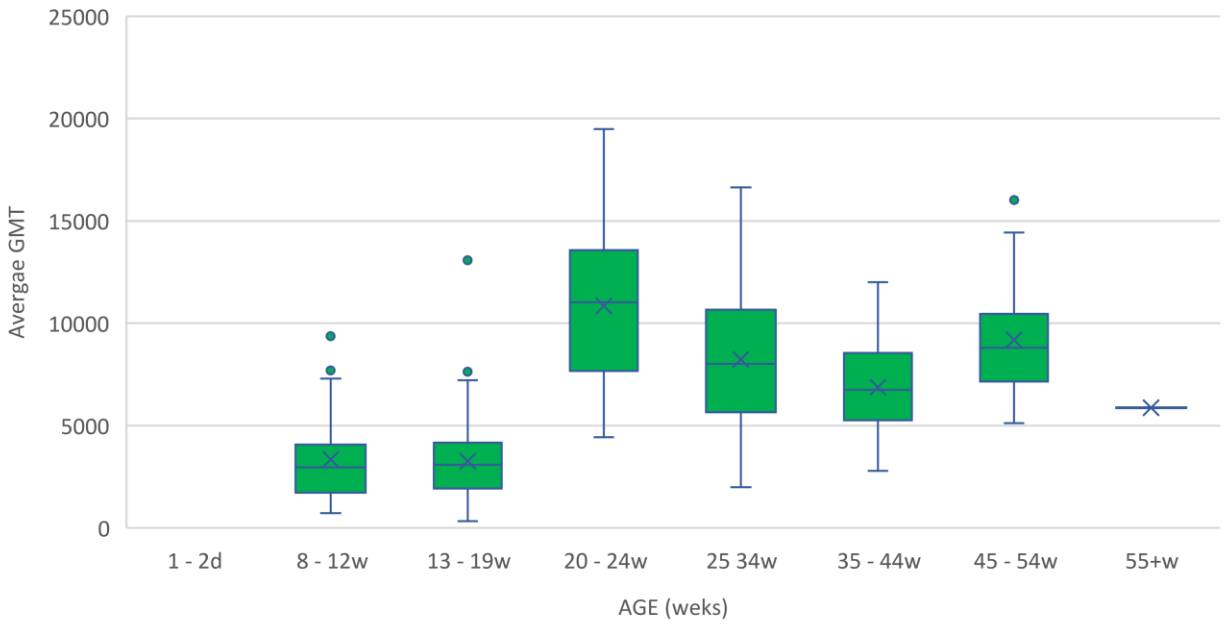




Breeder NDV titers and CVs by age

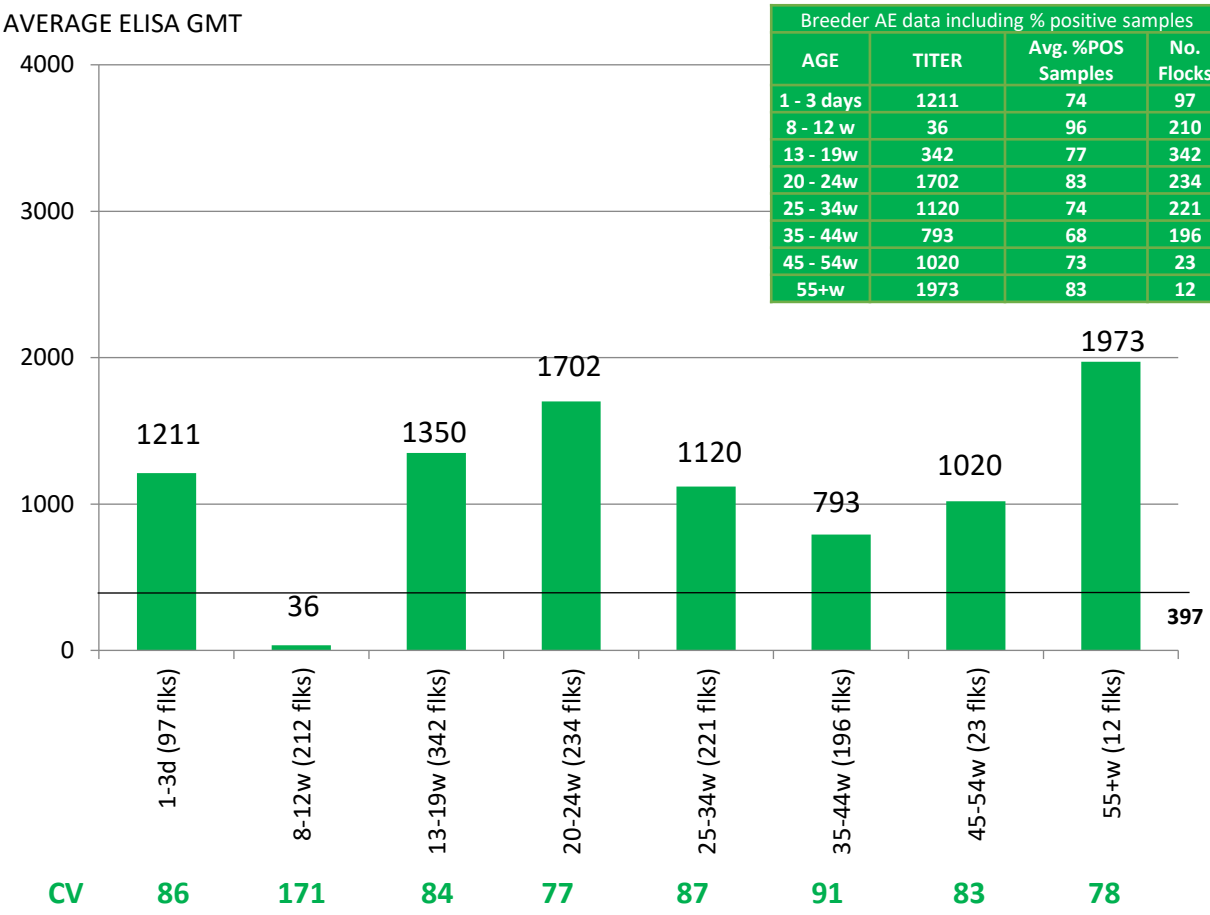
Companies Vaccinating with L-K Programs

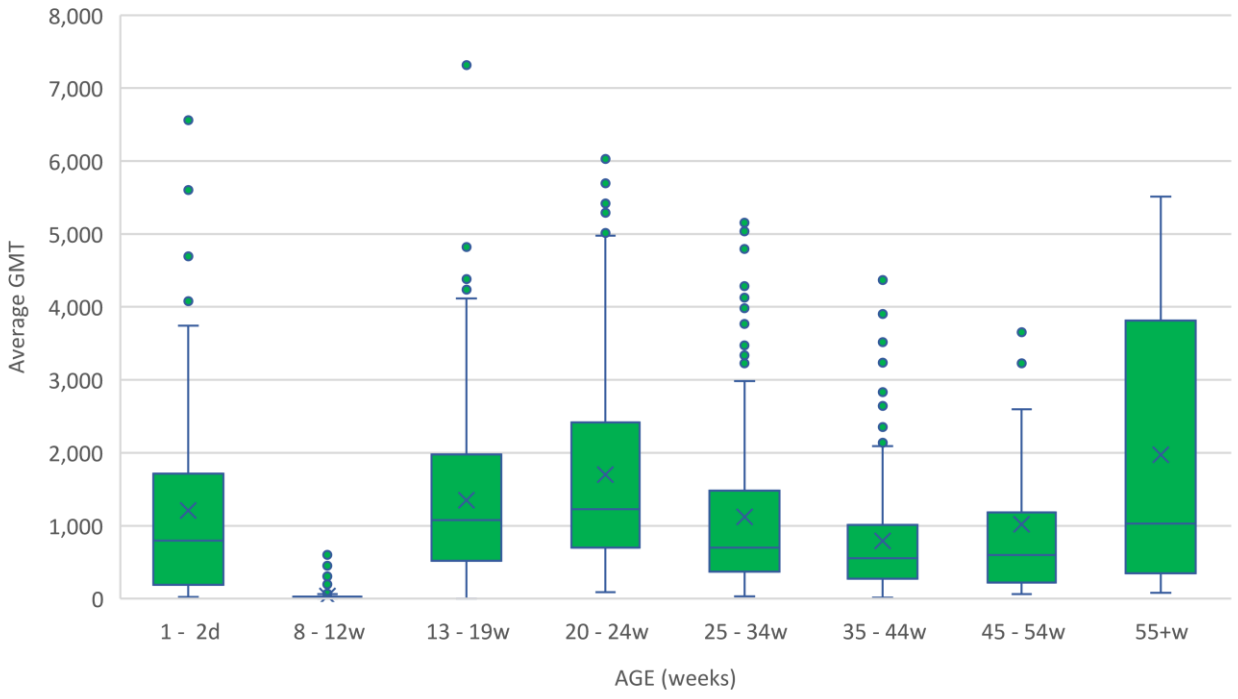




Breeder AE titers and CVs by age

Breeder AE data including % positive samples			
AGE	TITER	Avg. %POS Samples	No. Flocks
1 - 3 days	1211	74	97
8 - 12 w	36	96	210
13 - 19w	342	77	342
20 - 24w	1702	83	234
25 - 34w	1120	74	221
35 - 44w	793	68	196
45 - 54w	1020	73	23
55+w	1973	83	12





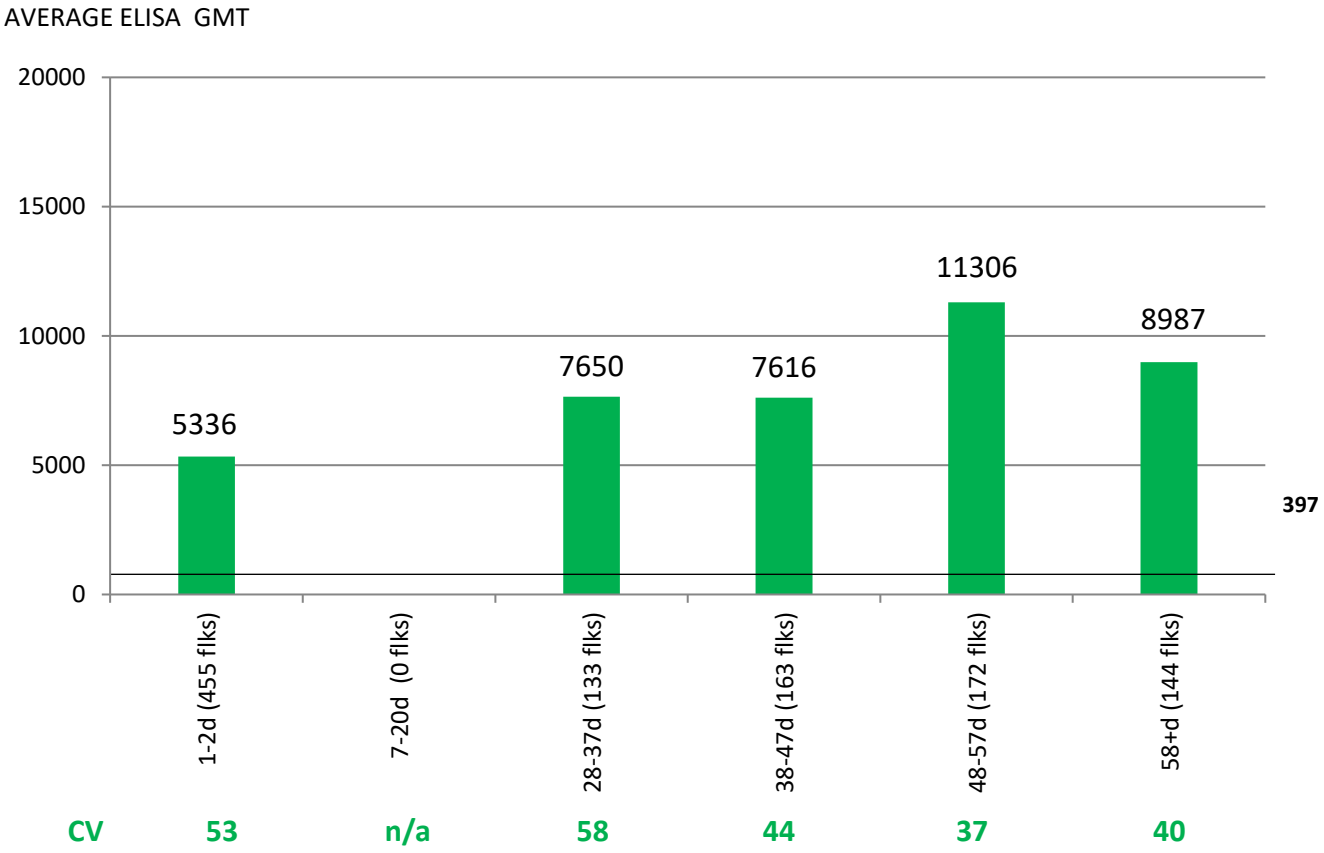
Breeder CAV % positive and CVs by age

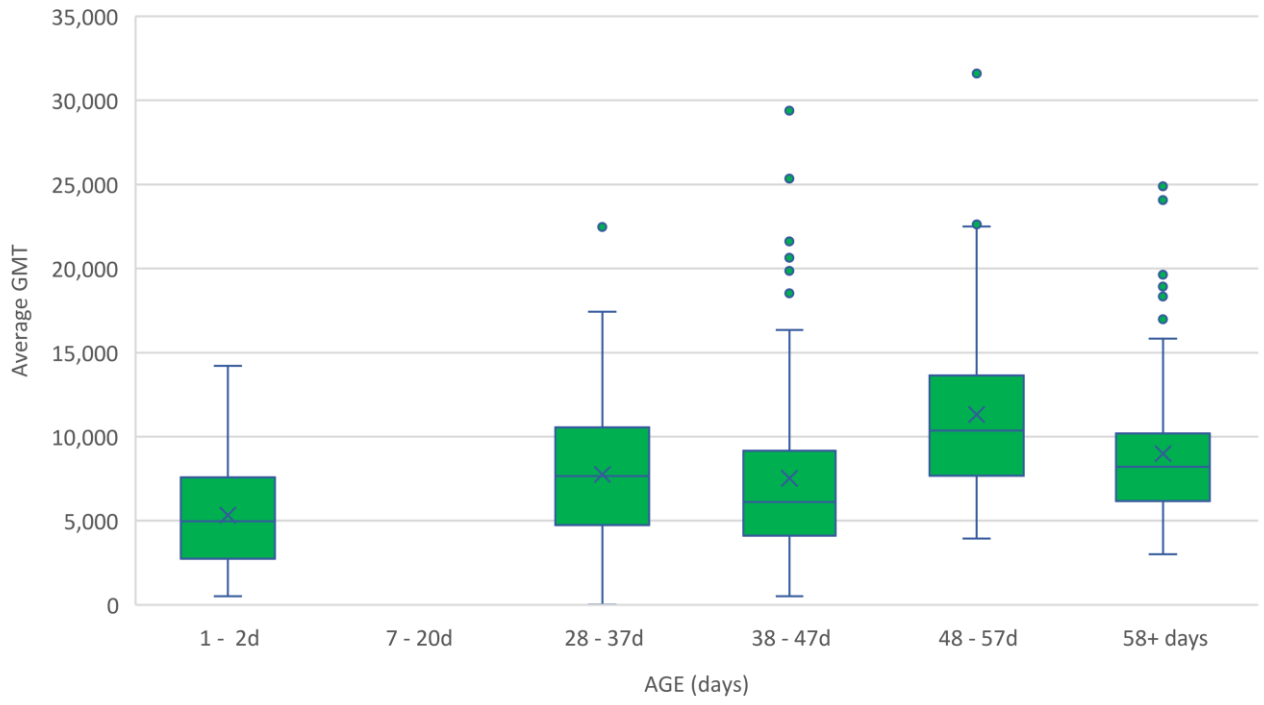
AGE	Avg % positive samples	CV	No. of flocks
1-3d	94.5	86	97
8-12w	88.1	80	326
13-19w	98.9	59	776
20-24w	99.5	47	243
25-34w	99.0	55	324
35-44w	99.1	53	200
45-54w	98.7	67	69
55+w	99.6	56	14

ELISA Titers in Broilers

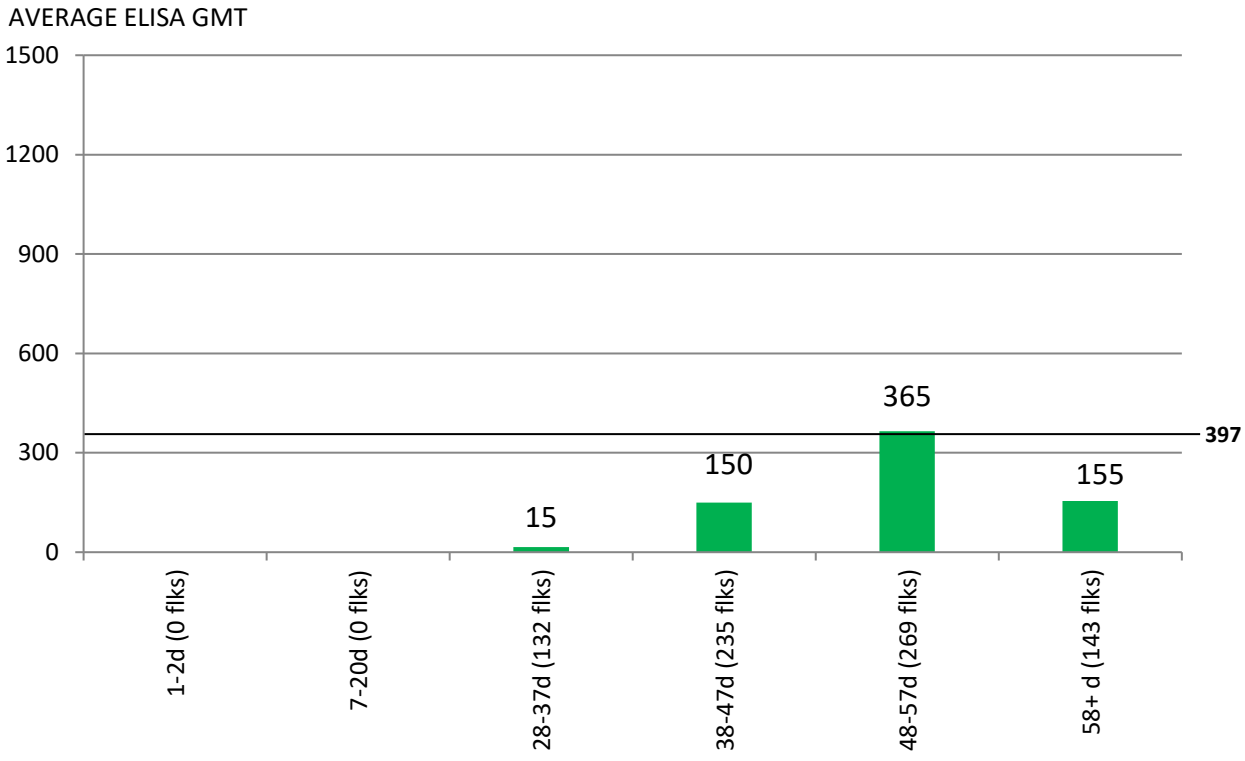
- Age ranges are divided in 6 groups: 1-2 days, 7-20 days, 28-37 days, 38-47 days, 48-57 days and 58+ days.
- GPLN receives very few broiler samples between 7 and 27 days of age. This age range reflects the maternal antibody decline after hatching.
- After 27 days of age, the increase in titers is due to a combination of vaccine response and field exposure.
- The number of samples per flock in this series is 10 or greater.
- The number of flocks per age range is 5 or greater.
- Note that the Y axis range of values may be different on the bar graph and on the box plot found on the same page.

Broiler **IBD-XR** titers and CVs by age

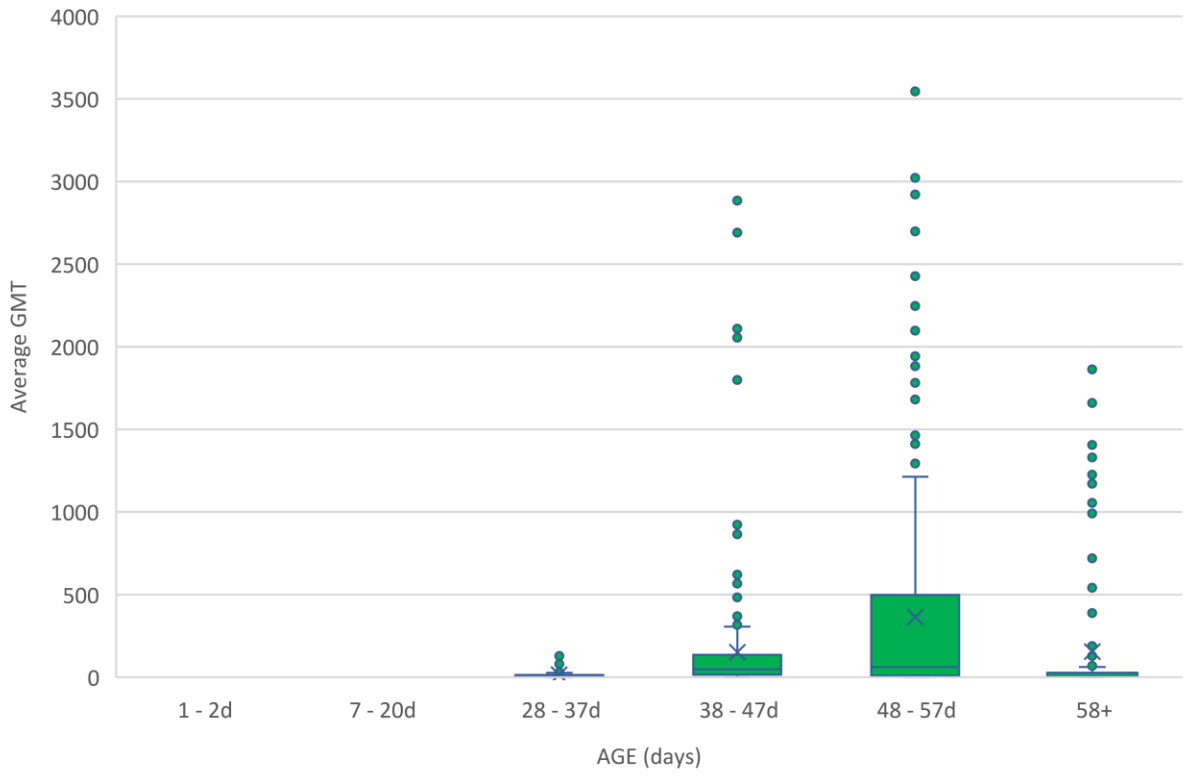




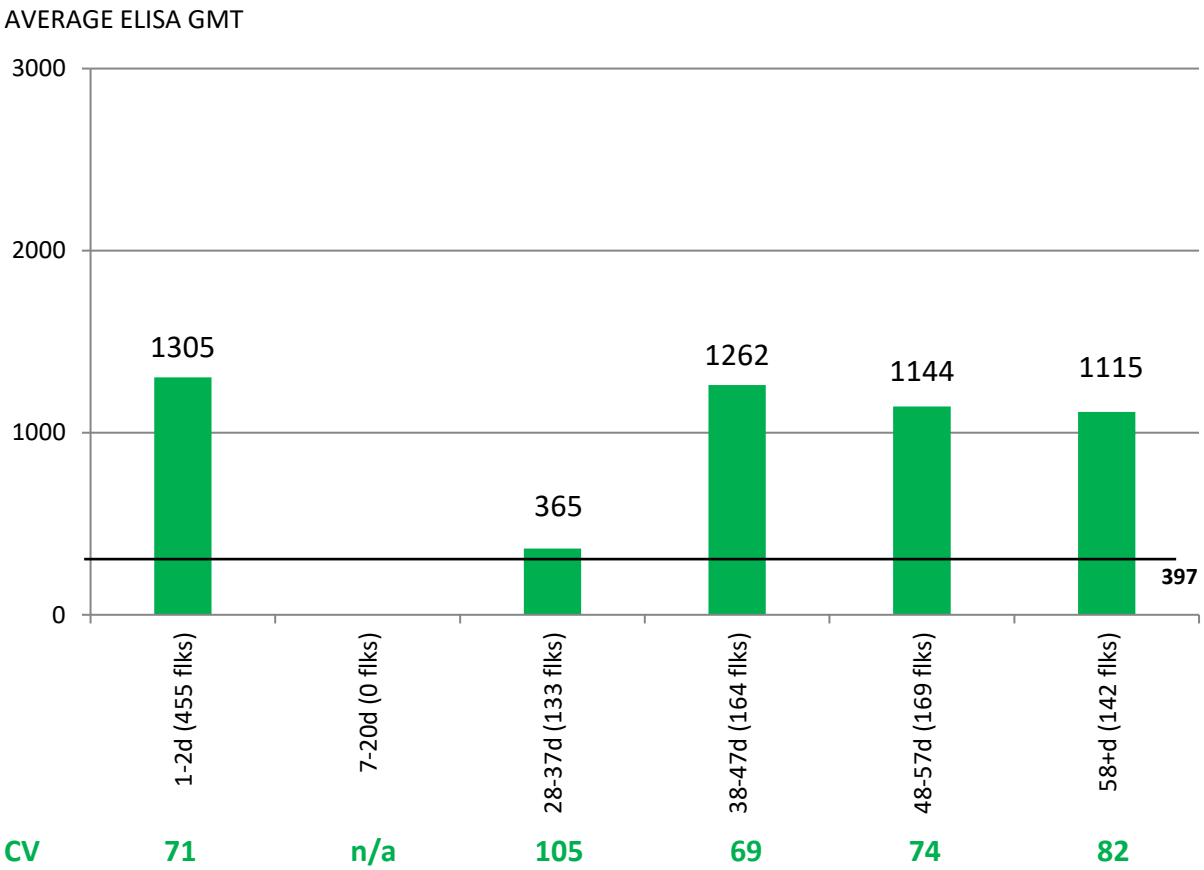
Broiler NDV titers and CVs by age

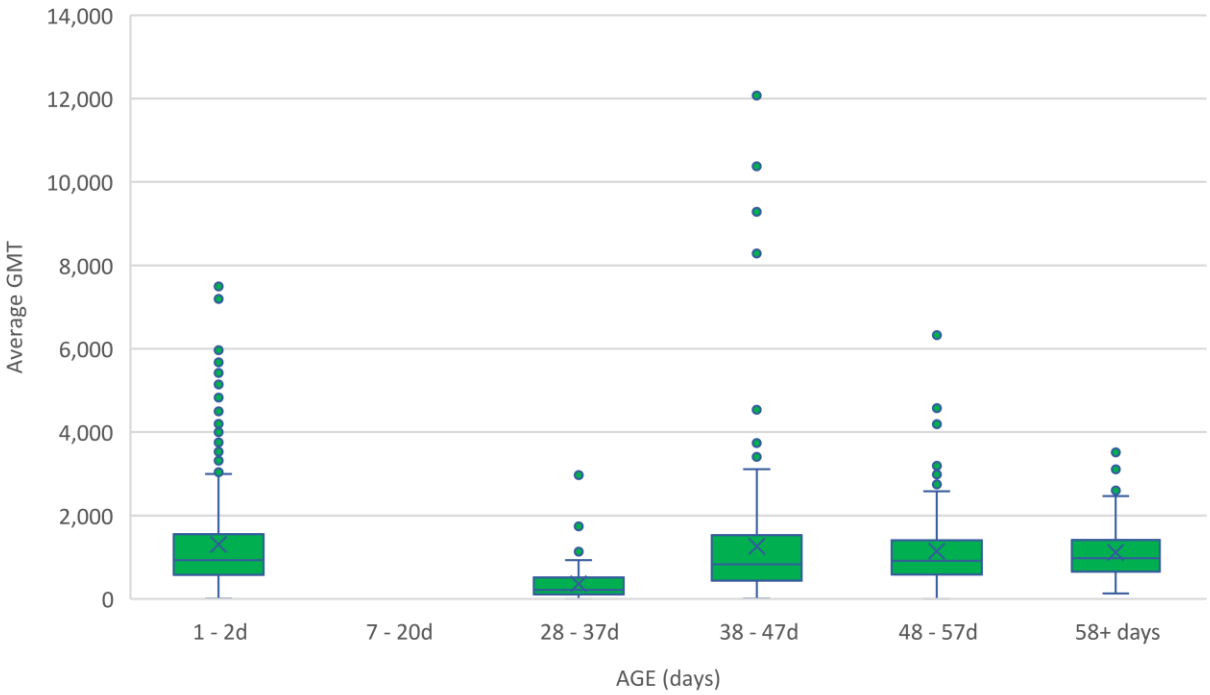


CV	n/a	n/a	186	142	132	162

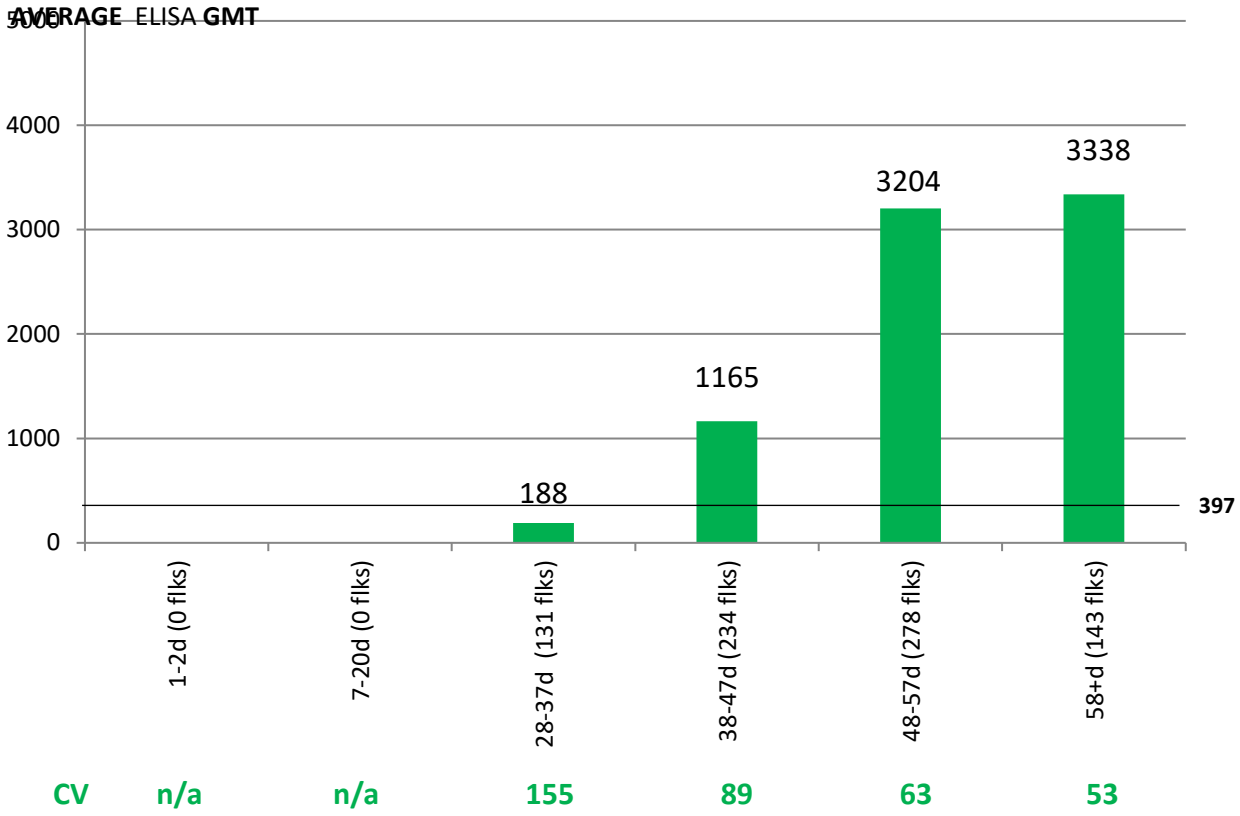


Broiler REO titers and CVs by age

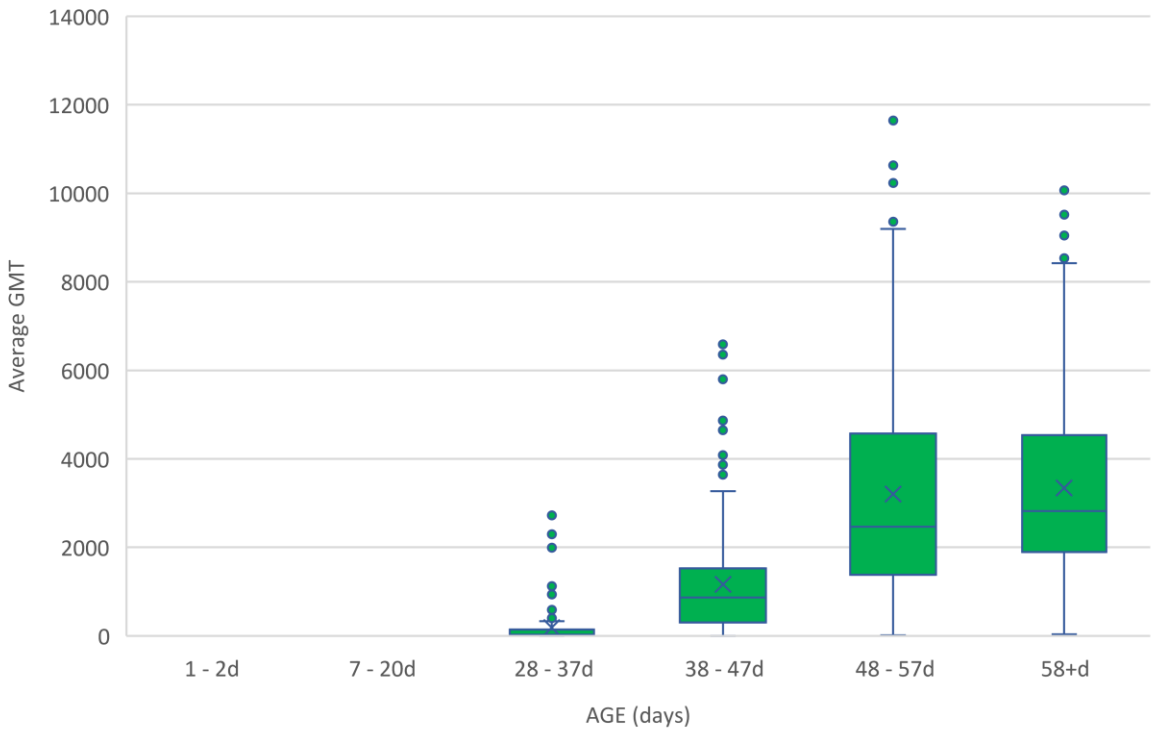




Broiler IBV titers and CVs by age



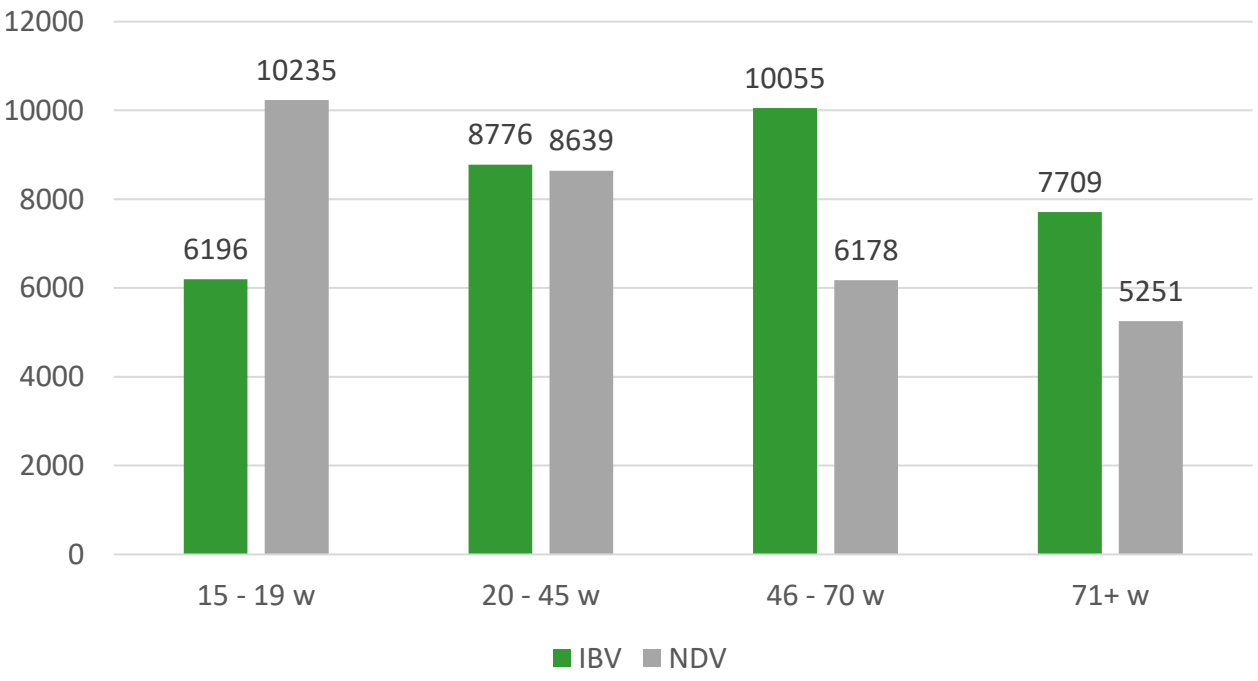
CV	n/a	n/a	155	89	63	53



ELISA Titers in Commercial Layers

- Age ranges were kept the same as previous years.
- GPLN receives relatively few samples for vaccine monitoring from Georgia commercial layer flocks or Georgia commercial layer pullet flocks.
- The number of samples per flock in this series is 10 or greater.

Layer IBV & NDV titers and CVs by age



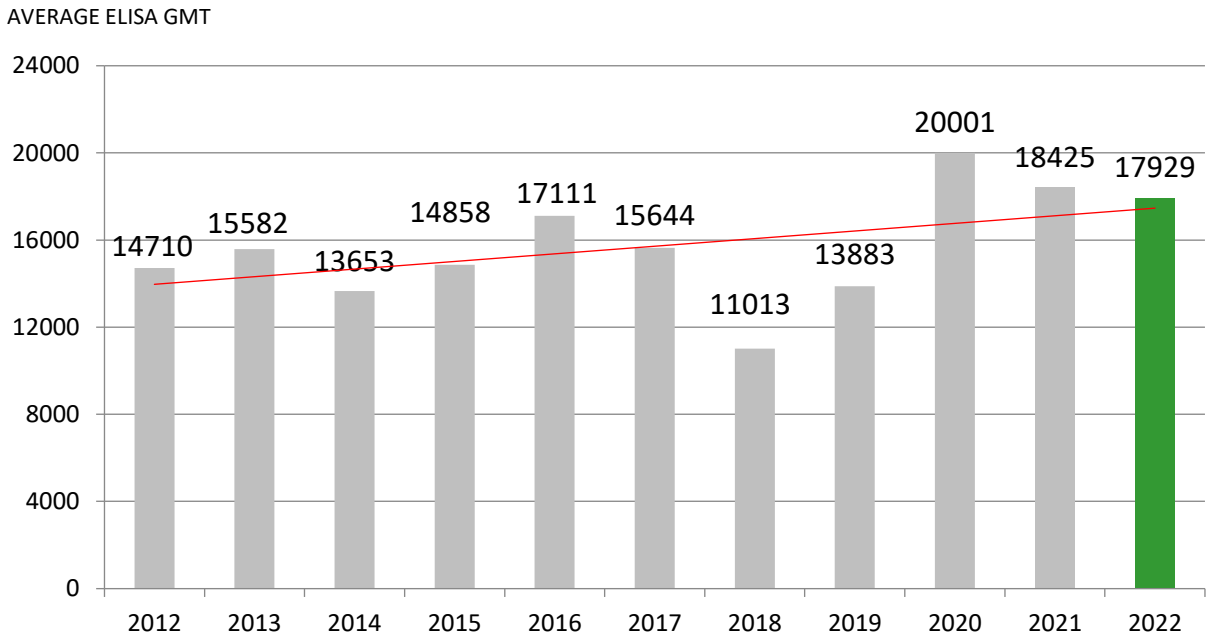
No flocks	**11**	**10**	**93**	**81**	**31**	**30**	**11**	**11**
CV	**45**	41	**39**	40	**33**	47	**41**	52

Trending of ELISA Titers over Time

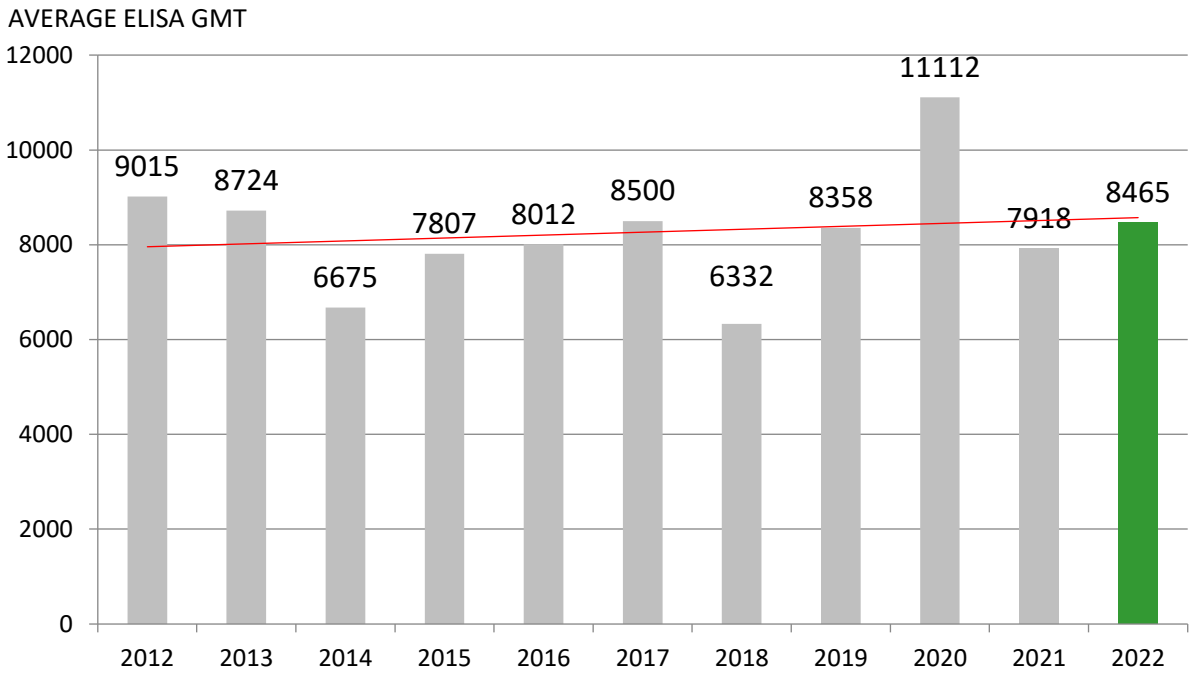
The following 5 graphs show trends over time (2012-2022) for targeted agents and age ranges. A red trend line has been added to each graph.

- Breeder IBD-XR titers at 22-26 weeks of age should be at their maximum. For that reason, this is a very popular age range for testing. Different vaccines are more immunogenic than others, and vaccination programs change over time, so that data point is interesting to compare year to year.
- Breeder REO titers at 22-26 weeks of age follow the same logic as IBD-XR titers. For REO, several companies use autogenous vaccines in addition to conventional ones, bringing the total number of REO inactivated vaccine injections to 3 or 4 in some cases.
- Breeder flocks are expected to seroconvert to AE before they start production. At 20-24 weeks, all birds and flocks should be positive and show their peak vaccine titer.
- Broiler processing age REO titers are mostly an indication of REO field exposure, and so are broiler processing age IBV titers.

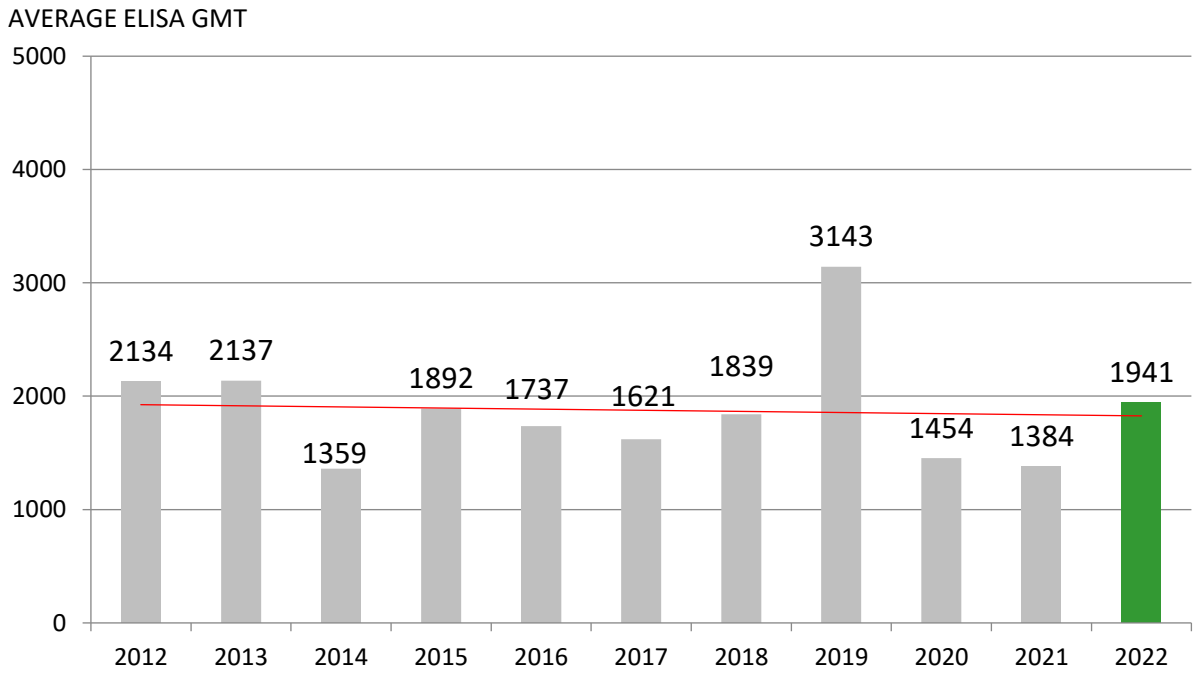
GA 22-26w **IBD-XR** titers in Breeders over time



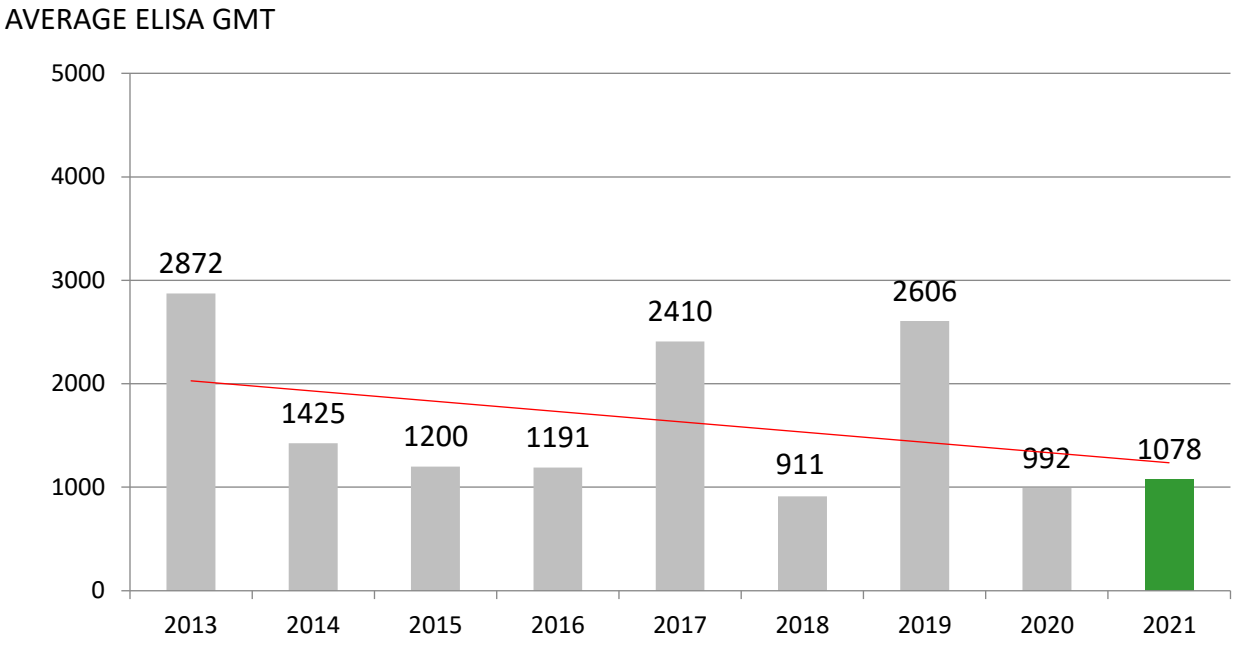
GA 22-26w **REO** titers in Breeders over time



GA 20-24w **AE** titers in Breeders over time



GA Processing Age (35 days +) **REO** titers in Broilers over time



GA Processing Age (35 days +) **IBV** titers in Broilers over time