Appendix A – PM Sampling

List of Tables

Table A-1. Comparison of CA1B, KY1B-1, and KY1B-2. ..... A-3

Table A-2. PM Sampling Schedule CA1B. A-4

Table A-1. Comparison of CA1B, KY1B-1, and KY1B-2.

Parameter	Site			
	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Site Type	Litter on Floor			
House Ventilation Type	Mechanically-ventilated (MV) (tunnel)			
House Capacity (no. of birds per flock)	21,000[a]		24,400 (summer) 25,800 (winter)	
Bird Type	60% Cobb, 40% Ross		100% Cobb (mixed sex)	
Average Animal residence time, days	42		53	
Frequency of full clean-out	After three flocks		Once per year	
Decaking	After each flock top 20-25% of litter removed from entire length of house		After each flock	
Manure storage in barn, days	46 (brooder area), 155 (back)		~ 365	
# buildings at site	16		8	24
Year of construction	1960s/2002		1992	1991
Ridgeline orientation	East-West		North-South	
Barn width, m	12.2 (40 ft)		13.1 (43 ft)	
Barn length, m	125 (410 ft)		155.5 (510 ft)	
Barn area, m^2	1,524 (16,400 ft^2)		621 (2,1930 ft2)	
Barn spacing, m	12.2 (40 ft)		18.3 (60 ft)	
Ridge height, m	4.2 (13.8 ft)		5.2 (17.2 ft)	
Sidewall height, m	2.3 (7.5 ft)		2.1 (7 ft)	
Number of air inlets	60 sidewall/2 tunnel		52	
Type of inlet	Baffled eave inlet, 0.18 x 1.32 m (0.6 x 4.3 ft)		box air inlets 15 x 66 cm (6 x 26 inch)	
Inlet control basis	Static pressure		automatic	
Number of exhaust fans	12		14	
Largest fan dia., m	1.22 (48 in)		1.22 (48 in)	
Smallest fan dia., m	0.91 (36 in)		0.91 (36 in)	
Fan spacing, m	0.2 (8 in)		36.6 m (120 ft)	
Number of Ventilation Stages	17		12	13
Fan manufacturer	Choretime (48), Aerotech (36)		CanArm	Euroemme
Controls vendor	Choretime (48), Aerotech (36)		Chore-Time	Rotem
Artificial heating	LP Radiant brooders (14), 42,000 Btu/h		Pancake brooders (26), 30,000 Btu/h	
	LP heaters (3), 180,000 Btu/h		Space furnaces (3) 225,000 Btu/h	
Summer cooling	Tunnel/EP		Tunnel/EP	
Brooding section	East half of barn		South half of barn	
Monitoring Period	Sept. 27, 2007- Oct. 21, 2009		Feb. 14, 2006 – March 14, 2007	Feb. 20, 2006 – March 5, 2007
Length of Monitoring (days)	756		394	379

[a] The NAEMS documentation for site CA1B did not indicate a difference in summer and winter bird placements.

Table A-2. PM Sampling Schedule CA1B.

Time and day, m/d/y		Test duration (days)		
Start	Stop	PM_{10}	TSP	$PM_{2.5}$
9/28/07	12/10/07	73.6		
12/10/07	12/19/07		8.9	
12/19/07	2/1/08	44.0		
2/1/08	2/19/08			18.1
2/19/08	2/20/08			0.3†
2/19/08	2/20/08	0.3‡		
2/20/08	5/15/08	85.7		
5/15/08	5/28/08		12.8	
5/28/08	7/9/08	42.0		
7/9/08	7/25/08			16.0
7/25/08	11/17/08	115.1		
11/17/08	11/24/08		7.1	
11/24/08	1/5/09	41.9		
1/5/09	1/20/09			15.0
1/20/09	4/9/09	79.0		
4/9/09	4/20/09		11.0	
4/20/09	6/25/09	66.1		
6/25/09	7/8/09		12.9	
7/8/09	9/26/09	80.1		
9/26/09	10/7/09			10.9
10/7/09	10/21/09		14.1	
10/21/09	10/22/09	0.4		
Totals		628.3	66.7	60.3

† All except ambient

‡Only ambient

Appendix B – Data Processing

List of Tables

Table B-1. Summary of the effect of applying the negative emission cut-off to broiler data..... B-4

1.0 NEGATIVE EMISSION VALUE ASSESSMENT METHODOLOGY

Negative calculated emission values can occur in NAEMS data set due to a range of different scenarios as described in the SAB review of the 2012 EEMs developed by EPA (U.S. EPA SAB, 2013). A summary of these scenarios and whether SAB recommended the data should be retained or removed is provided below:

1. A calculation bias may occur when measured values are at or close to the detection limit, or negative. This scenario should result in small negative values, which should be retained.

2. In NAEMS, the background and source measurements were measured either intermittently (twice a day for gas), or continuously without correction for lag time in the barn (PM data), thus leading to a bias either up or down, introducing the potential for negative emission values. Negative emission values should be retained because this bias could occur in either the positive or negative direction.

3. Outdoor events may affect background and barn concentrations. For example, if there was activity outside an animal barn which resulted in increased pollutant concentration (e.g., manure cleanout of another barn)), the measured background values would create a negative bias. Alternatively, a positive bias could occur if meteorological conditions caused the barn exhaust air to return into the barn, thus affecting measured barn concentrations.

To avoid bias from the true value, the SAB suggests keeping calculated values from scenario 1 and 2 and removing values identified to be caused by scenario 3, however the NAEMS did not record outdoor events that may affect background concentration (scenario 3), therefore it could not be determined if negative emissions were caused by scenario 2 or 3. It is likely that scenarios 1 and 2 result in smaller negative (closer to zero) emissions than scenario 3. Therefore, a methodology was developed to remove large negative emissions likely associated with scenario 3. In the NAEMS QAPP, the gas and PM barn emission uncertainty were determined to be ±27% and ±32% for mechanically ventilated barns and ±50% and ±53% for naturally ventilated barns (Heber et al. 2008). Cut-offs for valid negative data were therefore determined for each pollutant by multiplying the emission uncertainty by the median of the positive measured emission values.

Table B-1. Summary of the effect of applying the negative emission cut-off to broiler data.

Pollutant	Median positive emission (kg d^{-1}/ g d^{-1})[a]	Uncertainty (%)	Negative emission Cut-Off (kg day^{-1}/ g d^{-1})[a]	# of negative emission values		
				Before cut-off applied	Removed due to cut-off	After cut-off applied
NH_3	11.72	27	-3.16	2	0	2
H_2S	32.00	27	-8.64	37	3	34
PM_{10}	754.10	32	-241.31	4	0	4
$PM_{2.5}$		32	-16.29	0	0	0
TSP		32	-559.85	0	0	0

[a] NH_3 emissions in units of kg d^{-1}, all other pollutants in units of g d^{-1}

2.0 REFERENCES

Heber A.J., Ni J-Q., Ramirez J.C., Schrock W., and Elkins J. 2008. Quality assurance project plan for the National Air Emissions Monitoring Study (barn component). Purdue University, West Lafayette, IN.

U.S. EPA Science Advisory Board (SAB), 2013. SAB Review of Emissions-Estimating Methodologies for Broiler Animal Feeding Operations and for Lagoons and Basins at Swine and Dairy Animal Feeding Operations, EPA-SAB-13-003.

Appendix C – Data Completeness

List of Tables

Table C-1. The number of Broiler ADM for NH_3 at varying percentages of data completeness. C-4

Table C-2. The number of Broiler ADM for H_2S at varying percentages of data completeness. C-4

Table C-3. The number of Broiler ADM for PM_{10} at varying percentages of data completeness. C-5

Table C-4. The number of Broiler ADM for $PM_{2.5}$ at varying percentages of data completeness. C-5

Table C-5. The number of Broiler ADM for TSP at varying percentages of data completeness. C-5

1 Data Completeness Criteria for the Revised Data Set

The appropriate data completeness criteria to use in a study depends on the size of the dataset and the accuracy needed. A study by Grant et al. (2013), in which NH_3 emissions were modeled from swine lagoons based on NAEMS data, investigated data completeness and associated accuracy. The swine lagoon NH_3 emissions dataset had limited data availability at a data completeness of 75%. Grant et al. (2013) explored how much the data completeness criteria could be relaxed but still result in data with acceptable error. The study suggested an error of ±25% to be acceptable and determined that a daily data completeness of 52% (or 25 out of 48 30-minute periods) gave less than ±25% error (see Figure B-1). Using this relaxed daily completeness criteria resulted in a substantial increase in the size of the dataset.

Based on Figure B-1 from the Grant et al. (2013) study, it can be observed that a daily completeness criterion of 75% (36 out of 48 30-minute periods) would give an error of approximately 10%. If it is assumed that the relationship between data completeness and error from the Grant et al. (2013) study is representative of other NAEMS datasets, the effect of relaxed data completeness criteria can be investigated for other NAEMS sources.

The following sections examine the effect of a reduced data completeness criterion on the number of valid average daily means (ADM) for both the layer barns and manure shed, based on additional analysis completed by Heber that examined the effect of different completeness criteria by comparing the number of valid ADM.

EPA reviewed this data for the egg-layer sites and retained the 75% completeness criterion for all sites. The full analysis can be found in Appendix B.

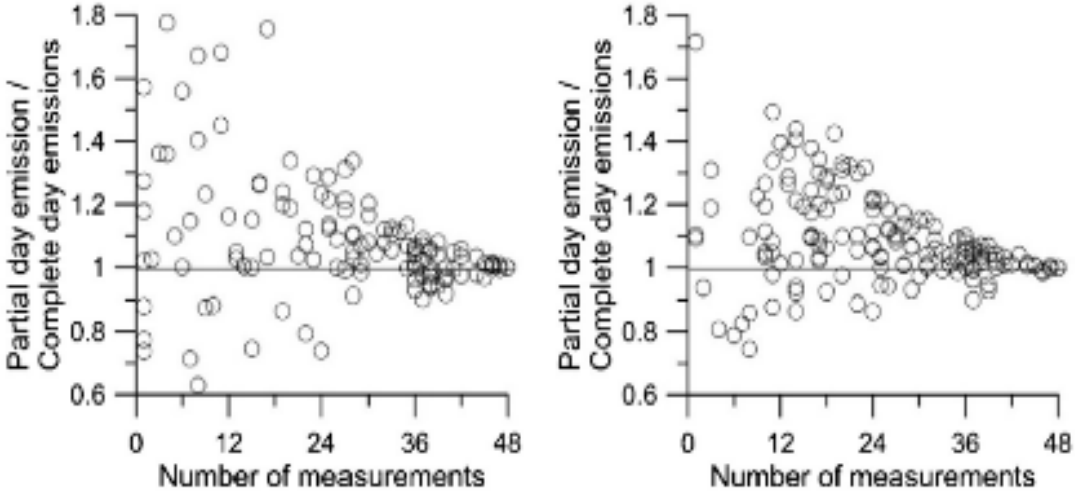


Figure C-1. Ratio of mean predicted emissions for portion of day with valid emissions measurements to mean predicted emissions for the complete day at the finishing (A) and sow (B) farm. Error plotted against number of valid 30-minute measurements (from Grant et al.

1.1 Data Completeness Review and Conclusions for the CA1B dataset

The number of average daily means (ADM) for NH_3 emissions at varying percentages of data completeness for the revised data set are shown in Figure C-1. For the Broiler site data set, decreasing the daily completeness criteria from 75% to 50% would increase the number of valid days by 32 (3 %), but based on the Grant et al. (2013) study there would be an approximate 15% increase in error. Since the small increase in the number of ADM values does not justify the 15% increase in error, a daily completeness criterion of 75% was chosen for the revised NH_3 Broiler site data set.

Table C-1. The number of Broiler ADM for NH_3 at varying percentages of data completeness.

% Valid Data	0	10	20	30	40	50	60	70	75	80	90	100
CA1B H10	506	505	504	502	497	487	477	472	472	466	456	363
CA1B H12	506	505	504	502	497	488	476	473	471	466	462	389
Total	1,012	1,010	1,008	1,004	994	975	953	945	943	932	918	752

For H_2S, the number of ADM at varying percentages of data completeness for the revised data set are shown in Table C-2. For the Broiler site data set, decreasing the daily completeness criteria from 75% to 50% would increase the number of valid days by 38 (3%), but based on the Grant et al. (2013) study there would be an approximate 15% increase in error. Since the small increase in the number of ADM values does not justify the 15% increase in error, a daily completeness criterion of 75% was chosen for the revised H_2S Broiler site data set.

Table C-2. The number of Broiler ADM for H_2S at varying percentages of data completeness.

% Valid Data	0	10	20	30	40	50	60	70	75	80	90	100
CA1B H10	628	627	626	624	620	612	602	597	596	588	576	460
CA1B H12	628	627	626	624	620	614	601	596	592	585	581	490
Total	1,256	1,254	1,252	1,248	1,240	1,226	1,203	1,193	1,188	1,173	1,157	950

For PM_{10}, the number of ADM at varying percentages of data completeness for the revised data set are shown in Table C-3. For the Broiler site data set, decreasing the daily completeness criteria from 75% to 50% would increase the number of valid days by 456 (14 %). The number of ADM for $PM_{2.5}$ are presented in Table C-4, and show the number of valid ADM would increase by 5 (5%). TSP (Table C-5) had an increase of 9 days (12%), when shifting to 50% completeness criteria. Again, the small increase in the number of ADM values does not justify the 15% increase in error, a daily completeness criterion of 75% was chosen for the all the PM species for the Broiler data set.

Table C-3. The number of Broiler ADM for PM_{10} at varying percentages of data completeness.

% Valid Data	0	10	20	30	40	50	60	70	75	80	90	100
CA1B H10	408	407	407	401	389	375	359	353	352	344	336	244
CA1B H12	428	426	426	422	411	395	381	377	376	373	364	282
Total	836	833	833	823	800	770	740	730	728	717	700	526

Table C-4. The number of Broiler ADM for $PM_{2.5}$ at varying percentages of data completeness.

% Valid Data	0	10	20	30	40	50	60	70	75	80	90	100
CA1B H10	62	61	61	61	59	55	53	53	53	53	52	41
CA1B H12	51	50	50	50	48	46	43	43	43	43	43	36
Total	113	111	111	111	107	101	96	96	96	96	95	77

Table C-5. The number of Broiler ADM for TSP at varying percentages of data completeness.

% Valid Data	0	10	20	30	40	50	60	70	75	80	90	100
CA1B H10	53	51	50	48	46	41	38	37	37	36	34	21
CA1B H12	53	52	50	48	46	44	41	39	39	38	36	29
Total	106	103	100	96	92	85	79	76	76	74	70	50

1.2 Data Completeness Review and Conclusions for the KY1B sites

Evaluation of adjusted completeness criteria was not performed for the data from KY1B-1 or KY1B-2.

Appendix D – Summary Statistics

List of Tables

Table D-1. Summary statistics for NH_3 emissions (kg d^{-1}) from broiler sites. D-3

Table D-2. Summary statistics for NH_3 emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-3

Table D-3. Summary statistics for H_2S emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-3

Table D-4. Summary statistics for H_2S emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-3

Table D-5. Summary statistics for PM_{10} emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-4

Table D-6. Summary statistics for PM_{10} emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-4

Table D-7. Summary statistics for $PM_{2.5}$ emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-4

Table D-8. Summary statistics for $PM_{2.5}$ emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-4

Table D-9. Summary statistics for TSP emissions (g d^{-1}) from broiler sites D-5

Table D-10. Summary statistics for TSP emissions (g $hd^{-1}d^{-1}$) from broiler sites. D-5

Table D-11. Summary statistics of production parameters at broiler sites. D-6

Table D-12. Summary statistics of environmental parameters at broiler sites D-7

Table D-13. Summary statistics of ambient meteorological parameters at broiler sites. D-7

Table D-14. Summary statistics of litter age parameters at broiler sites D-8

Table D-15. Summary statistics of litter parameters at broiler sites. D-9

Table D-1. Summary statistics for NH_3 emissions (kg d^{-1}) from broiler sites.

Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Mean	10.21	8.98	12.13	12.37
St. Dev	9.27	8.46	7.81	9.57
N	472	471	378	336
Median	6.43	4.94	11.22	11.14
Min	0	-0.02	0	0
Max	51.93	36.05	44.72	35.48
CV(%)	90.86	94.18	64.39	77.36
N<0	0	2	0	0

Table D-2. Summary statistics for NH_3 emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1BH10	CA1BH12	KY1B1H5	KY1B2H3
Mean	0.62	0.55	0.54	0.59
St. Dev	1.10	1.04	0.33	0.38
N	391	393	299	246
Median	0.37	0.29	0.50	0.58
Min	0.00	0.00	0.01	0.01
Max	19.33	18.50	1.52	1.48
CV(%)	177.42	188.84	60.94	64.56
N<0	0	0	0	0

Table D-3. Summary statistics for H_2S emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Mean	52.73	50.41	47.70	53.50
St. Dev	50.48	50.71	51.11	50.19
N	596	592	342	291
Median	35.02	25.79	31.00	35.60
Min	-8.65	-13.09	0.00	0.00
Max	206.84	184.90	259.45	186.33
CV(%)	95.73	100.59	107.14	93.81
N<0	18	18	1	0

Table D-4. Summary statistics for H_2S emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1BH10	CA1BH12	KY1B1H5	KY1B2H3
Mean	0.00301	0.00289	0.00252	0.00284
St. Dev	0.00273	0.00278	0.00238	0.00199
N	511	510	276	216
Median	0.00267	0.00226	0.00197	0.00291
Min	-0.00003	-0.00002	0.00005	0.00006
Max	0.02275	0.02207	0.01180	0.00783
CV(%)	90.92673	96.17013	94.34564	69.95740
N<0	3	4	0	0

Table D-5. Summary statistics for PM_{10} emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Mean	873.30	879.19	919.69	1,040.05
St. Dev	831.52	781.04	886.32	999.30
N	352	376	301	305
Median	622.62	651.82	745.93	770.89
Min	-2.11	-1.46	0.00	0.00
Max	3,557.85	3,464.29	4,513.85	4,146.86
CV(%)	95.22	88.84	96.37	96.08
N<0	3	1	0	0

Table D-6. Summary statistics for PM_{10} emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1BH10	CA1BH12	KY1B1H5	KY1B2H3
Mean	0.04464	0.04367	0.04326	0.05048
St. Dev	0.04026	0.03772	0.03917	0.04006
N	334	366	285	256
Median	0.03198	0.03142	0.03534	0.05072
Min	0.00046	0.00033	0.00080	0.00098
Max	0.17060	0.16869	0.20717	0.17389
CV(%)	90.18984	86.38324	90.55632	79.35431
N<0	0	0	0	0

Table D-7. Summary statistics for $PM_{2.5}$ emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Mean	98.80	124.39	89.60	96.99
St. Dev	62.97	47.60	91.79	99.08
N	53	43	286	301
Median	92.25	118.07	49.37	55.54
Min	1.25	45.11	0.00	0.00
Max	243.34	234.83	405.16	383.81
CV(%)	63.74	38.27	102.44	102.15
N<0	0	0	0	0

Table D-8. Summary statistics for $PM_{2.5}$ emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1BH10	CA1BH12	KY1B1H5	KY1B2H3
Mean	0.00478	0.00600	0.00430	0.00466
St. Dev	0.00306	0.00231	0.00425	0.00410
N	53	43	266	252
Median	0.00446	0.00565	0.00280	0.00391
Min	0.00006	0.00215	0.00013	0.00011
Max	0.01192	0.01140	0.01860	0.01528
CV(%)	63.90884	38.45081	98.79736	88.12967
N<0	0	0	0	0

Table D-9. Summary statistics for TSP emissions (g d^{-1}) from broiler sites.

Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Mean	2,652.40	2,269.78	2,166.50	2,413.70
St. Dev	890.25	1,594.64	2,018.75	2,198.01
N	37	39	315	301
Median	2,224.89	2,318.96	1,743.66	1,998.44
Min	1,298.64	3.44	0.00	0.00
Max	4,761.51	6,215.15	10,340.87	7,472.53
CV(%)	33.56	70.26	93.18	91.06
N<0	0	0	0	0

Table D-10. Summary statistics for TSP emissions (g $hd^{-1}d^{-1}$) from broiler sites.

Statistic	CA1BH10	CA1BH12	KY1B1H5	KY1B2H3
Mean	0.12832	0.10904	0.10458	0.11564
St. Dev	0.04130	0.07638	0.08755	0.08700
N	37	39	290	256
Median	0.10703	0.11185	0.08895	0.12318
Min	0.06791	0.00016	0.00174	0.00182
Max	0.22848	0.29756	0.42234	0.30915
CV(%)	32.18559	70.05418	83.72068	75.23857
N<0	0	0	0	0

Table D-11. Summary statistics of production parameters at broiler sites.

Parameter	Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Inventory (head)	Mean	16,957.87	16,989.01	18,036.17	18,363.42
	St. Dev	7,777.85	7,721.77	10,073.84	10,797.32
	N	765	765	394	379
	Median	20,788.00	20,759.00	23,877.50	24,198.00
	Min	0.00	0.00	0.00	0.00
	Max	21,454.00	21,422.00	26,600.00	26,013.00
	CV(%)	45.87	45.45	55.85	58.80
Average bird weight (kg)	Mean	1.04	1.05	1.14	1.11
	St. Dev	0.84	0.85	0.87	0.88
	N	613	616	307	282
	Median	0.84	0.87	0.99	0.93
	Min	0.06	0.06	0.03	0.03
	Max	2.75	2.76	2.89	2.97
	CV(%)	81.13	81.03	76.16	78.70
Live animal weight (Mg)	Mean	17,909.11	18,104.07	20,108.78	20,342.10
	St. Dev	17,672.49	17,782.28	20,395.00	21,872.13
	N	732	731	394	379
	Median	11,896.50	11,951.00	12,729.50	11,332.00
	Min	0.00	0.00	0.00	0.00
	Max	55,741.00	56,265.00	69,843.00	74,611.00
	CV(%)	98.68	98.22	101.42	107.52
Bird age (days)	Mean	23.78	23.85	26.10	25.35
	St. Dev	13.50	13.59	14.83	15.14
	N	647	651	307	282
	Median	24.00	24.00	26.00	24.00
	Min	1.00	1.00	1.00	1.00
	Max	49.00	49.00	54.00	54.00
	CV(%)	56.79	56.96	56.81	59.71
Flock age (days)	Mean	19.90	20.03	20.34	18.87
	St. Dev	15.16	15.19	16.99	17.12
	N	773	773	394	379
	Median	19.00	19.00	19.00	16.00
	Min	0.00	0.00	0.00	0.00
	Max	49.00	49.00	54.00	54.00
	CV(%)	76.15	75.84	83.54	90.75
Flock age cont (days)	Mean	28.57	28.54	33.77	35.48
	St. Dev	16.61	16.63	19.68	22.24
	N	772	773	394	379
	Median	28.00	28.00	33.00	34.00
	Min	1.00	1.00	1.00	1.00
	Max	70.00	70.00	75.00	91.00
	CV(%)	58.13	58.25	58.28	62.70

Table D-12. Summary statistics of environmental parameters at broiler sites.

Parameter	Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
House Temperature (°C)	Mean	24.99	24.99	22.24	22.93
	St. Dev	4.25	4.35	5.05	5.05
	N	723	724	384	367
	Median	25.50	25.65	23.49	23.67
	Min	8.20	7.60	5.65	4.24
	Max	32.60	33.70	38.71	32.03
	CV(%)	17.00	17.41	22.69	22.01
House Relative Humidity (%)	Mean	57.65	56.00	60.59	62.11
	St. Dev	9.86	9.53	11.02	11.44
	N	732	721	384	367
	Median	56.85	55.40	61.12	62.07
	Min	34.10	34.00	29.40	32.86
	Max	91.10	88.10	88.52	93.75
	CV(%)	17.10	17.01	18.19	18.42
Airflow (dsm^3/s)	Mean	14.62	14.88	17.30	15.77
	St. Dev	13.93	14.37	15.88	15.76
	N	698	687	384	366
	Median	10.05	10.03	11.42	8.91
	Min	0.00	0.00	0.00	0.00
	Max	63.66	71.53	59.22	72.65
	CV(%)	95.28	96.58	91.80	99.98

Table D-13. Summary statistics of ambient meteorological parameters at broiler sites.

Parameter	Statistic	CA1B	KY1B-1	KY1B-2
Ambient Temperature (°C)	Mean	16.86	13.75	13.68
	St. Dev	6.59	9.49	9.59
	N	726	384	367
	Median	16.90	14.54	14.18
	Min	3.30	-9.94	-8.97
	Max	31.10	29.77	29.94
	CV(%)	39.10	69.06	70.11
Ambient Relative Humidity (%)	Mean	61.17	72.69	72.37
	St. Dev	13.58	12.63	11.73
	N	661	384	367
	Median	60.30	73.64	73.37
	Min	32.70	37.43	37.28
	Max	95.00	99.74	97.43
	CV(%)	22.21	17.38	16.20

Table D-14. Summary statistics of litter age parameters at broiler sites.

Parameter	Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Litter age (days)	Mean	82.43	82.43	133.61	297.38
	St. Dev	50.48	50.48	67.72	122.81
	N	717	717	394	379
	Median	81.00	81.00	132.50	304.00
	Min	1.00	1.00	1.00	1.00
	Max	181.00	181.00	270.00	493.00
	CV(%)	61.24	61.24	50.68	41.30
Status of litter usage (0-1), continuous for in-between flock	Mean	0.68	0.68	0.81	0.94
	St. Dev	0.47	0.47	0.39	0.23
	N	772	773	394	379
	Median	1.00	1.00	1.00	1.00
	Min	0.00	0.00	0.00	0.00
	Max	1.00	1.00	1.00	1.00
	CV(%)	69.25	68.77	47.75	24.86
Status of litter usage (0-3), continuous for in-between flock	Mean	1.06	1.06	1.48	2.59
	St. Dev	0.84	0.84	1.00	0.77
	N	772	773	394	379
	Median	1.00	1.00	1.00	3.00
	Min	0.00	0.00	0.00	0.00
	Max	2.00	2.00	3.00	3.00
	CV(%)	79.16	78.76	67.47	29.77
Status of litter usage (0-6), empty for in-between flock	Mean	1.02	1.02	1.49	3.71
	St. Dev	0.84	0.84	0.95	1.73
	N	648	651	307	282
	Median	1.00	1.00	1.00	4.00
	Min	0.00	0.00	0.00	0.00
	Max	2.00	2.00	3.00	6.00
	CV(%)	82.59	82.66	63.97	46.56
Status of litter usage (0-6), continuous for in-between flock	Mean	1.06	1.06	1.48	3.61
	St. Dev	0.84	0.84	1.00	1.66
	N	772	773	394	379
	Median	1.00	1.00	1.00	4.00
	Min	0.00	0.00	0.00	0.00
	Max	2.00	2.00	3.00	6.00
	CV(%)	79.16	78.76	67.47	45.83

Table D-15. Summary statistics of litter parameters at broiler sites.

Parameter	Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
Decaked litter Solids (% wet weight basis)	Mean	59.03	59.03	[a]	[a]
	St. Dev	7.81	7.81	[a]	[a]
	N	8	8	[a]	[a]
	Median	58.80	58.80	[a]	[a]
	Min	49.20	49.20	[a]	[a]
	Max	70.50	70.50	[a]	[a]
	CV(%)	13.24	13.24	[a]	[a]
Decaked litter TKN (% wet weight basis)	Mean	2.33	2.30	2.72	2.65
	St. Dev	0.33	0.37	0.22	0.10
	N	8	8	4	4
	Median	2.40	2.42	2.70	2.60
	Min	1.89	1.78	2.50	2.60
	Max	2.84	2.82	3.00	2.80
	CV(%)	14.03	16.06	8.14	3.77
Decaked litter TKN (% dry weight basis)	Mean	[b]	[b]	4.65	4.74
	St. Dev	[b]	[b]	0.40	0.46
	N	[b]	[b]	4	4
	Median	[b]	[b]	4.65	4.80
	Min	[b]	[b]	4.30	4.17
	Max	[b]	[b]	5.00	5.18
	CV(%)	[b]	[b]	8.69	9.72
Litter Floor Solids (% wet weight basis)	Mean	73.93	74.25	[c]	[c]
	St. Dev	10.05	9.52	[c]	[c]
	N	16	16	[c]	[c]
	Median	74.50	73.10	[c]	[c]
	Min	56.80	57.10	[c]	[c]
	Max	88.60	87.50	[c]	[c]
	CV(%)	13.59	12.82	[c]	[c]
Litter Floor pH	Mean	8.15	8.00	[a]	[a]
	St. Dev	0.12	0.12	[a]	[a]
	N	16	16	[a]	[a]
	Median	8.32	8.04	[a]	[a]
	Min	7.11	7.29	[a]	[a]
	Max	8.70	8.67	[a]	[a]
	CV(%)	1.51	1.46	[a]	[a]
Litter Floor TAN (% wet weight basis)	Mean	0.31	0.31	[c]	[c]
	St. Dev	0.09	0.13	[c]	[c]
	N	16	16	[c]	[c]
	Median	0.34	0.33	[c]	[c]
	Min	0.15	0.16	[c]	[c]
	Max	0.41	0.62	[c]	[c]
	CV(%)	30.44	40.06	[c]	[c]
Loadout Litter Solids (% wet weight basis)	Mean	49.35	51.58	[c]	[c]
	St. Dev	33.23	34.65	[c]	[c]

Parameter	Statistic	CA1B H10	CA1B H12	KY1B-1 H5	KY1B-2 H3
	N	4	4	[c]	[c]
	Median	63.15	66.90	[c]	[c]
	Min	0.00	0.00	[c]	[c]
	Max	71.10	72.50	[c]	[c]
	CV(%)	67.34	67.19	[c]	[c]
Loadout Litter TKN (% wet weight basis)	Mean	2.22	2.40	2.60	2.20
	St. Dev	0.34	0.37	.	.
	N	4	4	1	1
	Median	2.32	2.31	2.60	2.20
	Min	1.74	2.08	2.60	2.20
	Max	2.52	2.88	2.60	2.20
	CV(%)	15.30	15.25	.	.
Loadout Litter TKN (% dry weight basis)	Mean	[b]	[b]	4.30	3.33
	St. Dev	[b]	[b]	.	.
	N	[b]	[b]	1	1
	Median	[b]	[b]	4.30	3.33
	Min	[b]	[b]	4.30	3.33
	Max	[b]	[b]	4.30	3.33
	CV(%)	[b]	[b]	.	.
New Litter Solids (% wet weight basis)	Mean	91.90	92.70	[a]	[a]
	St. Dev	1.27	0.85	[a]	[a]
	N	2	2	[a]	[a]
	Median	91.90	92.70	[a]	[a]
	Min	91.00	92.10	[a]	[a]
	Max	92.80	93.30	[a]	[a]
	CV(%)	1.39	0.92	[a]	[a]
New Litter TKN (% wet weight basis)	Mean	0.46	0.51	0.36	[a]
	St. Dev	0.09	0.14	.	[a]
	N	2	2	1	[a]
	Median	0.46	0.51	0.36	[a]
	Min	0.39	0.41	0.36	[a]
	Max	0.52	0.61	0.36	[a]
	CV(%)	20.20	27.73	.	[a]
New Litter TKN (% dry weight basis)	Mean	[b]	[b]	0.39	[a]
	St. Dev	[b]	[b]	.	[a]
	N	[b]	[b]	1	[a]
	Median	[b]	[b]	0.39	[a]
	Min	[b]	[b]	0.39	[a]
	Max	[b]	[b]	0.39	[a]
	CV(%)	[b]	[b]	.	[a]

[a] Parameter was not available for this site

[b] Parameter only available on a percent wet weight basis

[c] Parameter only available on a percent dry weight basis

Appendix E – Time Series Plots

List of Figures

Figure E-1. NAEMS broiler NH_3 emissions, by site. E-4

Figure E-2. NAEMS broiler H_2S emissions, by site. E-5

Figure E-3. NAEMS broiler PM_{10} emissions, by site. E-6

Figure E-4. NAEMS broiler $PM_{2.5}$ emissions, by site..... E-7

Figure E-5. NAEMS broiler TSP emissions, by site..... E-8

Figure E-6. NAEMS broiler inventory, by site. E-9

Figure E-7. NAEMS broiler average bird weight, by site..... E-10

Figure E-8. NAEMS broiler live animal weight, by site..... E-11

Figure E-9. NAEMS broiler flock age excluding between flock, by site. E-12

Figure E-10. NAEMS broiler flock age, by site..... E-13

Figure E-11. NAEMS broiler age, by site..... E-14

Figure E-12. NAEMS broiler house temperature, by site. E-15

Figure E-13. NAEMS broiler house relative humidity by site..... E-16

Figure E-14. NAEMS broiler house airflow, by site. E-17

Figure E-15. NAEMS broiler site ambient temperature, by site. E-18

Figure E-16. NAEMS broiler site ambient relative humidity, by site..... E-19

Figure E-17. NAEMS broiler litter age, by site. E-20

Figure E-18. NAEMS broiler litter status (0 = first flock on fresh litter, 1 = one or more flocks raised on litter), by site. E-21

Figure E-19. NAEMS broiler litter status (0 = fresh litter, 1 = second flock raised on litter, 2= third flock, 3= four or more flocks), by site. E-22

Figure E-20. NAEMS broiler litter status (0-6, continuous), by site. E-23

Figure E-21. NAEMS broiler litter status (0-6, null between flocks), without in between flock, by site... E-24

Figure E-22. NAEMS broiler mean solid content of litter floor samples, by site..... E-25

Figure E-23. NAEMS broiler TAN content of litter floor samples, by site. E-26

Figure E-24. NAEMS broiler TKN content of new litter samples on a wet weight percentage, by site. E-27

Figure E-25. NAEMS broiler TKN content of new litter samples on a dry weight percentage, by site. E-28

Figure E-26. NAEMS broiler solids content of new litter samples, by site. E-29

Figure E-27. NAEMS broiler TKN content of decaked litter samples on a wet weight percentage, by site. E-30

Figure E-28. NAEMS broiler TKN content of decaked litter samples on a dry weight percentage, by site. E-31

Figure E-29. NAEMS broiler solids content of decaked litter samples, by site. E-32

Figure E-30. NAEMS broiler TKN content of loadout litter samples on a wet weight percentage, by site. E-33

Figure E-31. NAEMS broiler TKN content of loadout litter samples on a dry weight percentage, by site. E-34

Figure E-32. NAEMS broiler solids content of loadout litter samples, by site..... E-35

Emission

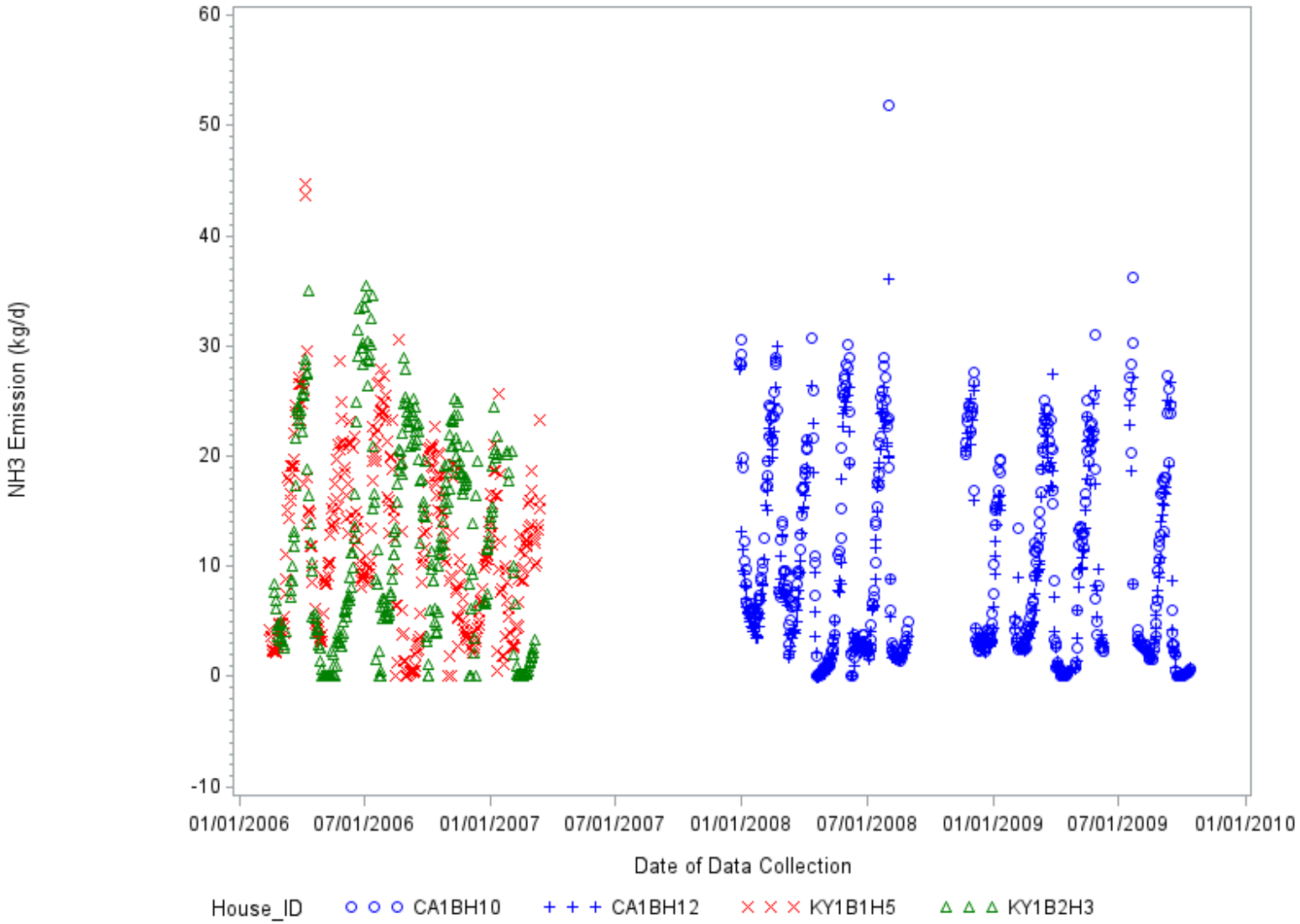


Figure E-1. NAEMS broiler NH_3 emissions, by site.

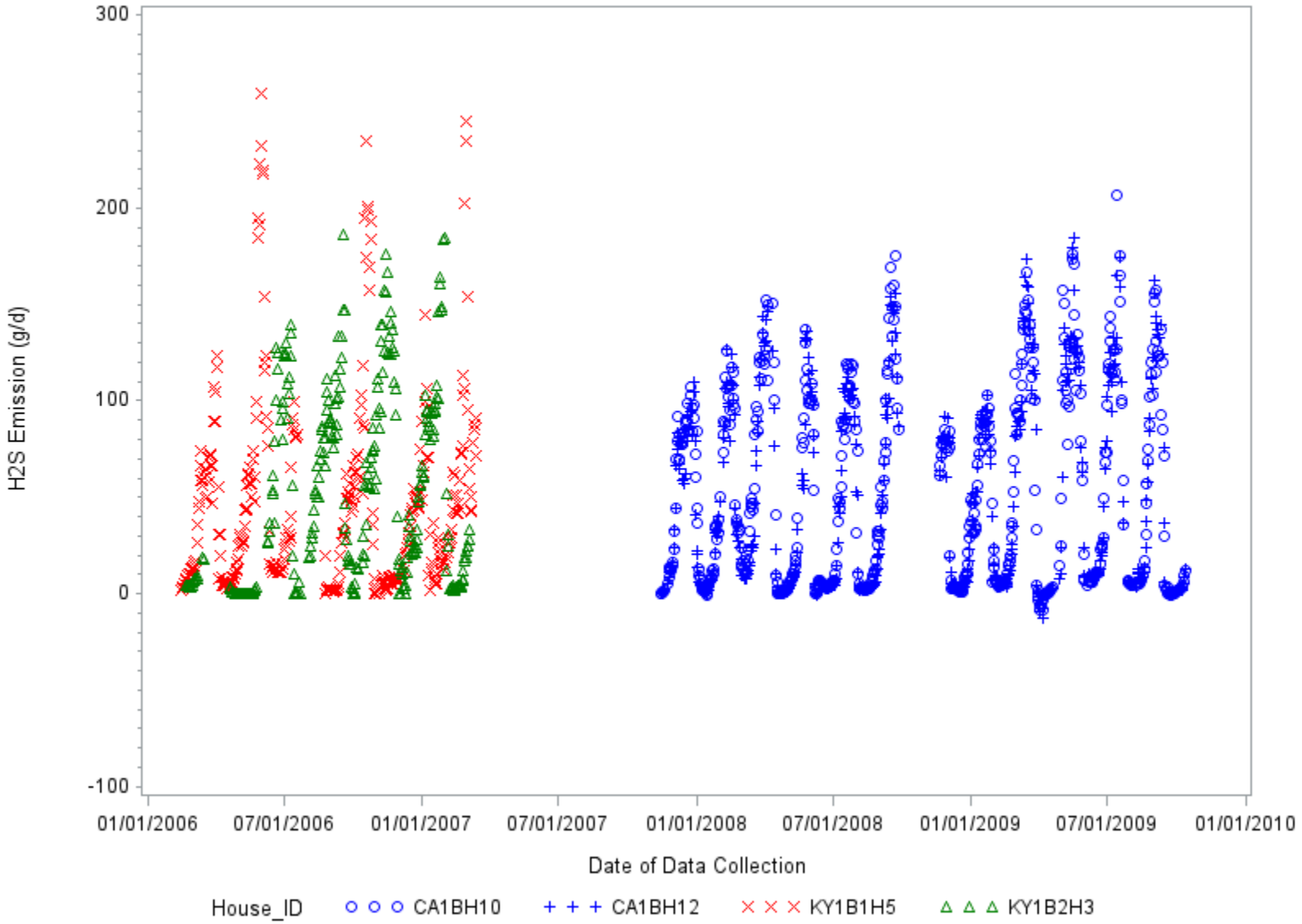


Figure E-2. NAEMS broiler H_2S emissions, by site.

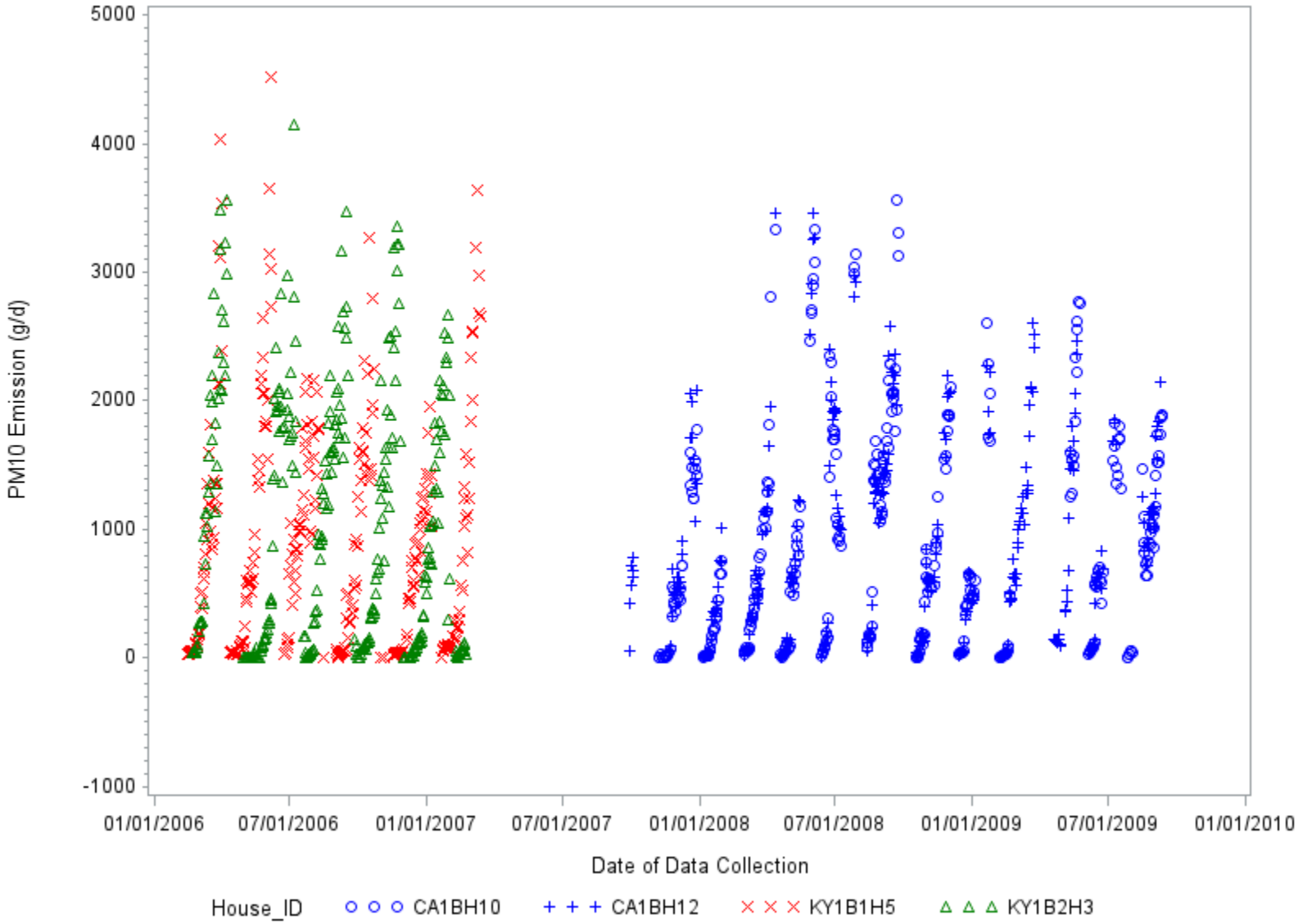


Figure E-3. NAEMS broiler PM_{10} emissions, by site.

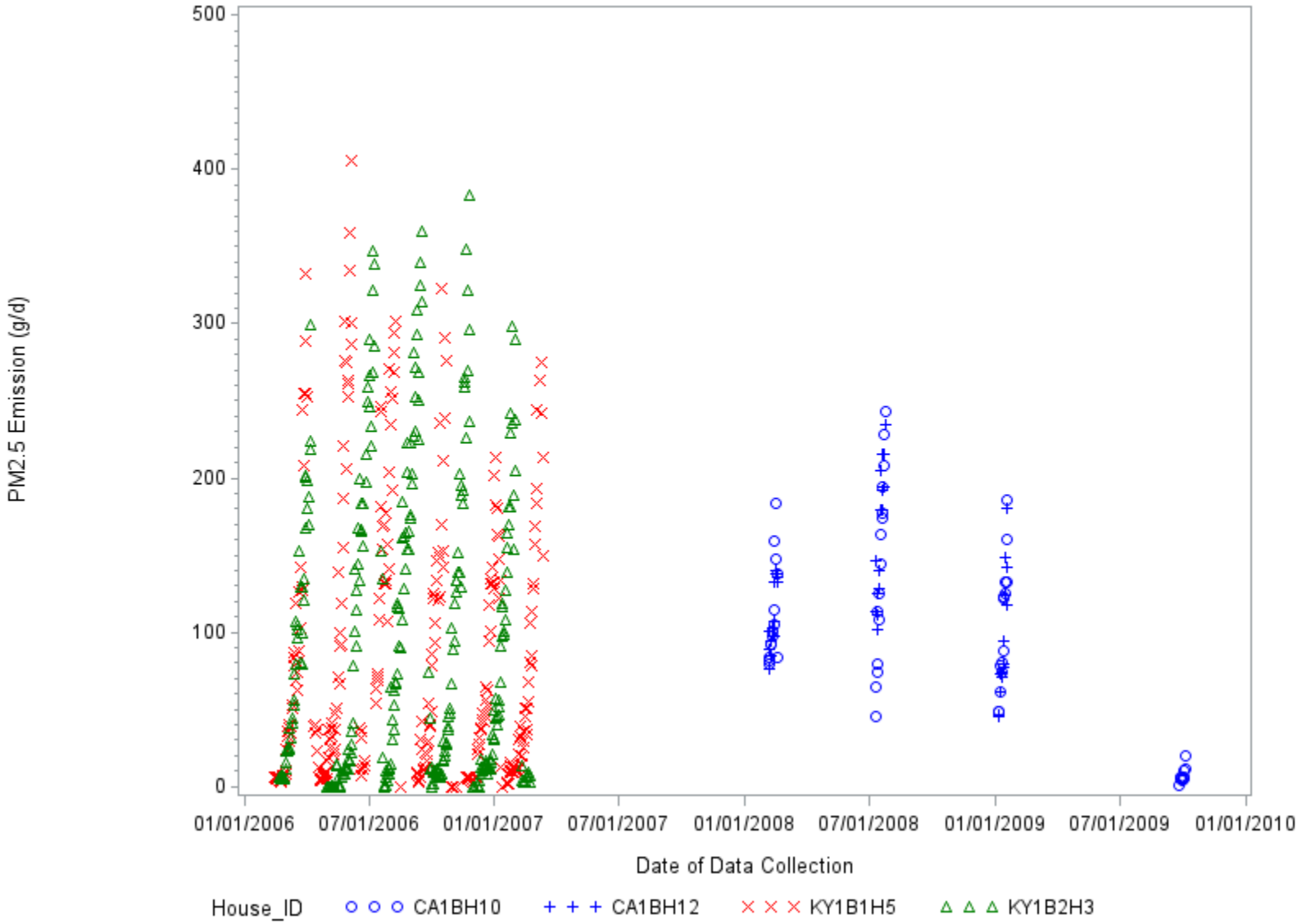


Figure E-4. NAEMS broiler $PM_{2.5}$ emissions, by site.

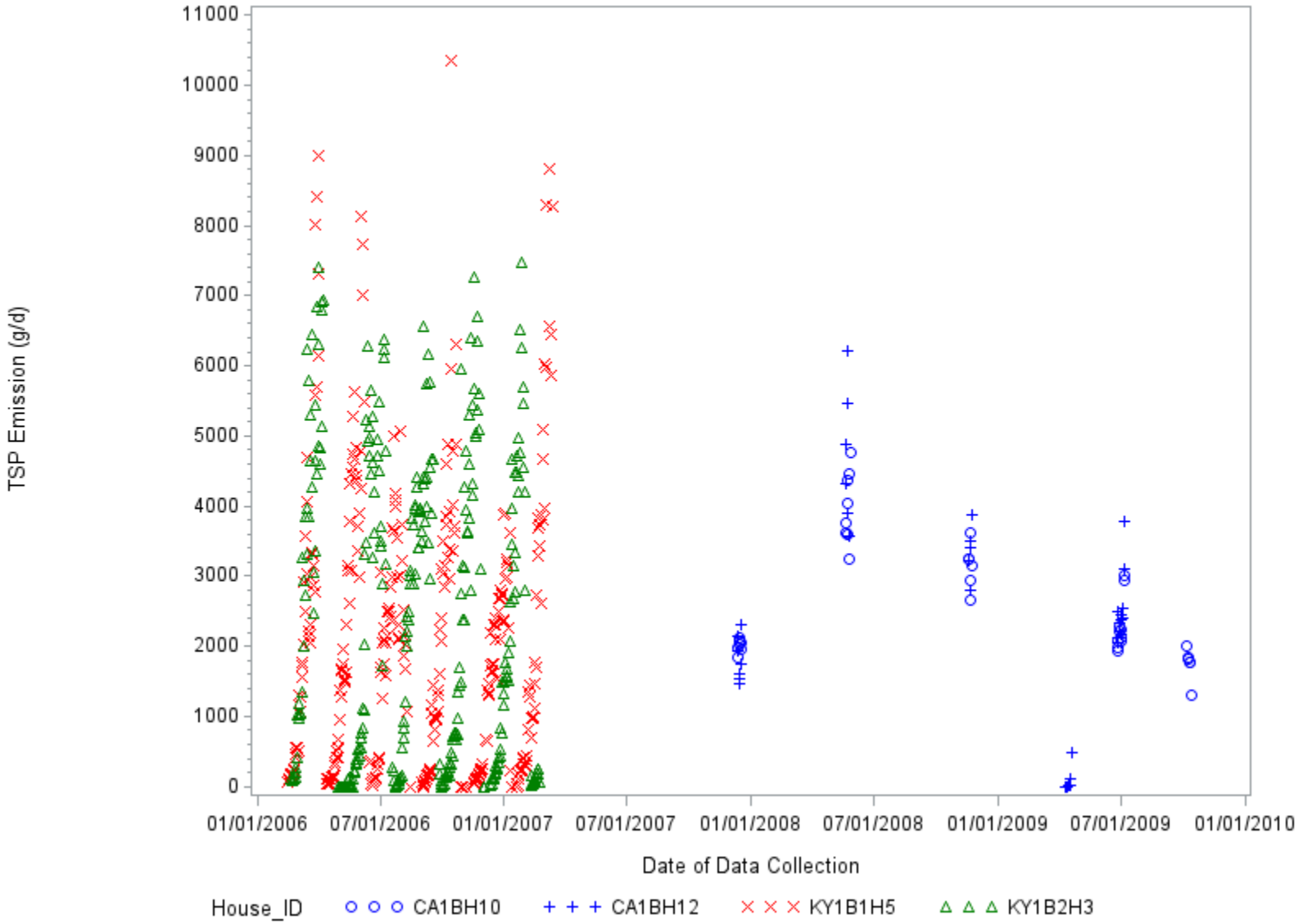


Figure E-5. NAEMS broiler TSP emissions, by site.

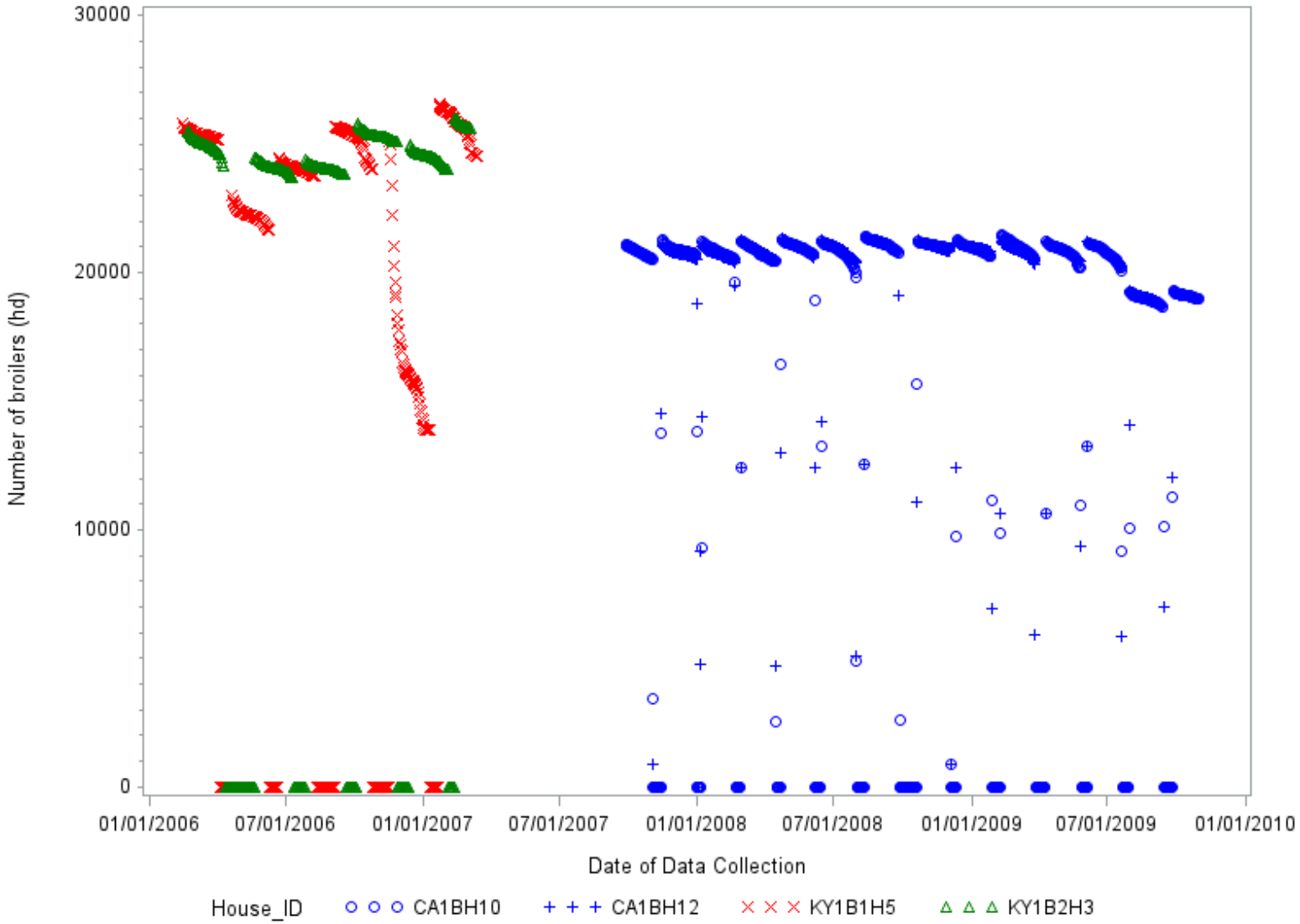


Figure E-6. NAEMS broiler inventory, by site.

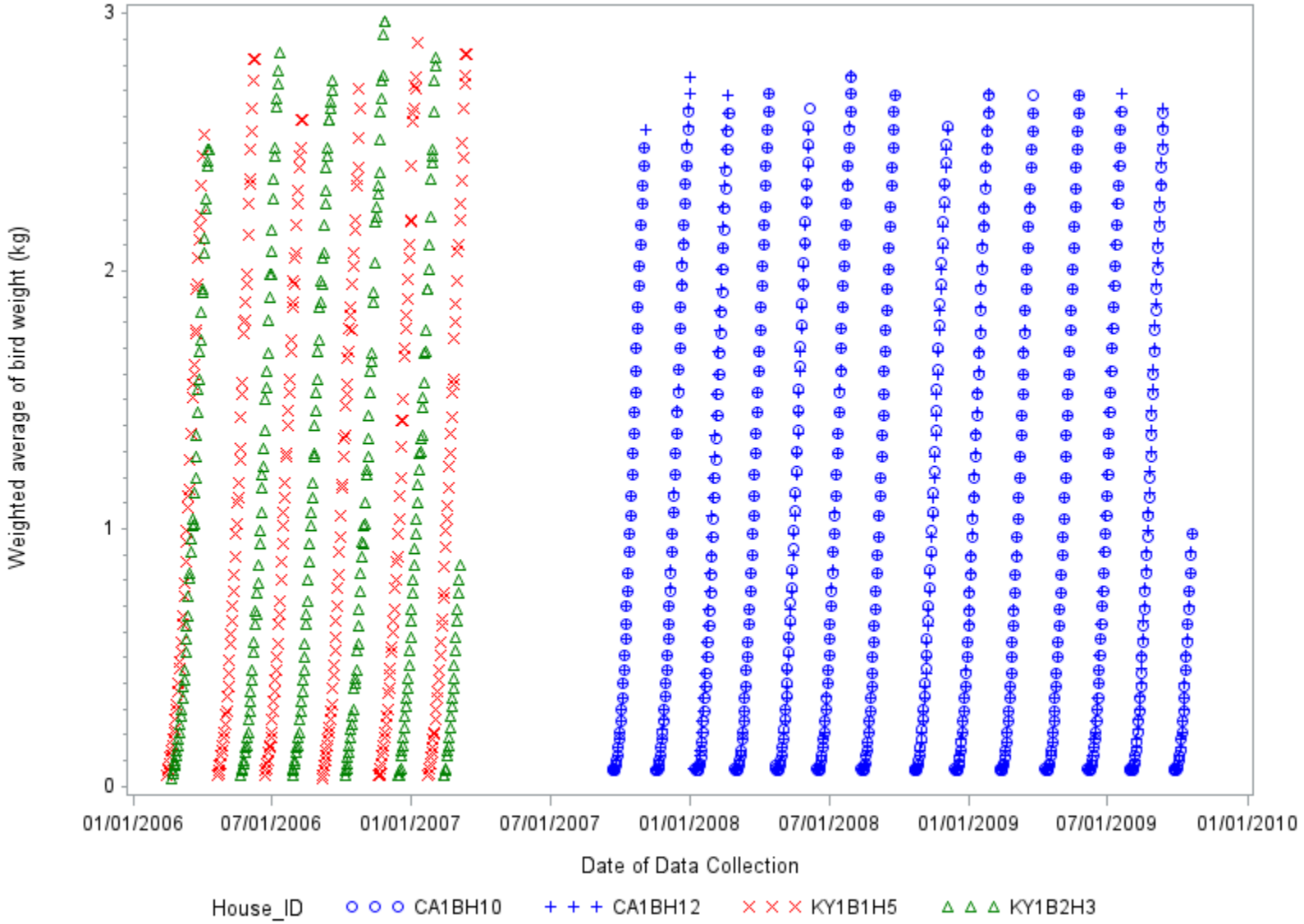


Figure E-7. NAEMS broiler average bird weight, by site.

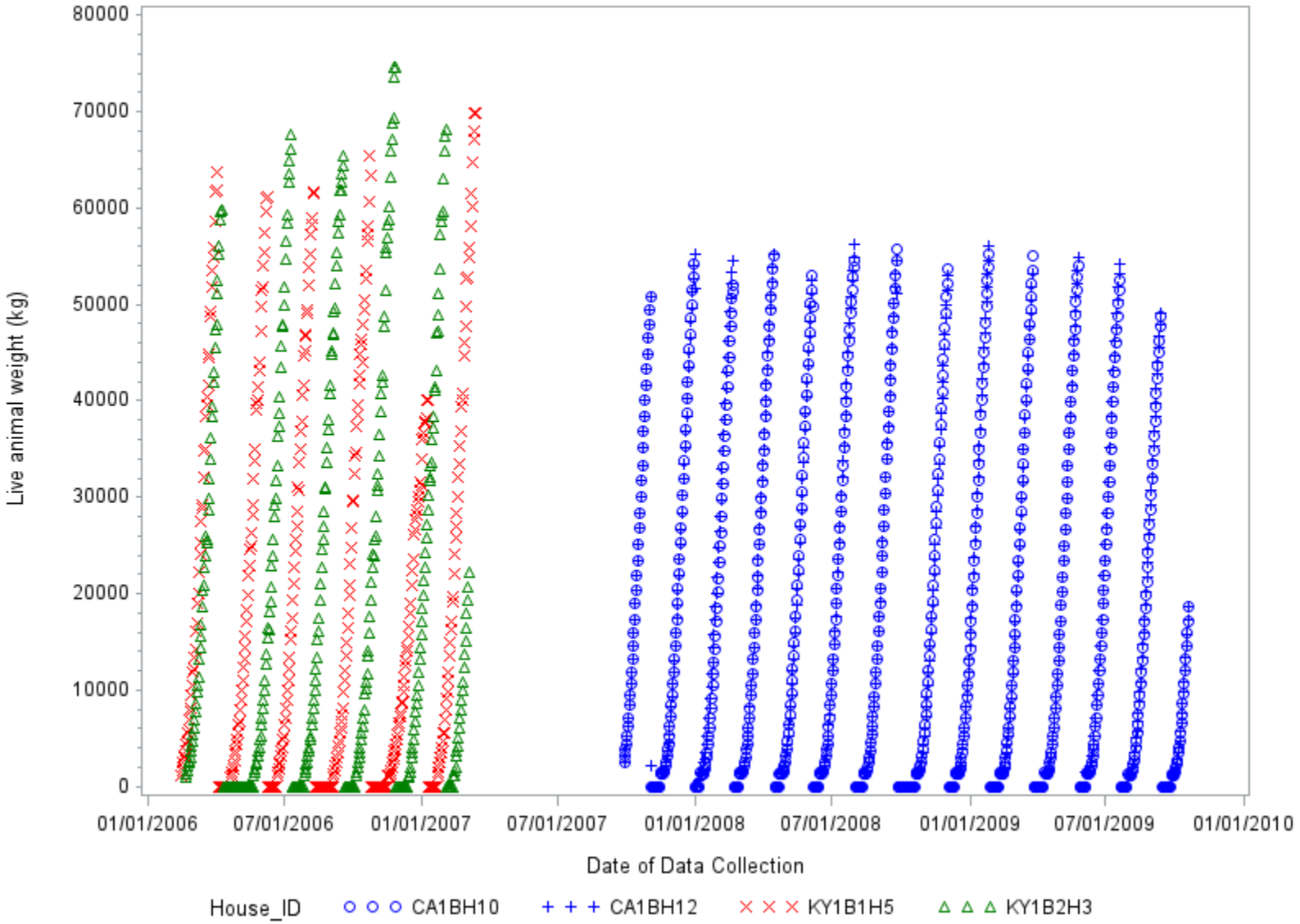


Figure E-8. NAEMS broiler live animal weight, by site.

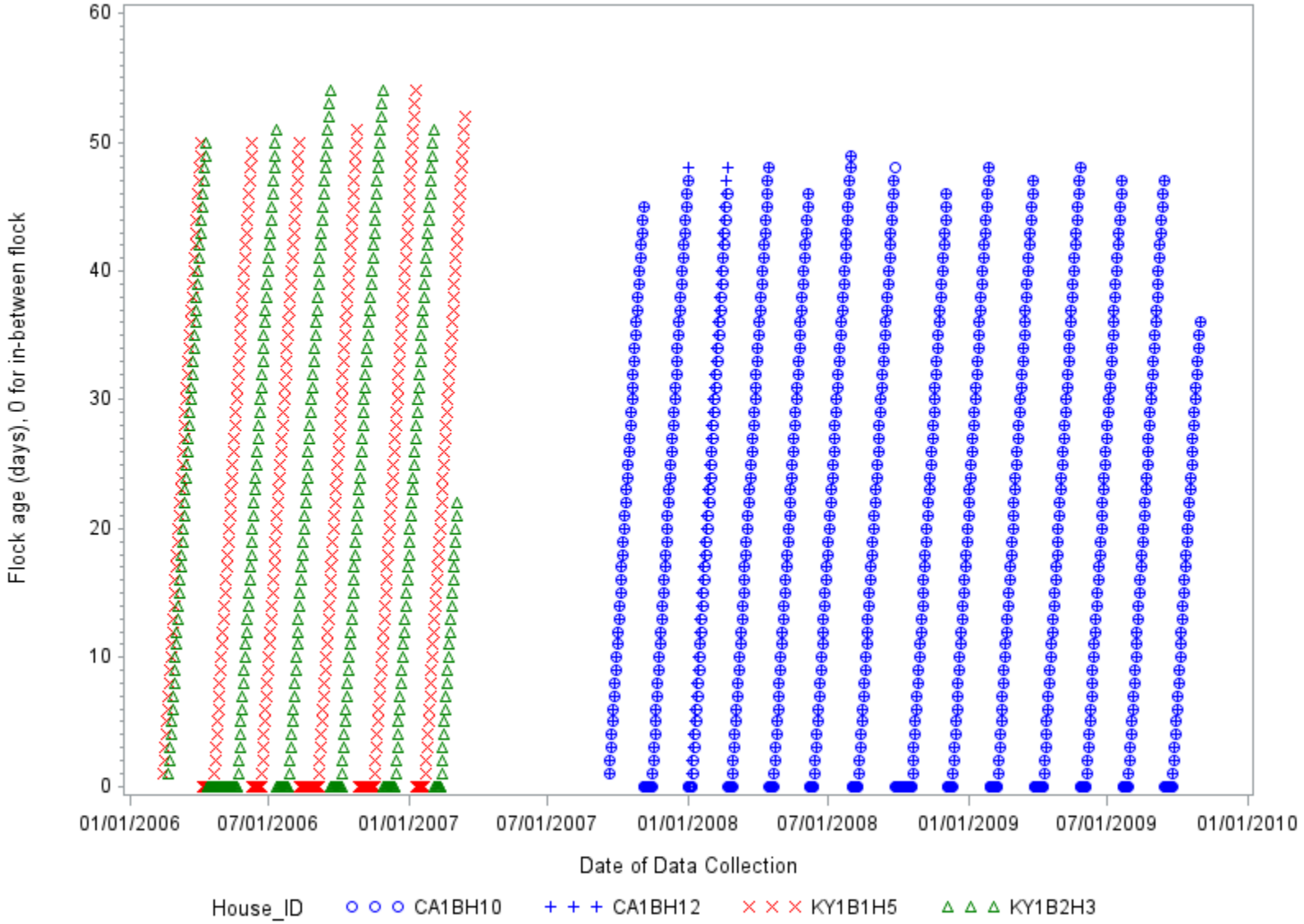


Figure E-9. NAEMS broiler flock age excluding between flock, by site.

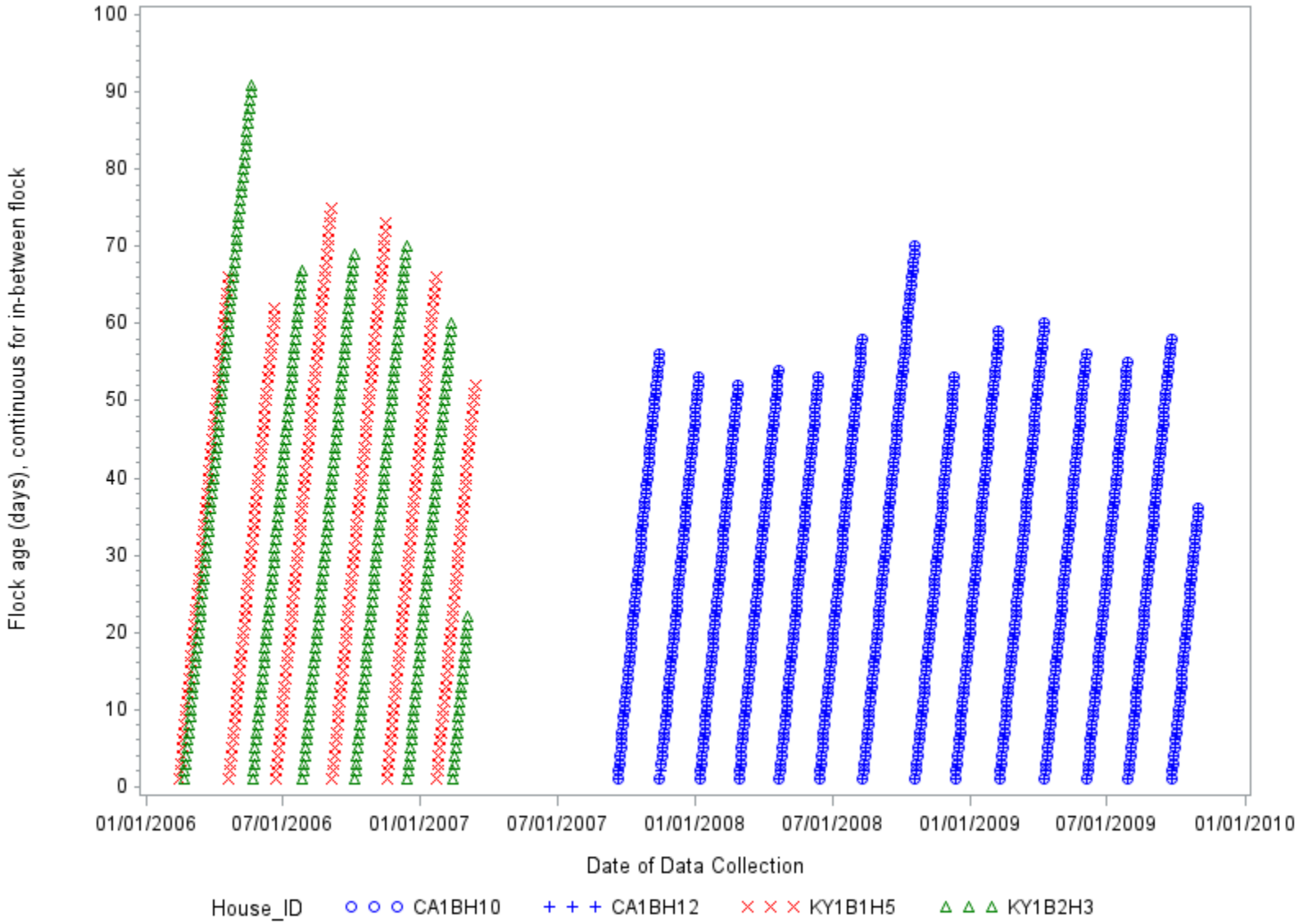


Figure E-10. NAEMS broiler flock age, by site.

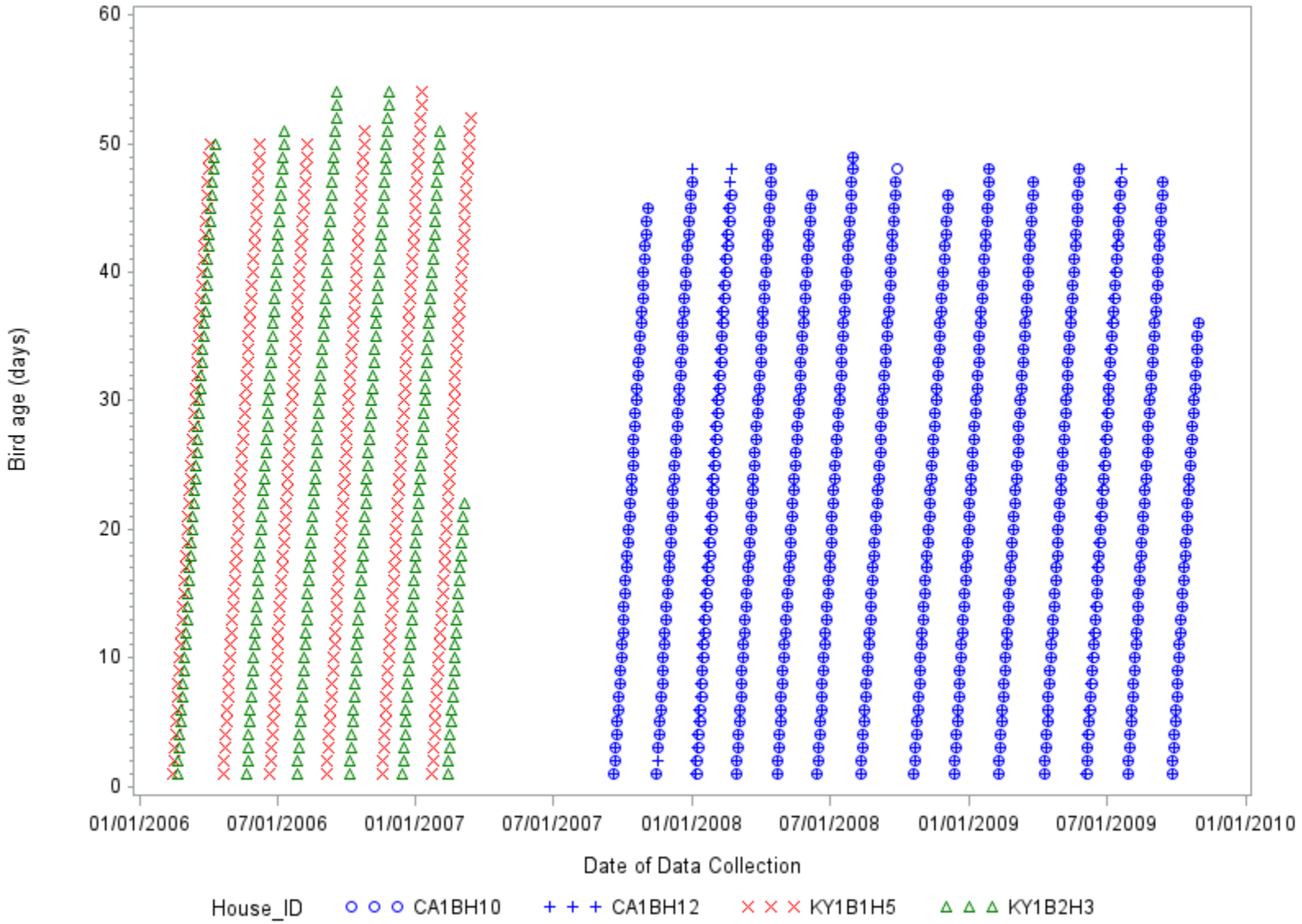


Figure E-11. NAEMS broiler age, by site.

Barn Environmental Parameters

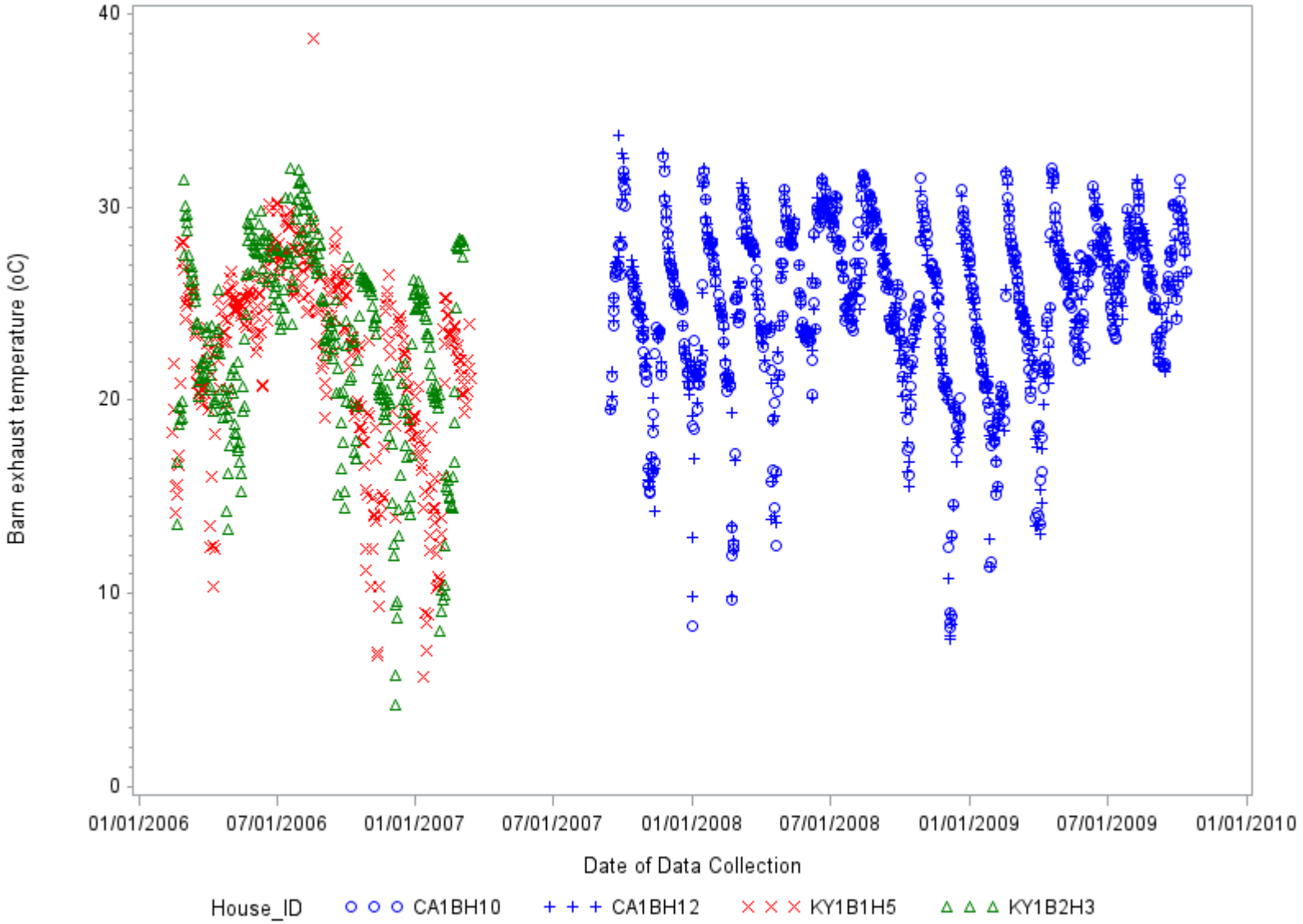


Figure E-12. NAEMS broiler house temperature, by site.

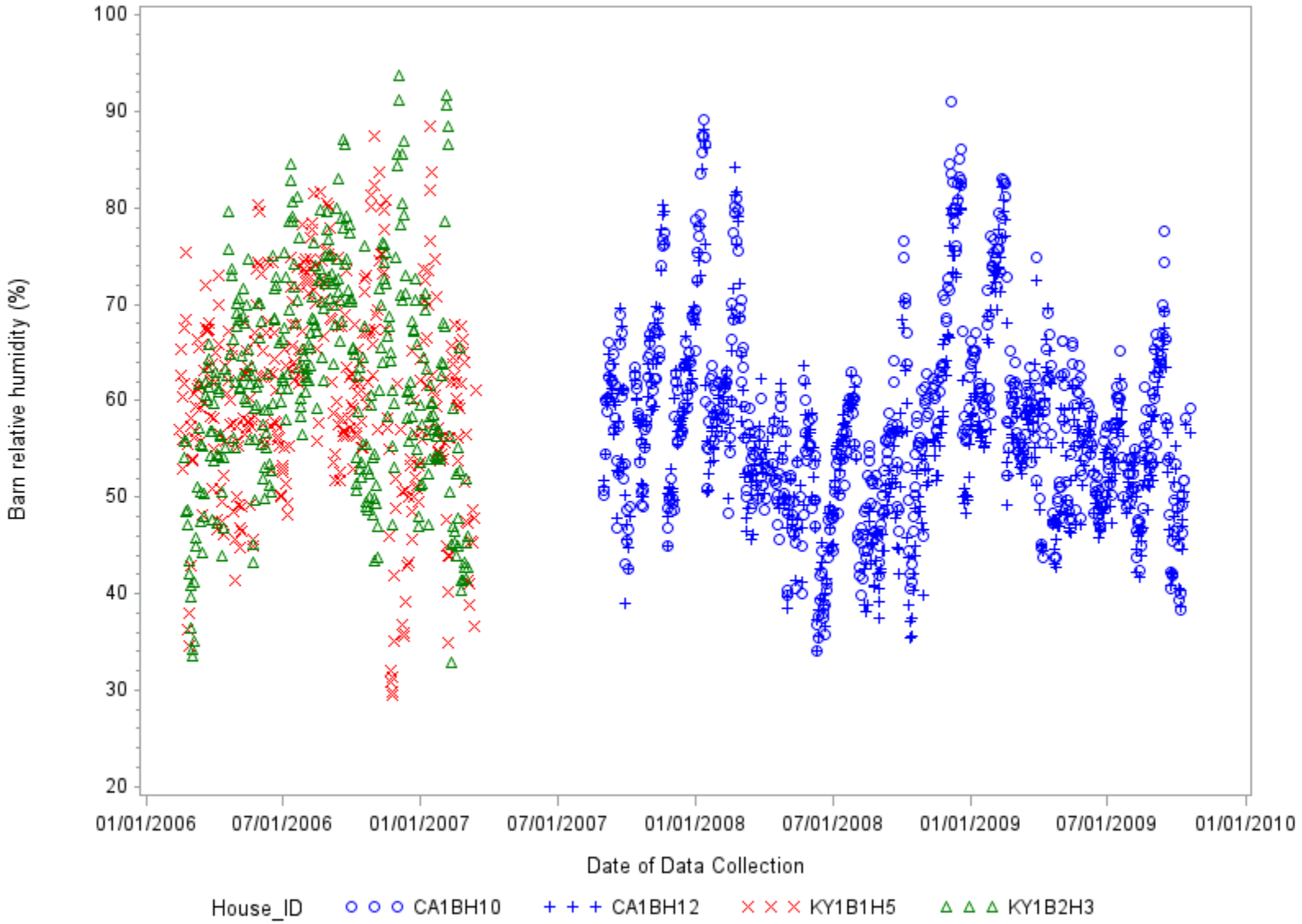


Figure E-13. NAEMS broiler house relative humidity by site.

Figure E-14. NAEMS broiler house airflow, by site.

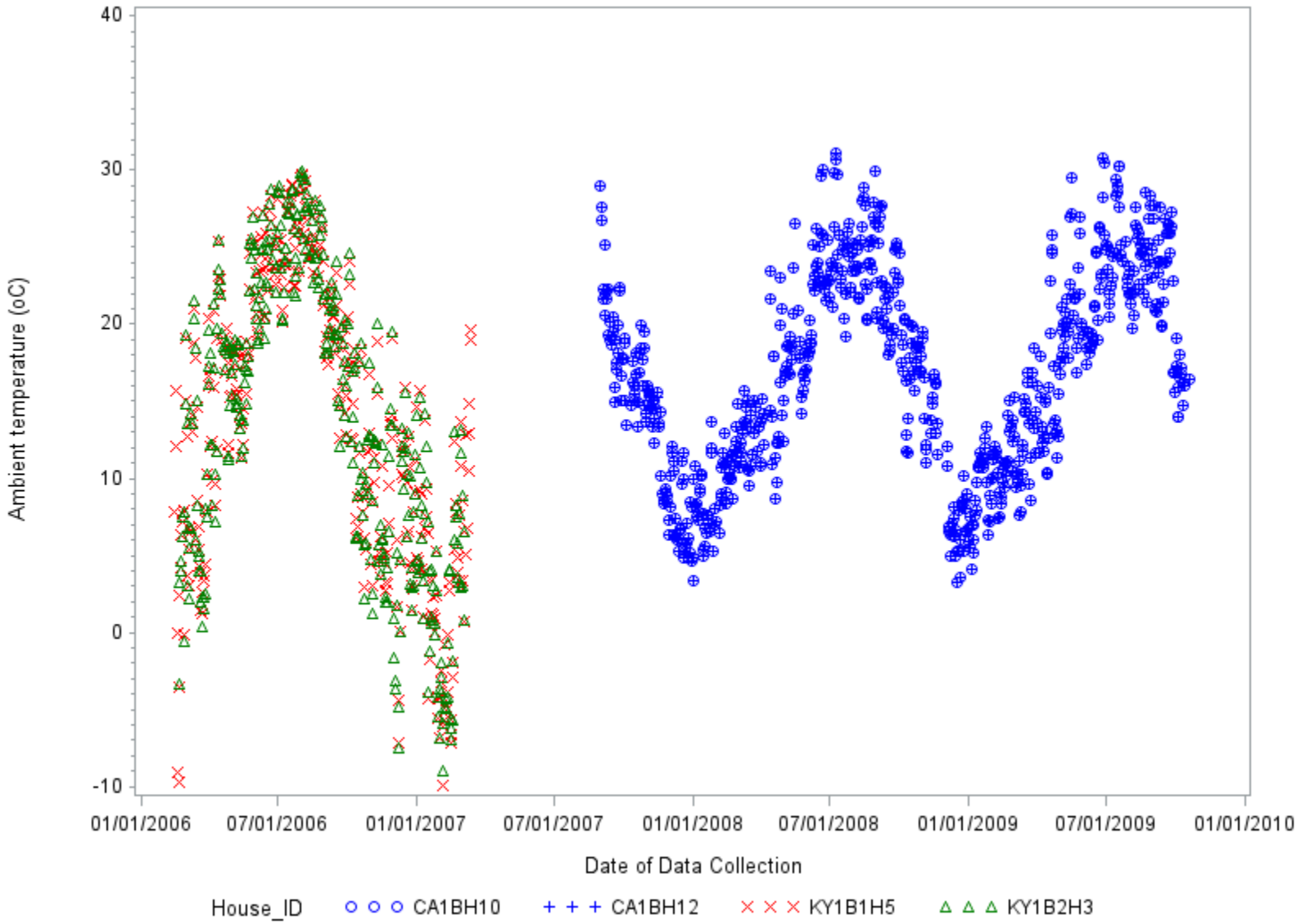


Figure E-15. NAEMS broiler site ambient temperature, by site.

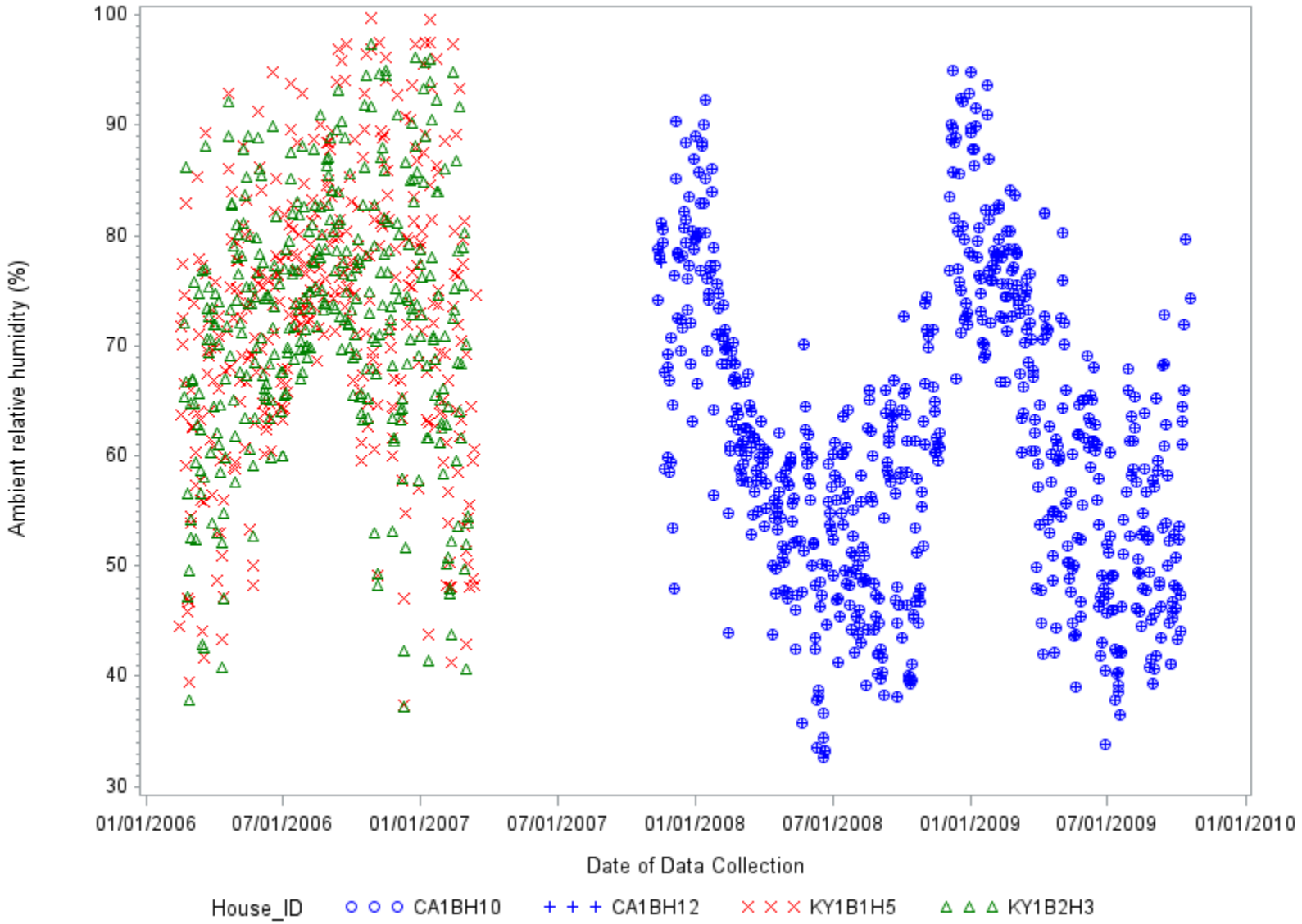


Figure E-16. NAEMS broiler site ambient relative humidity, by site.

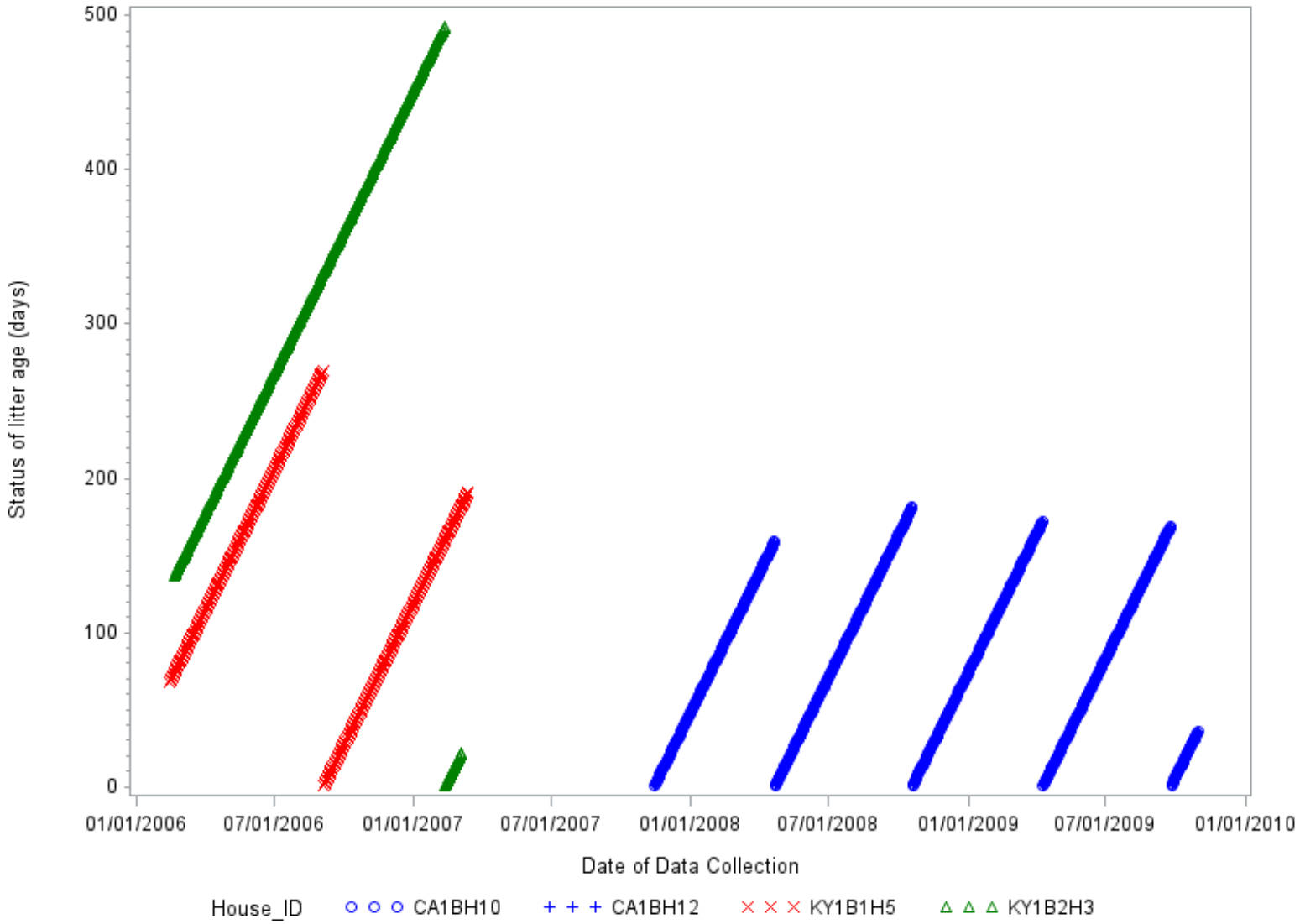


Figure E-17. NAEMS broiler litter age, by site.

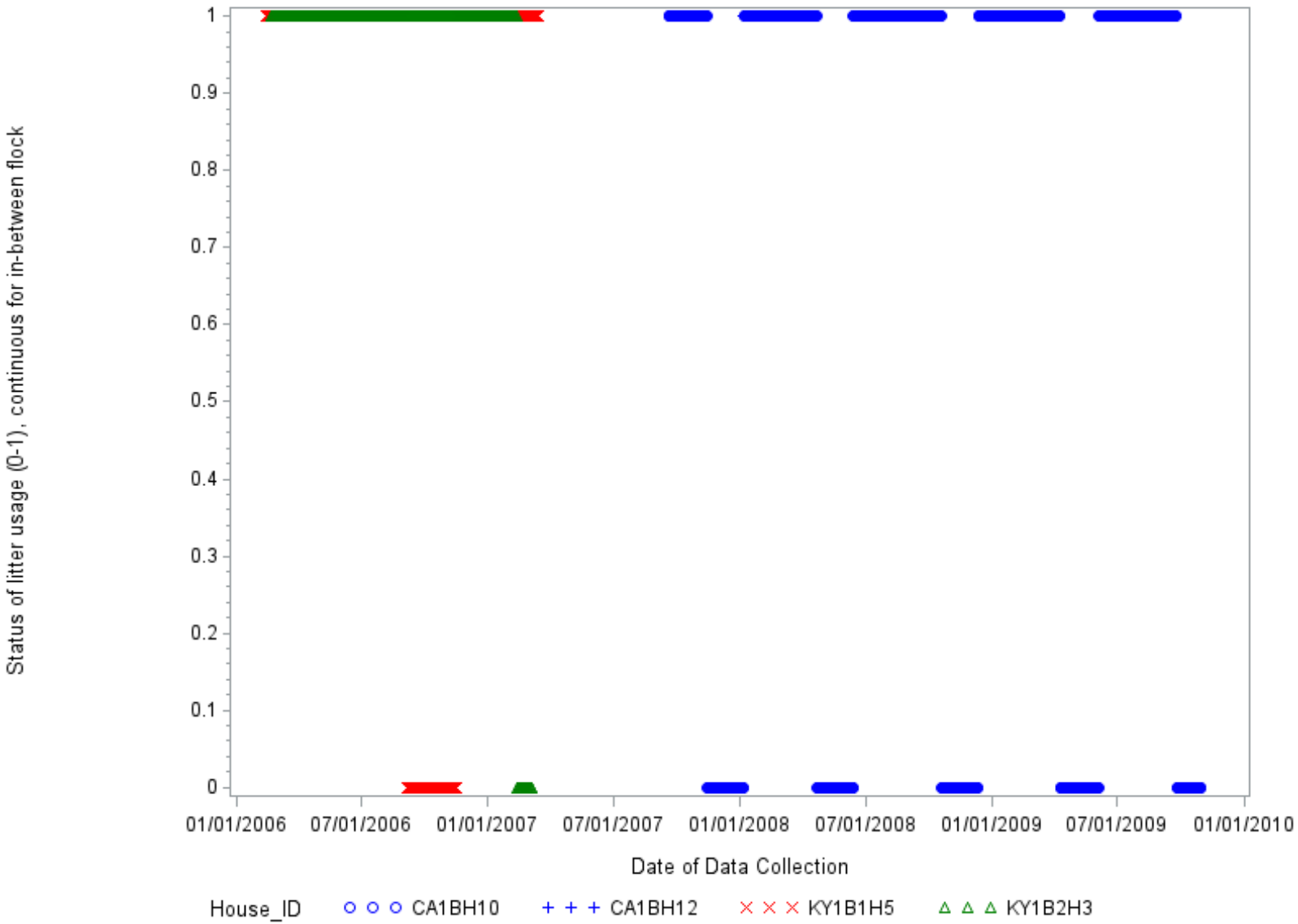


Figure E-18. NAEMS broiler litter status (0 = first flock on fresh litter, 1 = one or more flocks raised on litter), by site.

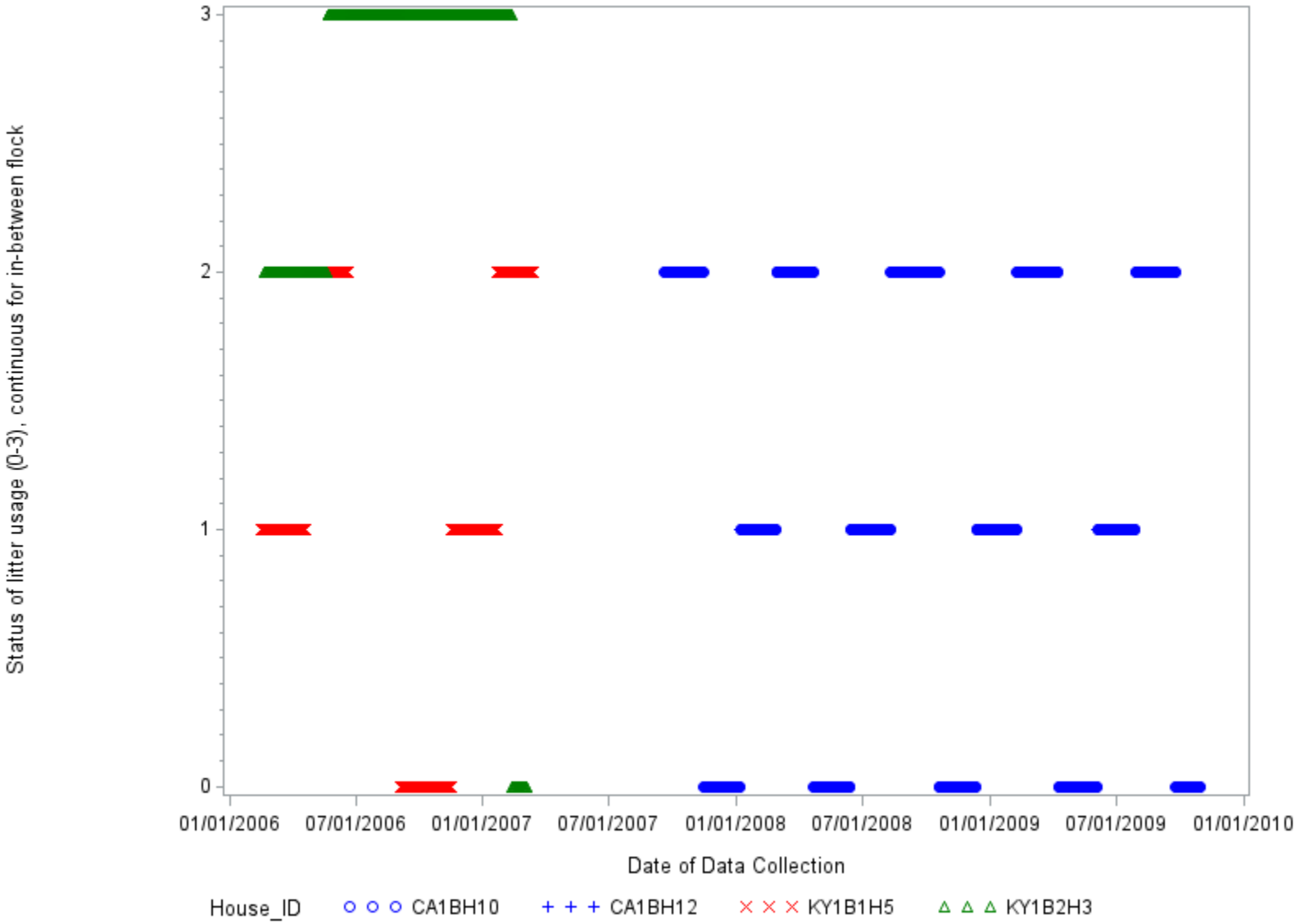


Figure E-19. NAEMS broiler litter status (0 = fresh litter, 1 = second flock raised on litter, 2= third flock, 3= four or more flocks), by site.

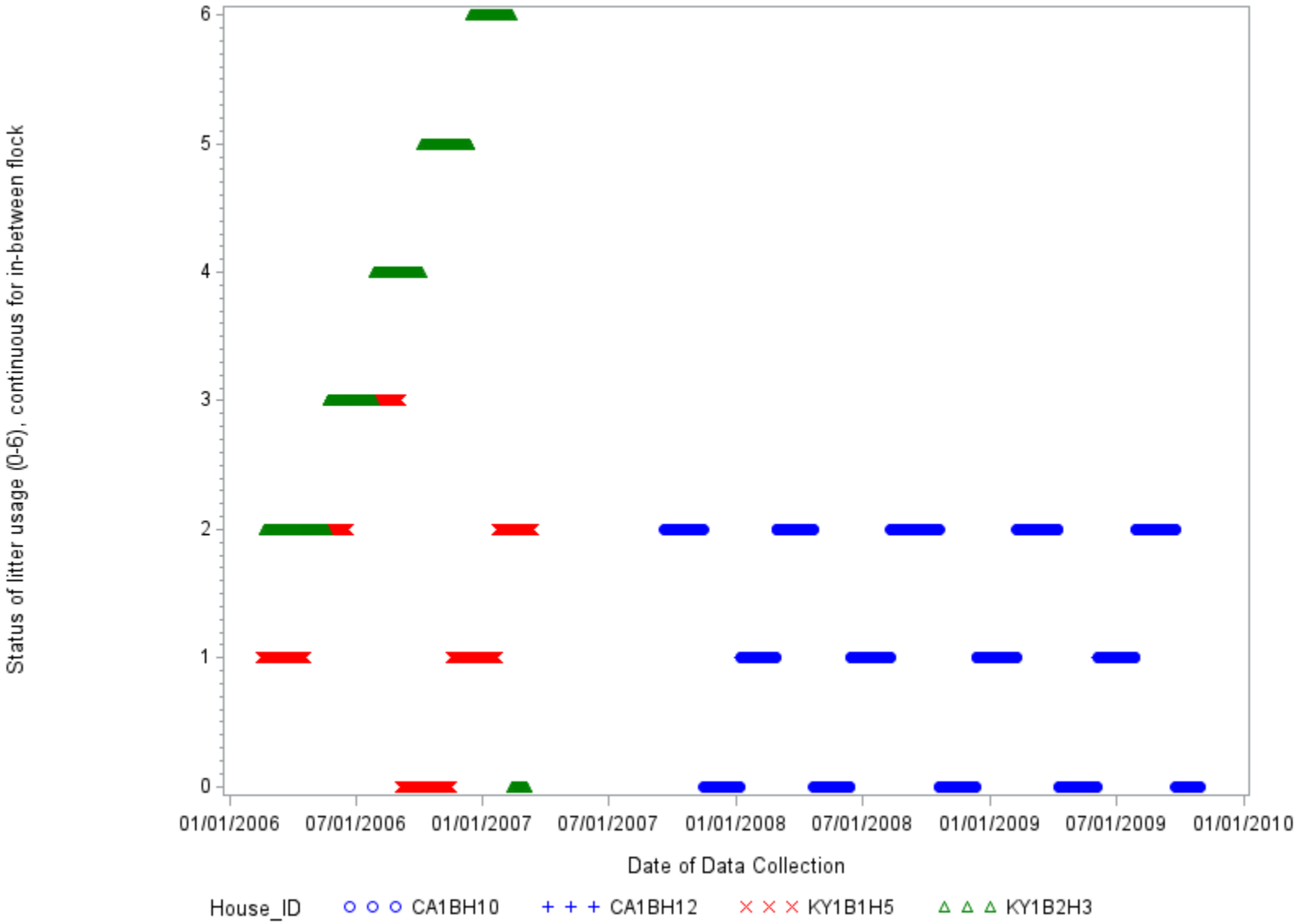


Figure E-20. NAEMS broiler litter status (0-6, continuous), by site.

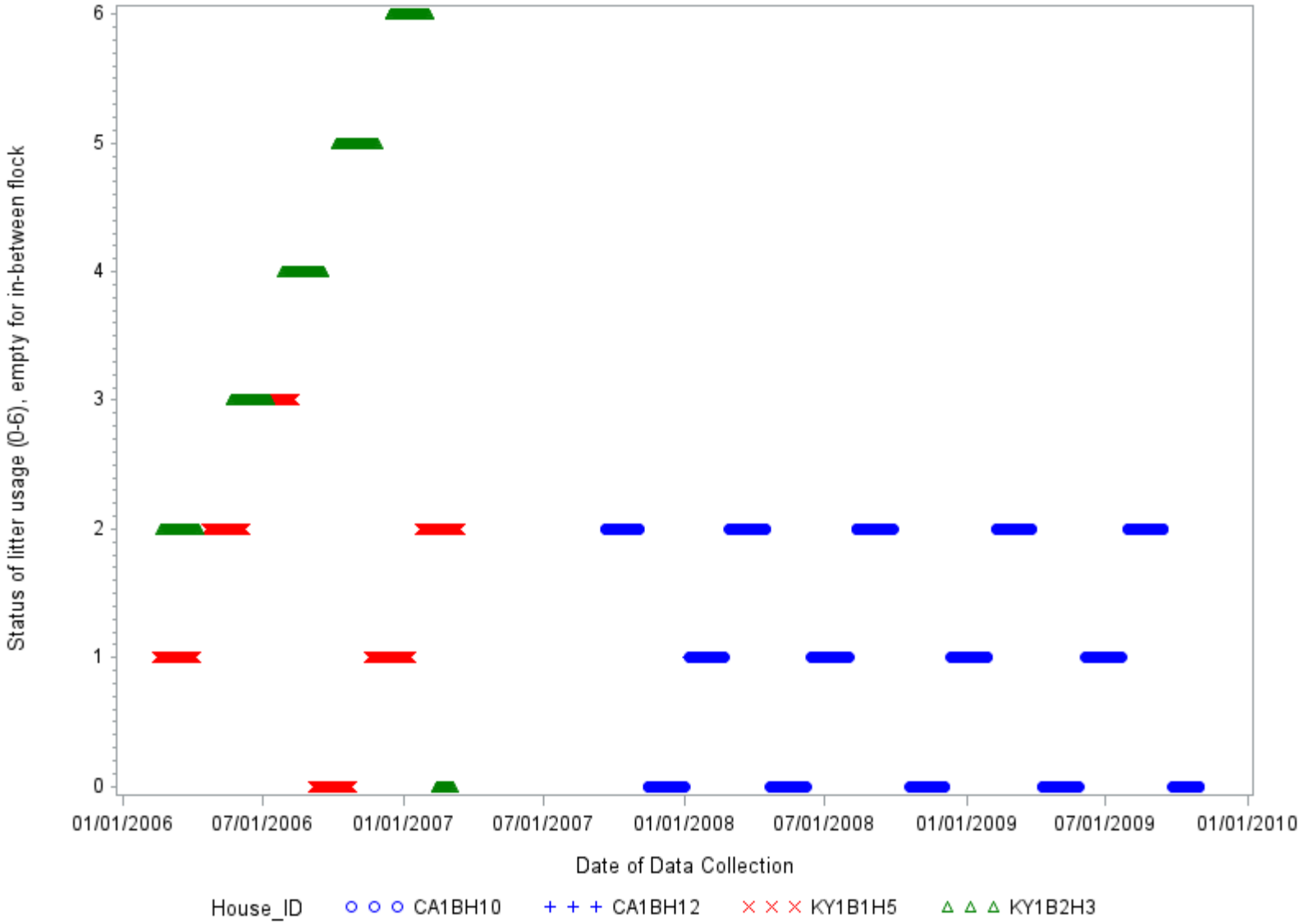


Figure E-21. NAEMS broiler litter status (0-6, null between flocks), without in between flock, by site.

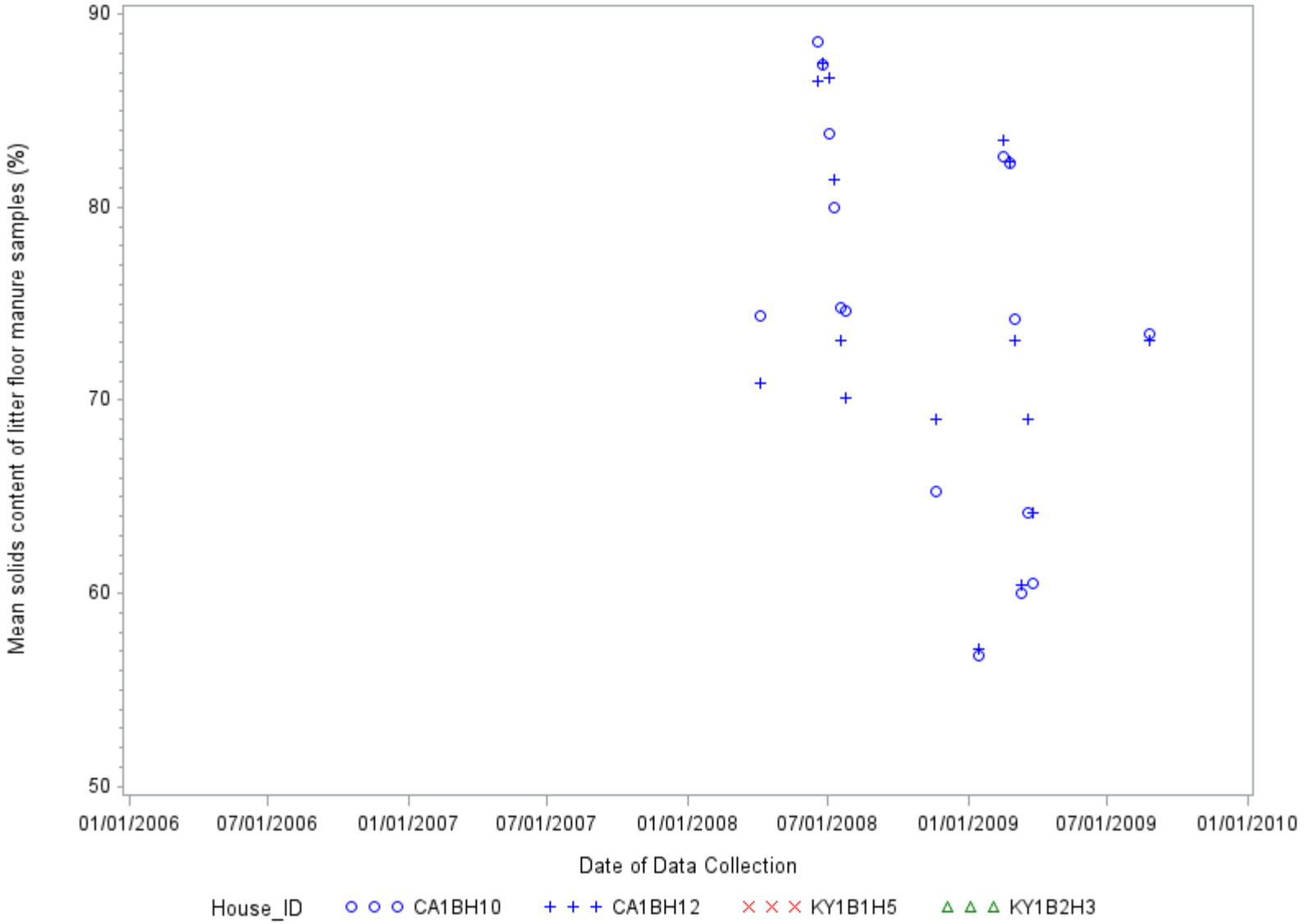


Figure E-22. NAEMS broiler mean solid content of litter floor samples, by site.

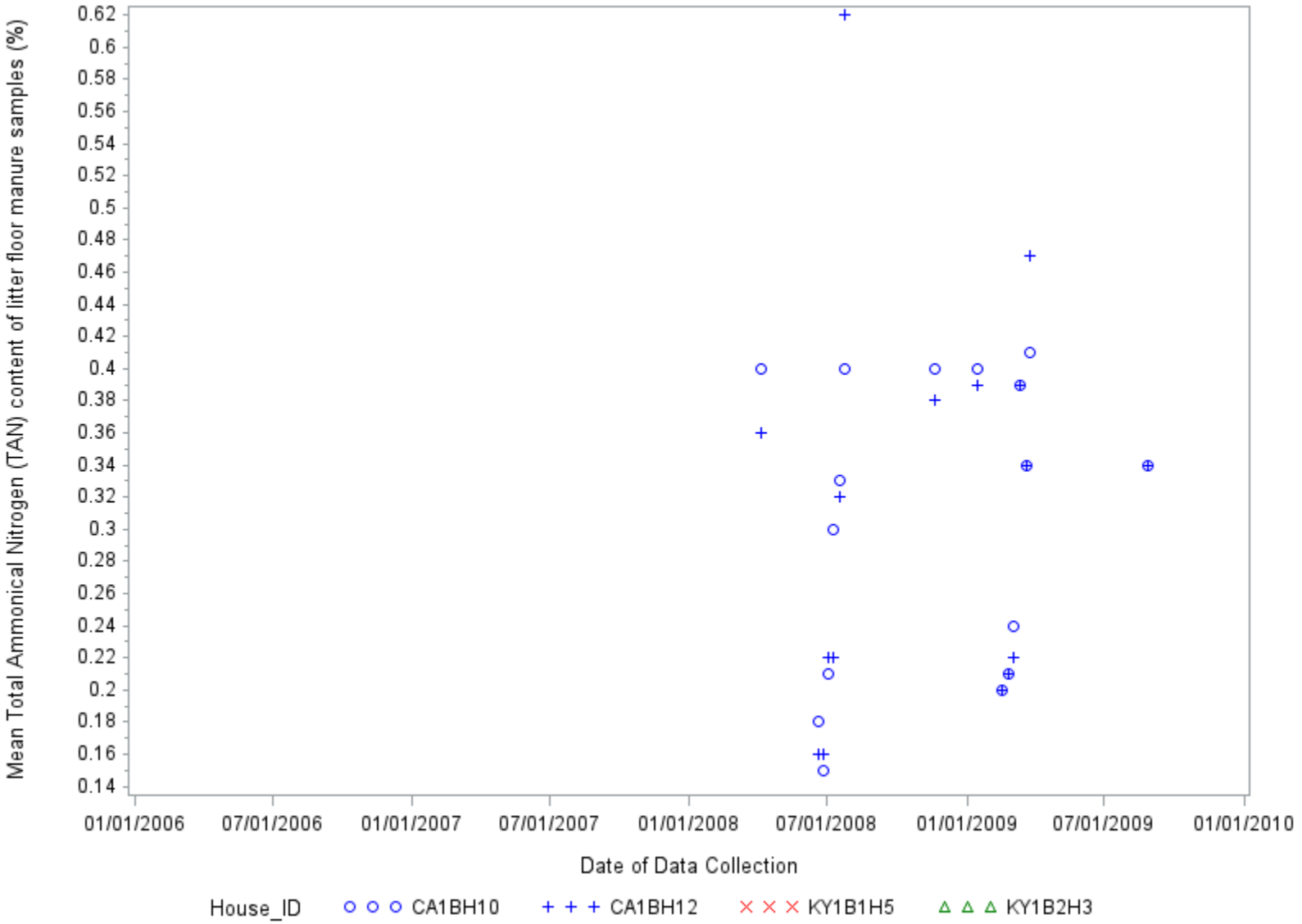


Figure E-23. NAEMS broiler TAN content of litter floor samples, by site.

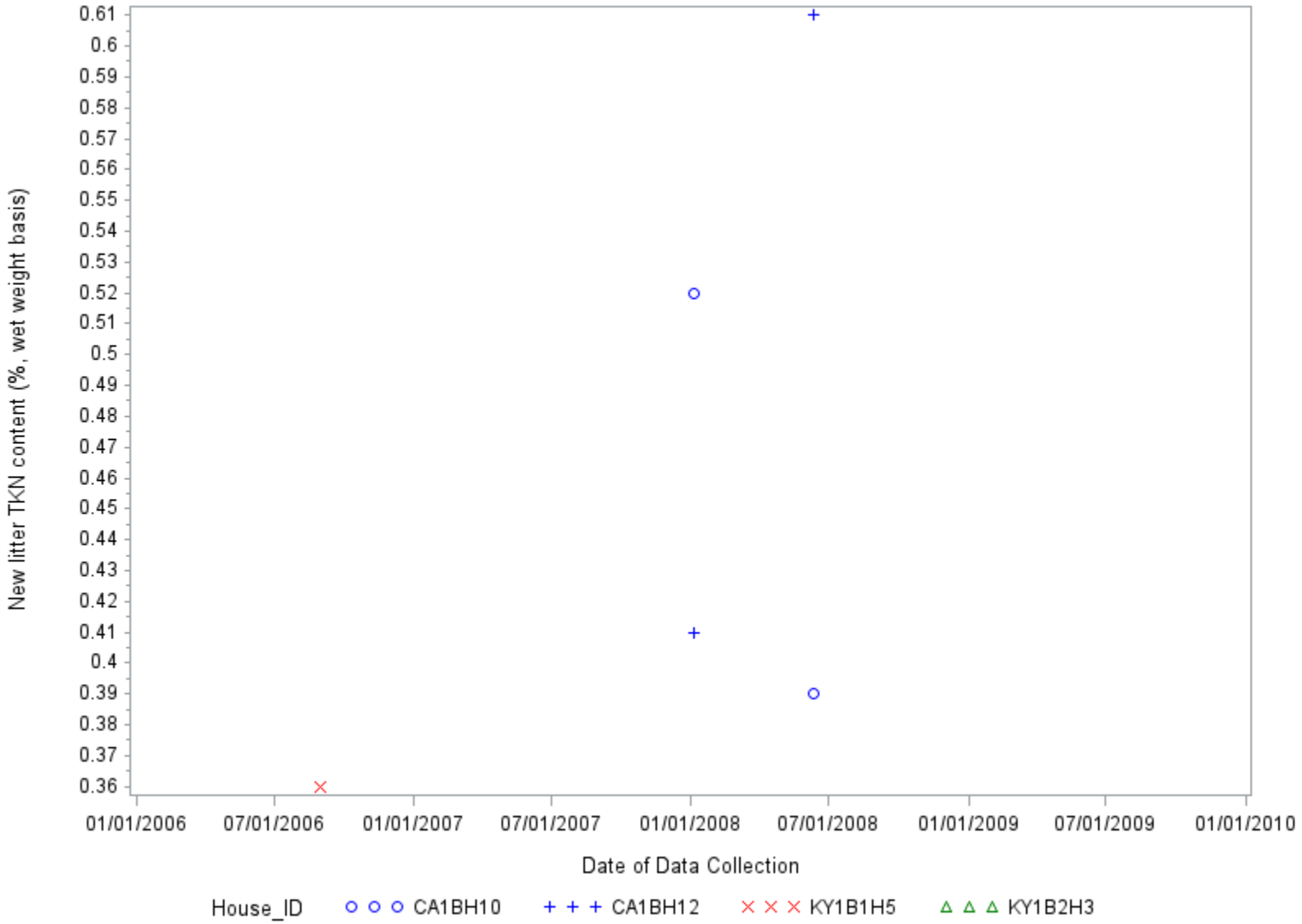


Figure E-24. NAEMS broiler TKN content of new litter samples on a wet weight percentage, by site.

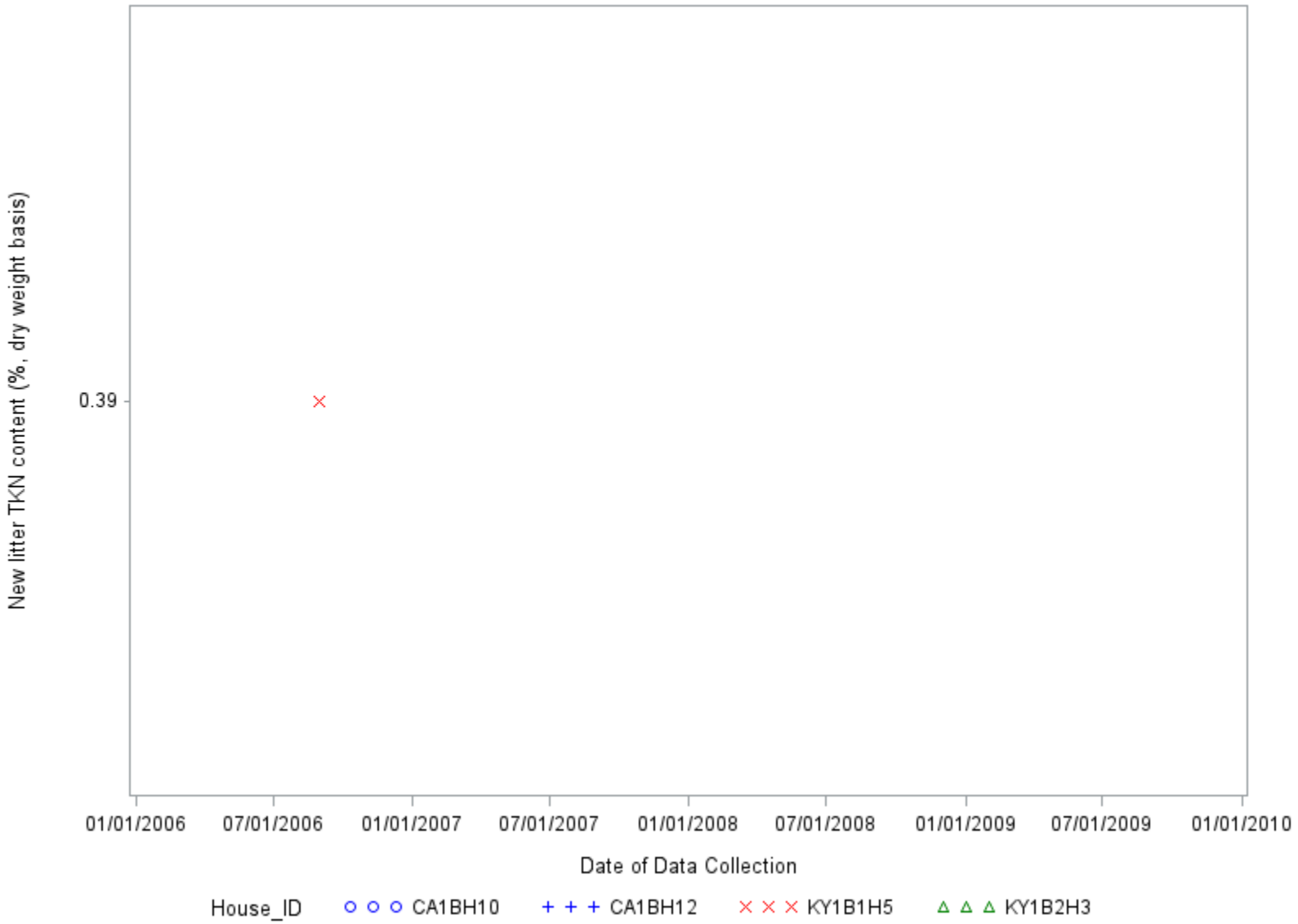


Figure E-25. NAEMS broiler TKN content of new litter samples on a dry weight percentage, by site.

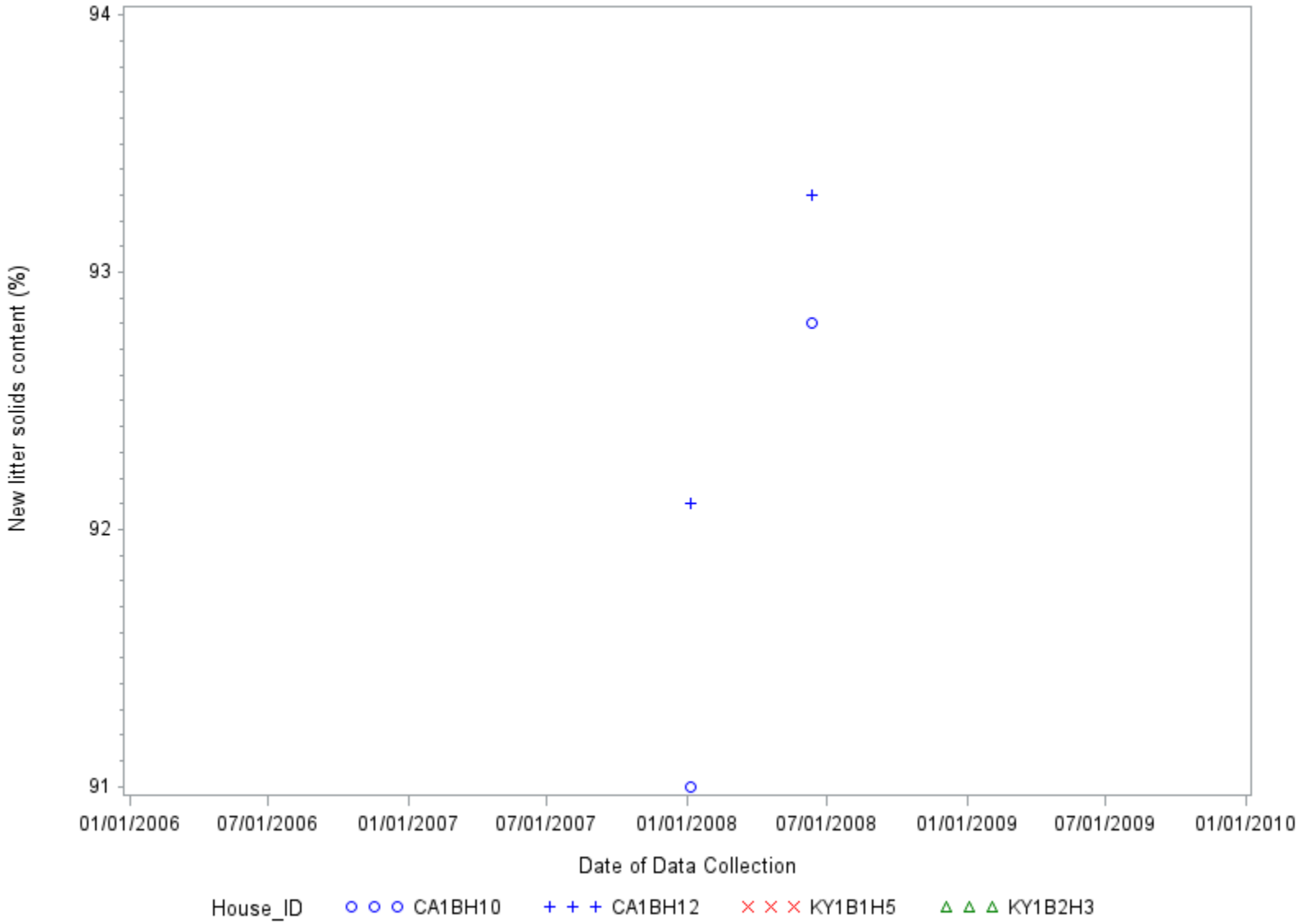


Figure E-26. NAEMS broiler solids content of new litter samples, by site.

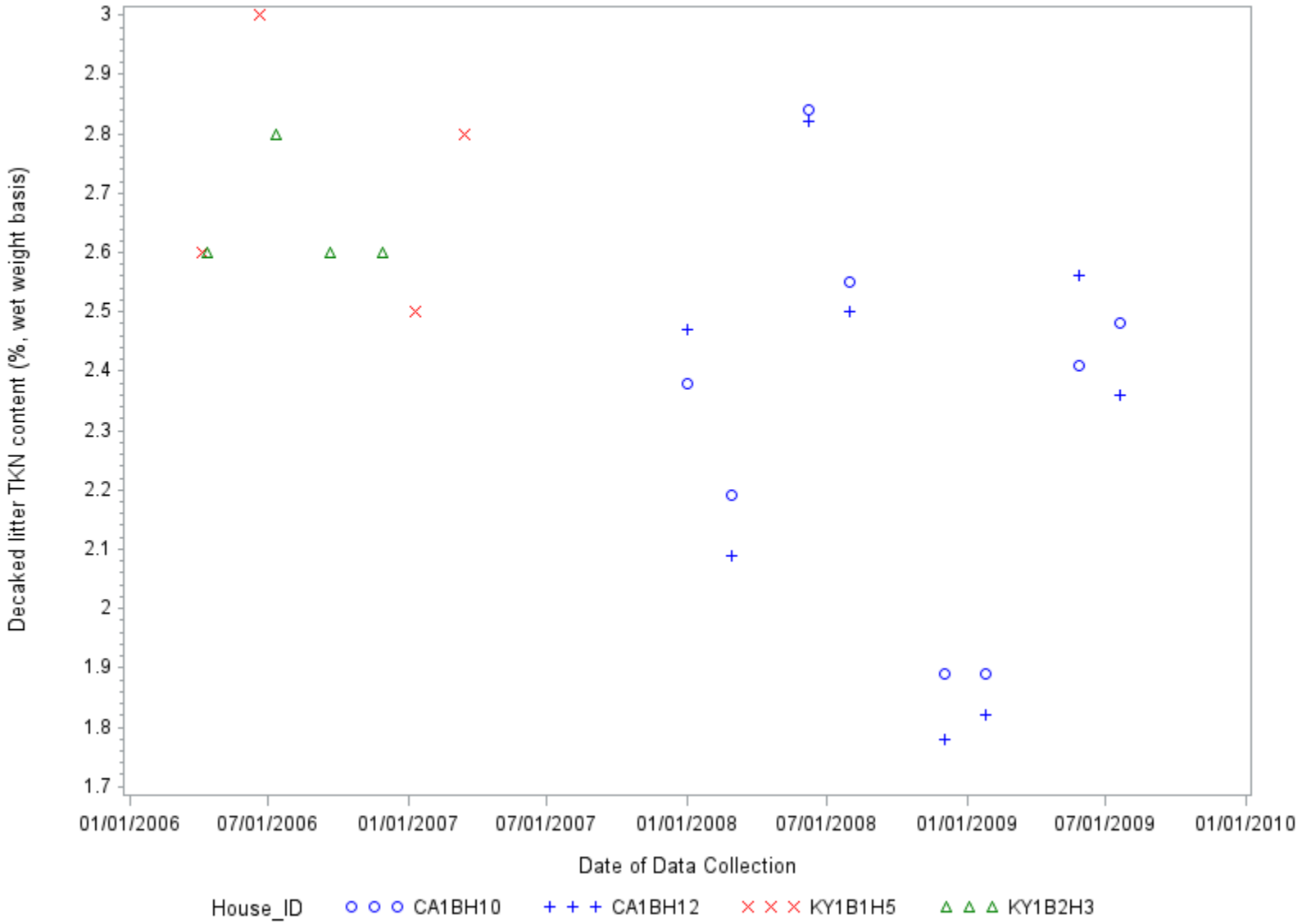


Figure E-27. NAEMS broiler TKN content of decaked litter samples on a wet weight percentage, by site.

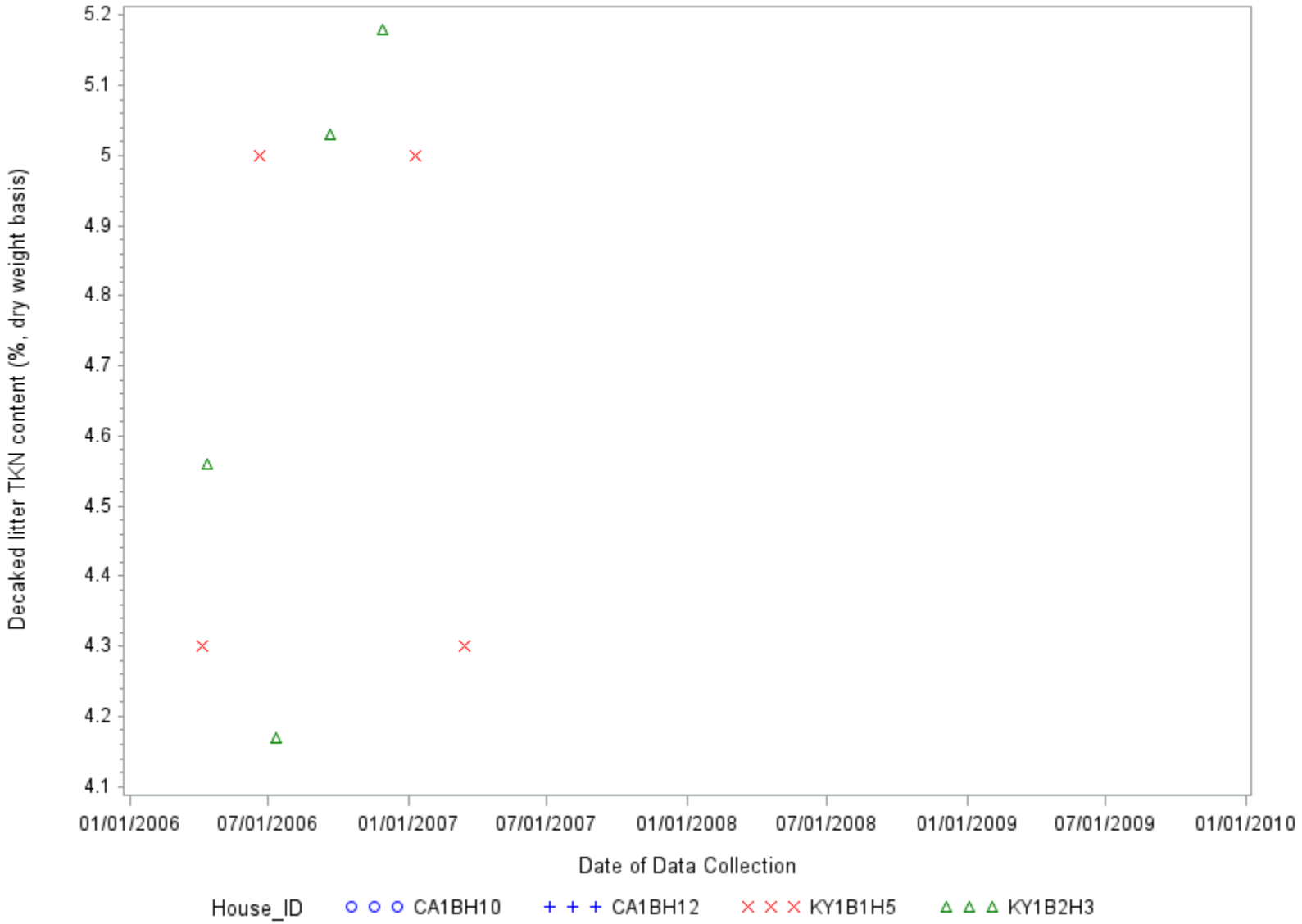


Figure E-28. NAEMS broiler TKN content of decaked litter samples on a dry weight percentage, by site.

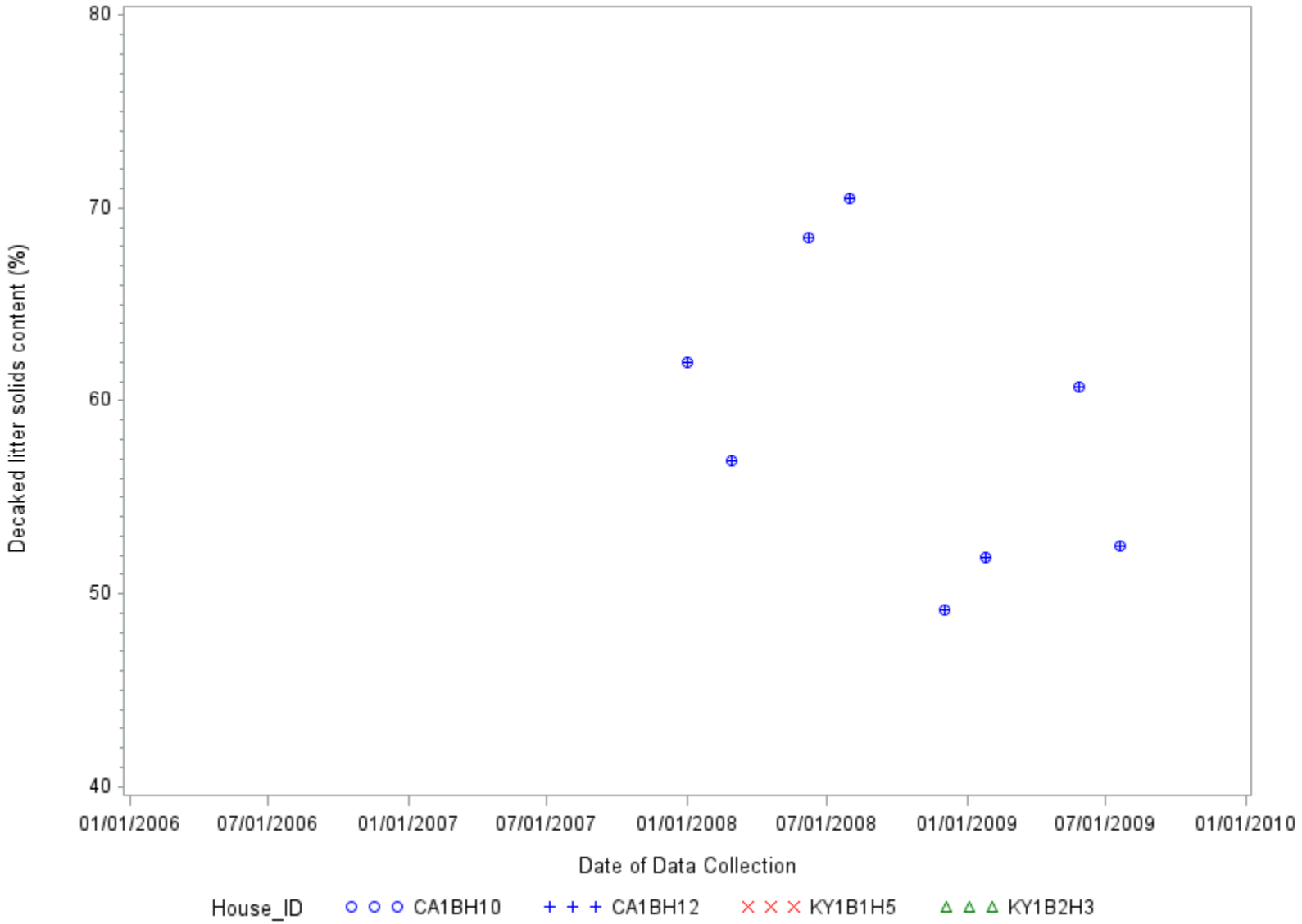


Figure E-29. NAEMS broiler solids content of decaked litter samples, by site.

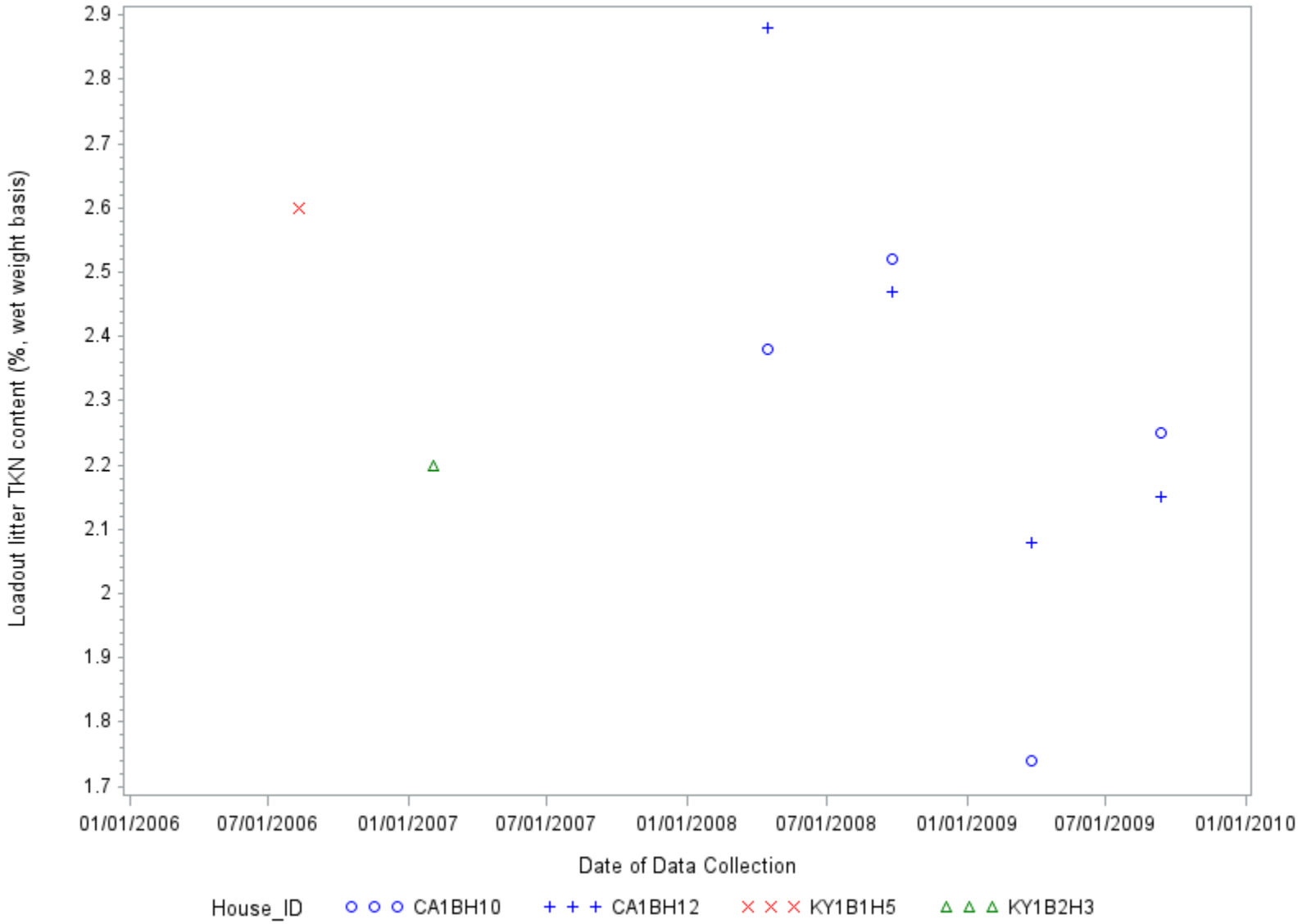


Figure E-30. NAEMS broiler TKN content of loadout litter samples on a wet weight percentage, by site.

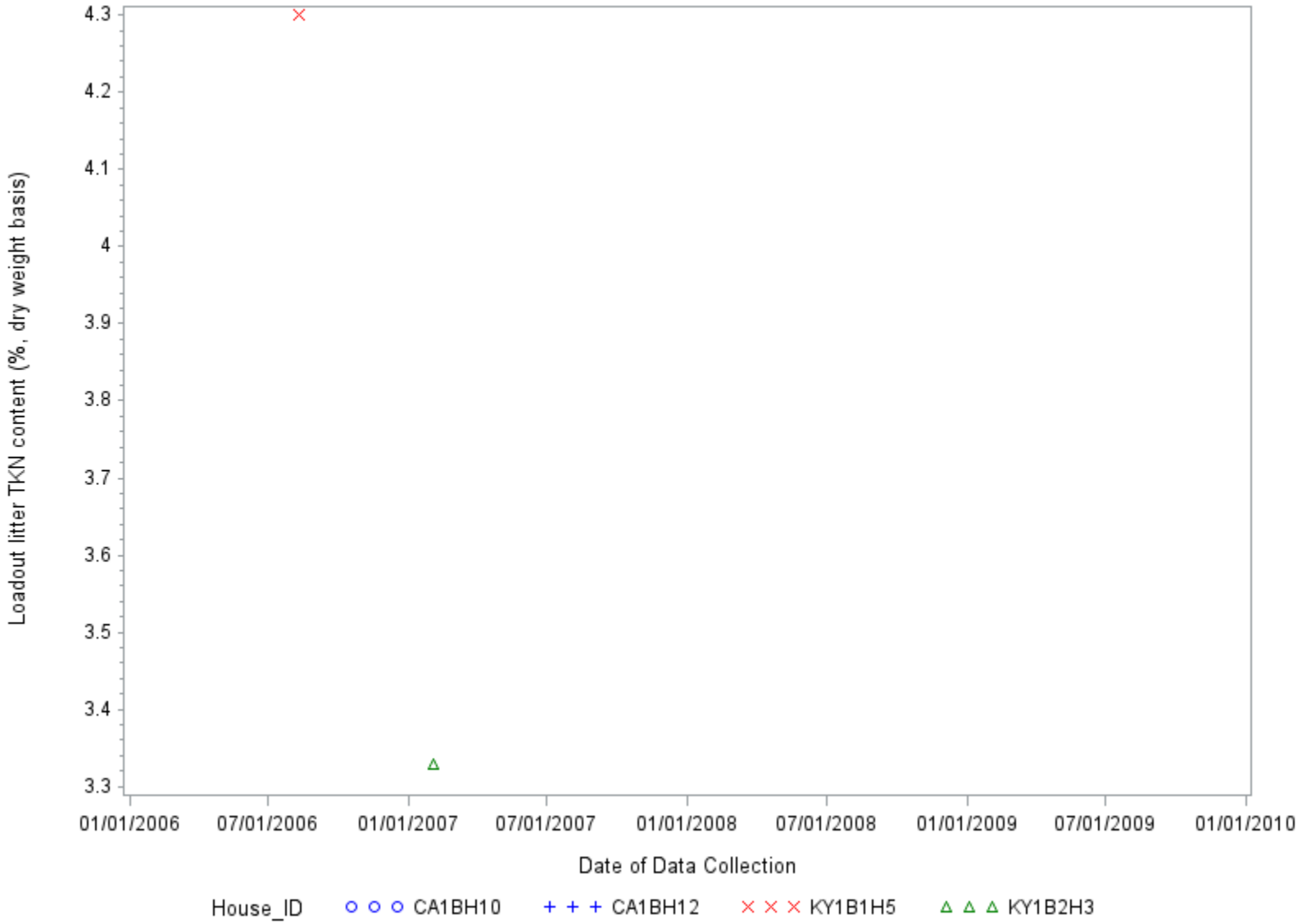


Figure E-31. NAEMS broiler TKN content of loadout litter samples on a dry weight percentage, by site.

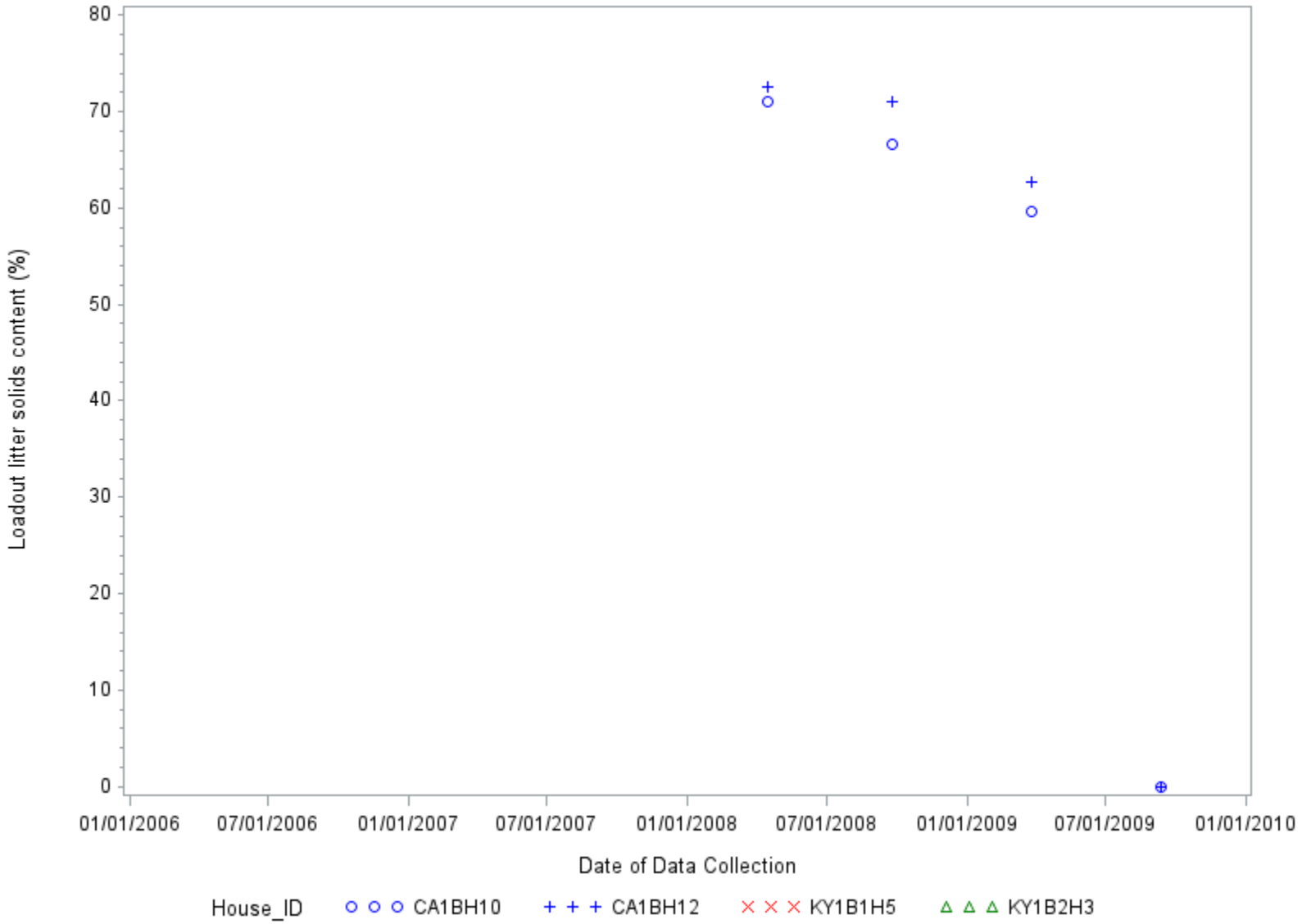


Figure E-32. NAEMS broiler solids content of loadout litter samples, by site.

Appendix F – Scatter Plots

List of Tables

Table F-1: Relationship classification based on R^2 values F-6
Table F-2: Summary of high rise house R^2 values..... F-7

List of Figures

Figure F-1. Scatter plot of broiler NH_3 emissions versus inventory and scatter plot with regression. F-10
Figure F-2. Scatter plot of broiler H_2S emissions versus inventory and scatter plot with regression. F-11
Figure F-3. Scatter plot of broiler PM_{10} emissions versus inventory and scatter plot with regression. F-12
Figure F-4. Scatter plot of broiler $PM_{2.5}$ emissions versus inventory and scatter plot with regression..... F-13
Figure F-5. Scatter plot of broiler TSP emissions versus inventory and scatter plot with regression..... F-14
Figure F-6. Scatter plot of broiler NH_3 emissions versus average bird weight and scatter plot with regression. F-15
Figure F-7. Scatter plot of broiler H_2S emissions versus average bird weight and scatter plot with regression..... F-16
Figure F-8. Scatter plot of broiler PM_{10} emissions versus average bird weight and scatter plot with regression.... F-17
Figure F-9. Scatter plot of broiler $PM_{2.5}$ emissions versus average bird weight and scatter plot with regression. .. F-18
Figure F-10. Scatter plot of broiler TSP emissions versus average bird weight and scatter plot with regression. .. F-19
Figure F-11. Scatter plot of broiler NH_3 emissions versus live animal weight and scatter plot with regression. F-20
Figure F-12. Scatter plot of broiler H_2S emissions versus live animal weight and scatter plot with regression..... F-21
Figure F-13. Scatter plot of broiler PM_{10} emissions versus live animal weight and scatter plot with regression.... F-22
Figure F-14. Scatter plot of broiler $PM_{2.5}$ emissions versus live animal weight and scatter plot with regression. .. F-23
Figure F-15. Scatter plot of broiler TSP emissions versus live animal weight and scatter plot with regression. F-24
Figure F-16. Scatter plot of broiler NH_3 emissions versus flock age (set to zero between flocks) and scatter plot with regression..... F-25
Figure F-17. Scatter plot of broiler H_2S emissions versus flock age (set to zero between flocks) and scatter plot with regression..... F-26
Figure F-18. Scatter plot of broiler PM_{10} emissions versus flock age (set to zero between flocks) and scatter plot with regression..... F-27
Figure F-19. Scatter plot of broiler $PM_{2.5}$ emissions versus flock age (set to zero between flocks) and scatter plot with regression..... F-28
Figure F-20. Scatter plot of broiler TSP emissions versus flock age (set to zero between flocks) and scatter plot with regression..... F-29
Figure F-21. Scatter plot of broiler NH_3 emissions versus flock age (continues to increase between flocks) and scatter plot with regression. F-30
Figure F-22. Scatter plot of broiler H_2S emissions versus flock age (continues to increase between flocks) and scatter plot with regression. F-31
Figure F-23. Scatter plot of broiler PM_{10} emissions versus flock age (continues to increase between flocks) and scatter plot with regression. F-32
Figure F-24. Scatter plot of broiler $PM_{2.5}$ emissions versus flock age (continues to increase between flocks) and scatter plot with regression. F-33
Figure F-25. Scatter plot of broiler TSP emissions versus flock age (continues to increase between flocks) and scatter plot with regression. F-34
Figure F-26. Scatter plot of broiler NH_3 emissions versus bird age and scatter plot with regression..... F-35
Figure F-27. Scatter plot of broiler H_2S emissions versus bird age and scatter plot with regression. F-36
Figure F-28. Scatter plot of broiler PM_{10} emissions versus bird age and scatter plot with regression..... F-37
Figure F-29. Scatter plot of broiler $PM_{2.5}$ emissions versus bird age and scatter plot with regression..... F-38
Figure F-30. Scatter plot of broiler TSP emissions versus bird age and scatter plot with regression..... F-39
Figure F-31. Scatter plot of broiler NH_3 emissions versus barn exhaust temperature and scatter plot with regression. F-40
Figure F-32. Scatter plot of broiler H_2S emissions versus barn exhaust temperature and scatter plot with regression. F-41
Figure F-33. Scatter plot of broiler PM_{10} emissions versus barn exhaust temperature and scatter plot with regression. F-42
Figure F-34. Scatter plot of broiler $PM_{2.5}$ emissions versus barn exhaust temperature and scatter plot with regression. F-43

Figure F-35. Scatter plot of broiler TSP emissions versus barn exhaust temperature and scatter plot with regression. F-44
Figure F-36. Scatter plot of broiler NH_3 emissions versus barn relative humidity and scatter plot with regression. .. F-45
Figure F-37. Scatter plot of broiler H_2S emissions versus barn relative humidity and scatter plot with regression. F-46
Figure F-38. Scatter plot of broiler PM_{10} emissions versus barn relative humidity and scatter plot with regression. . F-47
Figure F-39. Scatter plot of broiler $PM_{2.5}$ emissions versus barn relative humidity and scatter plot with regression. F-48
Figure F-40. Scatter plot of broiler TSP emissions versus barn relative humidity and scatter plot with regression.... F-49
Figure F-41. Scatter plot of broiler NH_3 emissions versus airflow and scatter plot with regression. F-50
Figure F-42. Scatter plot of broiler H_2S emissions versus airflow and scatter plot with regression. F-51
Figure F-43. Scatter plot of broiler PM_{10} emissions versus airflow and scatter plot with regression. F-52
Figure F-44. Scatter plot of broiler $PM_{2.5}$ emissions versus airflow and scatter plot with regression. F-53
Figure F-45. Scatter plot of broiler TSP emissions versus airflow and scatter plot with regression. F-54
Figure F-46. Scatter plot of broiler NH_3 emissions versus ambient temperature and scatter plot with regression. . F-55
Figure F-47. Scatter plot of broiler H_2S emissions versus ambient temperature and scatter plot with regression... F-56
Figure F-48. Scatter plot of broiler PM_{10} emissions versus ambient temperature and scatter plot with regression. F-57
Figure F-49. Scatter plot of broiler $PM_{2.5}$ emissions versus ambient temperature and scatter plot with regression. F-58
Figure F-50. Scatter plot of broiler TSP emissions versus ambient temperature and scatter plot with regression. . F-59
Figure F-51. Scatter plot of broiler NH_3 emissions versus ambient relative humidity and scatter plot with regression. F-60
Figure F-52. Scatter plot of broiler H_2S emissions versus ambient relative humidity and scatter plot with regression. F-61
Figure F-53. Scatter plot of broiler PM_{10} emissions versus ambient relative humidity and scatter plot with regression. F-62
Figure F-54. Scatter plot of broiler $PM_{2.5}$ emissions versus ambient relative humidity and scatter plot with regression. F-63
Figure F-55. Scatter plot of broiler TSP emissions versus ambient relative humidity and scatter plot with regression. F-64
Figure F-56. Scatter plot of broiler NH_3 emissions versus litter age and scatter plot with regression..... F-65
Figure F-57. Scatter plot of broiler H_2S emissions versus litter age and scatter plot with regression. F-66
Figure F-58. Scatter plot of broiler PM_{10} emissions versus litter age and scatter plot with regression. F-67
Figure F-59. Scatter plot of broiler $PM_{2.5}$ emissions versus litter age and scatter plot with regression..... F-68
Figure F-60. Scatter plot of broiler TSP emissions versus litter age and scatter plot with regression..... F-69
Figure F-61. Scatter plot of broiler NH_3 emissions versus litter status (0-1, continuous) and scatter plot with regression. F-70
Figure F-62. Scatter plot of broiler H_2S emissions versus litter status (0-1, continuous) and scatter plot with regression. F-71
Figure F-63. Scatter plot of broiler PM_{10} emissions versus litter status (0-1, continuous) and scatter plot with regression..... F-72
Figure F-64. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-1, continuous) and scatter plot with regression..... F-73
Figure F-65. Scatter plot of broiler TSP emissions versus litter status (0-1, continuous) and scatter plot with regression. F-74
Figure F-66. Scatter plot of broiler NH_3 emissions versus litter status (0-3, continuous) and scatter plot with regression. F-75
Figure F-67. Scatter plot of broiler H_2S emissions versus litter status (0-3, continuous) and scatter plot with regression. F-76
Figure F-68. Scatter plot of broiler PM_{10} emissions versus litter status (0-3, continuous) and scatter plot with regression..... F-77
Figure F-69. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-3, continuous) and scatter plot with regression..... F-78
Figure F-70. Scatter plot of broiler TSP emissions versus litter status (0-3, continuous) and scatter plot with regression. F-79

Figure F-71. Scatter plot of broiler NH_3 emissions versus litter status (0-6, continuous) and scatter plot with regression. F-80
Figure F-72. Scatter plot of broiler H_2S emissions versus litter status (0-6, continuous) and scatter plot with regression. F-81
Figure F-73. Scatter plot of broiler PM_{10} emissions versus litter status (0-6, continuous) and scatter plot with regression..... F-82
Figure F-74. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-6, continuous) and scatter plot with regression..... F-83
Figure F-75. Scatter plot of broiler TSP emissions versus litter status (0-6, continuous) and scatter plot with regression. F-84
Figure F-76. Scatter plot of broiler NH_3 emissions versus litter status (0-6, empty between) and scatter plot with regression..... F-85
Figure F-77. Scatter plot of broiler H_2S emissions versus litter status (0-6, empty between) and scatter plot with regression..... F-86
Figure F-78. Scatter plot of broiler PM_{10} emissions versus litter status (0-6, empty between) and scatter plot with regression..... F-87
Figure F-79. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-6, empty between) and scatter plot with regression..... F-88
Figure F-80. Scatter plot of broiler TSP emissions versus litter status (0-6, empty between) and scatter plot with regression..... F-89
Figure F-81. Scatter plot of broiler NH_3 emissions versus solid contents of litter floor and scatter plot with regression. F-90
Figure F-82. Scatter plot of broiler H_2S emissions versus solid contents of litter floor and scatter plot with regression. F-91
Figure F-83. Scatter plot of broiler PM_{10} emissions versus solid contents of litter floor and scatter plot with regression. F-92
Figure F-84. Scatter plot of broiler $PM_{2.5}$ emissions versus solid contents of litter floor and scatter plot with regression. F-93
Figure F-85. Scatter plot of broiler TSP emissions versus solid contents of litter floor and scatter plot with regression. F-94
Figure F-86. Scatter plot of broiler NH_3 emissions versus TAN content of litter floor and scatter plot with regression. F-95
Figure F-87. Scatter plot of broiler H_2S emissions versus TAN content of litter floor and scatter plot with regression. F-96
Figure F-88. Scatter plot of broiler PM_{10} emissions versus TAN content of litter floor and scatter plot with regression. F-97
Figure F-89. Scatter plot of broiler $PM_{2.5}$ emissions versus TAN content of litter floor and scatter plot with regression. F-98
Figure F-90. Scatter plot of broiler TSP emissions versus TAN content of litter floor and scatter plot with regression. F-99
Figure F-91. Scatter plot of broiler NH_3 emissions versus TKN content of new litter (wet basis) and scatter plot with regression..... F-100
Figure F-92. Scatter plot of broiler H_2S emissions versus TKN content of new litter (wet basis) and scatter plot with regression..... F-101
Figure F-93. Scatter plot of broiler NH_3 emissions versus TKN content of new litter (dry basis) and scatter plot with regression..... F-102
Figure F-94. Scatter plot of broiler H_2S emissions versus TKN content of new litter (dry basis) and scatter plot with regression..... F-103
Figure F-95. Scatter plot of broiler NH_3 emissions versus solids content of new litter and scatter plot with regression. F-104
Figure F-96. Scatter plot of broiler H_2S emissions versus solids content of new litter and scatter plot with regression. F-105
Figure F-97. Scatter plot of broiler NH_3 emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression. F-106
Figure F-98. Scatter plot of broiler H_2S emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression. F-107

Figure F-99. Scatter plot of broiler $PM_{2.5}$ emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression. F-108
Figure F-100. Scatter plot of broiler TSP emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression. F-109
Figure F-101. Scatter plot of broiler NH_3 emissions versus decaked litter TKN content (dry weight basis)and scatter plot with regression. F-110
Figure F-102. Scatter plot of broiler H_2S emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression. F-111
Figure F-103. Scatter plot of broiler $PM_{2.5}$ emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression. F-112
Figure F-104. Scatter plot of broiler TSP emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression. F-113
Figure F-105. Scatter plot of broiler NH_3 emissions versus decaked litter solids content and scatter plot with regression. F-114
Figure F-106. Scatter plot of broiler H_2S emissions versus inventory and scatter plot with regression. F-115
Figure F-107. Scatter plot of broiler NH_3 emissions versus loadout litter TKN content (wet weight basis) and scatter plot with regression. F-116
Figure F-108. Scatter plot of broiler H_2S emissions versus loadout litter TKN content (wet weight basis) and scatter plot with regression. F-117
Figure F-109. Scatter plot of broiler NH_3 emissions versus loadout litter TKN content (dry weight basis) and scatter plot with regression. F-118
Figure F-110. Scatter plot of broiler H_2S emissions versus loadout litter TKN content (dry weight basis) and scatter plot with regression. F-119
Figure F-111. Scatter plot of broiler NH_3 emissions versus loadout litter solids content and scatter plot with regression. F-120
Figure F-112. Scatter plot of broiler H_2S emissions versus loadout litter solids content and scatter plot with regression. F-121

To further explore the trends between the predictor variables and emissions, and determine whether the parameter should be included in developing an EEM, EPA prepared scatter plots of emissions versus the process, environmental, and manure parameters and conducted least squares regression analysis to assess the influence of each variable on emissions. For the regressions, EPA classified the linear relationships based on the ranges in Table F-1.

Table F-1: Relationship classification based on R^2 values.

Range of R^2	Relationship strength
$R^2 = 0$	none
$0 < R^2 \leq 0.2$	slight or weak
$0.2 < R^2 \leq 0.4$	modest
$0.4 < R^2 \leq 0.6$	moderate
$0.6 < R^2 \leq 0.8$	moderately strong
$R^2 > 0.8$	strong

For broilers, litter age can affect emission rates in the house. To account for this, EPA tested five parameters to account for the age of the litter:

- Litter age: continuous variable that indicates the number of days since litter removal.
- Litter Status (0-1, continuous between flocks): discrete variable to indicate whether the flock was the first flock raised on fresh litter (0) or if it was not fresh litter (1). The value is held during transition periods between flocks.
- Litter Status (0-3, continuous between flocks): discrete variable to indicate the number of flocks since litter removal, where 0 indicates the first flock raised on fresh litter, up to 3 to indicate four or more flocks had been raised on the litter. The value is held during transition periods between flocks.
- Litter status (0-6, continuous between flocks): discrete variable to indicate the number of flocks since litter removal, where 0 indicates the first flock raised on fresh litter and up to 6 to indicate the up to seven (7) flock raised on the litter before a full clean out. The value is held during transition periods between flocks.
- Litter Status (0-6; empty between flocks): discrete variable to indicate the number of flocks since litter removal, where 0 indicates the first flock raised on fresh litter and up to 6 to indicate the up to seven (7) flock raised on the litter before a full clean out. The value set to "null" during transition periods between flocks.

Table F-2: Summary of high rise house R^2 values.

Pollutant	Parameter	R^2	Strength	Figure
NH_3	Inventory	0.0399	Slight or weak	F-1
H_2S	Inventory	0.1271	Slight or weak	F-2
PM_{10}	Inventory	0.0775	Slight or weak	F-3
$PM_{2.5}$	Inventory	0.0691	Slight or weak	F-4
TSP	Inventory	0.1179	Slight or weak	F-5
NH_3	Bird weight	0.7282	moderately strong	F-6
H_2S	Bird weight	0.6921	moderately strong	F-7
PM_{10}	Bird weight	0.7058	moderately strong	F-8
$PM_{2.5}$	Bird weight	0.7715	moderately strong	F-9
TSP	Bird weight	0.6364	moderately strong	F-10
NH_3	Live animal weight	0.5844	moderate	F-11
H_2S	Live animal weight	0.7242	moderately strong	F-12
PM_{10}	Live animal weight	0.7467	moderately strong	F-13
$PM_{2.5}$	Live animal weight	0.8122	strong	F-14
TSP	Live animal weight	0.7241	moderately strong	F-15
NH_3	Flock Age (0 between flocks)	0.4989	moderate	F-16
H_2S	Flock Age (0 between flocks)	0.6781	moderately strong	F-17
PM_{10}	Flock Age (0 between flocks)	0.7343	moderately strong	F-18
$PM_{2.5}$	Flock Age (0 between flocks)	0.7246	moderately strong	F-19
TSP	Flock Age (0 between flocks)	0.7070	moderately strong	F-20
NH_3	Flock age (continuous between flocks)	0.1209	Slight or weak	F-21
H_2S	Flock age (continuous between flocks)	0.0757	Slight or weak	F-22
PM_{10}	Flock age (continuous between flocks)	0.1924	Slight or weak	F-23
$PM_{2.5}$	Flock age (continuous between flocks)	0.1411	Slight or weak	F-24
TSP	Flock age (continuous between flocks)	0.0778	Slight or weak	F-25
NH_3	Bird age	0.6886	moderately strong	F-26
H_2S	Bird age	0.6656	moderately strong	F-27
PM_{10}	Bird age	0.7150	moderately strong	F-28
$PM_{2.5}$	Bird age	0.7337	moderately strong	F-29
TSP	Bird age	0.6632	moderately strong	F-30
NH_3	Exhaust temperature	0.0081	Slight or weak	F-31
H_2S	Exhaust temperature	0.0000	Slight or weak	F-32
PM_{10}	Exhaust temperature	0.0007	Slight or weak	F-33
$PM_{2.5}$	Exhaust temperature	0.0084	Slight or weak	F-34
TSP	Exhaust temperature	0.0111	Slight or weak	F-35
NH_3	House relative humidity	0.0733	Slight or weak	F-36
H_2S	House relative humidity	0.0124	Slight or weak	F-37
PM_{10}	House relative humidity	0.0012	Slight or weak	F-38
$PM_{2.5}$	House relative humidity	0.0628	Slight or weak	F-39
TSP	House relative humidity	0.0023	Slight or weak	F-40
NH_3	Airflow	0.4285	moderate	F-41
H_2S	Airflow	0.3537	modest	F-42
PM_{10}	Airflow	0.4568	moderate	F-43
$PM_{2.5}$	Airflow	0.5757	moderate	F-44
TSP	Airflow	0.2667	modest	F-45
NH_3	Ambient temperature	0.0131	Slight or weak	F-46

Pollutant	Parameter	R^2	Strength	Figure
H_2S	Ambient temperature	0.0105	Slight or weak	F-47
PM_{10}	Ambient temperature	0.0411	Slight or weak	F-48
$PM_{2.5}$	Ambient temperature	0.0526	Slight or weak	F-49
TSP	Ambient temperature	0.0059	Slight or weak	F-50
NH_3	Ambient relative humidity	0.0120	Slight or weak	F-51
H_2S	Ambient relative humidity	0.0000	Slight or weak	F-52
PM_{10}	Ambient relative humidity	0.0092	Slight or weak	F-53
$PM_{2.5}$	Ambient relative humidity	3F-05	Slight or weak	F-54
TSP	Ambient relative humidity	0.0139	Slight or weak	F-55
NH_3	Litter age	0.0466	Slight or weak	F-56
H_2S	Litter age	0.0266	Slight or weak	F-57
PM_{10}	Litter age	0.0262	Slight or weak	F-58
$PM_{2.5}$	Litter age	0.0227	Slight or weak	F-59
TSP	Litter age	0.0131	Slight or weak	F-60
NH_3	Litter Status (0-1, continuous)	0.0031	Slight or weak	F-61
H_2S	Litter Status (0-1, continuous)	0.0005	Slight or weak	F-62
PM_{10}	Litter Status (0-1, continuous)	0.0002	Slight or weak	F-63
$PM_{2.5}$	Litter Status (0-1, continuous)	0.0132	Slight or weak	F-64
TSP	Litter Status (0-1, continuous)	0.001	Slight or weak	F-65
NH_3	Litter Status (0-3, continuous)	0.0167	Slight or weak	F-66
H_2S	Litter Status (0-3, continuous)	0.0100	Slight or weak	F-67
PM_{10}	Litter Status (0-3, continuous)	0.0105	Slight or weak	F-68
$PM_{2.5}$	Litter Status (0-3, continuous)	0.0253	Slight or weak	F-69
TSP	Litter Status (0-3, continuous)	0.0047	Slight or weak	F-70
NH_3	Litter status (0-6, continuous between flocks)	0.0203	Slight or weak	F-71
H_2S	Litter status (0-6, continuous between flocks)	0.0145	Slight or weak	F-72
PM_{10}	Litter status (0-6, continuous between flocks)	0.0089	Slight or weak	F-73
$PM_{2.5}$	Litter status (0-6, continuous between flocks)	0.0123	Slight or weak	F-74
TSP	Litter status (0-6, continuous between flocks)	0.0055	Slight or weak	F-75
NH_3	Litter Status (0-6; empty between flocks)	0.0379	Slight or weak	F-76
H_2S	Litter Status (0-6; empty between flocks)	0.0285	Slight or weak	F-77
PM_{10}	Litter Status (0-6; empty between flocks)	0.0181	Slight or weak	F-78
$PM_{2.5}$	Litter Status (0-6; empty between flocks)	0.0196	Slight or weak	F-79
TSP	Litter Status (0-6; empty between flocks)	0.0081	Slight or weak	F-80
NH_3	Solid Content Litter Floor	0.6680	moderately strong	F-81
H_2S	Solid Content Litter Floor	0.6031	moderately strong	F-82
PM_{10}	Solid Content Litter Floor	0.1038	Slight or weak	F-83
$PM_{2.5}$	Solid Content Litter Floor	0.6169	moderately strong	F-84
TSP	Solid Content Litter Floor	a		F-85
NH_3	TAN Litter floor	0.7529	moderately strong	F-86
H_2S	TAN Litter floor	0.5696	moderate	F-87
PM_{10}	TAN Litter floor	0.1387	Slight or weak	F-88
$PM_{2.5}$	TAN Litter floor	0.7906	moderately strong	F-89
TSP	TAN Litter floor	a		F-90
NH_3	TKN Content, new litter (wet basis)	0.0486	Slight or weak	F-91
H_2S	TKN Content, new litter (wet basis)	0.3807	modest	F-92
PM_{10}	TKN Content, new litter (wet basis)	b		
$PM_{2.5}$	TKN Content, new litter (wet basis)	b		

Pollutant	Parameter	R^2	Strength	Figure
TSP	TKN Content, new litter (wet basis)	b		
NH_3	TKN Content, new litter, (dry basis)	a		F-93
H_2S	TKN Content, new litter, (dry basis)	a		F-94
PM_{10}	TKN Content, new litter, (dry basis)	b		
$PM_{2.5}$	TKN Content, new litter, (dry basis)	b		
TSP	TKN Content, new litter, (dry basis)	b		
NH_3	Solids content , new litter	0.9236	strong	F-95
H_2S	Solids content , new litter	0.3331	modest	F-96
PM_{10}	Solids content , new litter	b		
$PM_{2.5}$	Solids content , new litter	b		
TSP	Solids content , new litter	b		
NH_3	TKN, decaked litter (wet weight basis)	0.0718	Slight or weak	F-97
H_2S	TKN, decaked litter (wet weight basis)	0.2384	modest	F-98
PM_{10}	TKN, decaked litter (wet weight basis)	b		
$PM_{2.5}$	TKN, decaked litter (wet weight basis)	a		F-99
TSP	TKN, decaked litter (wet weight basis)	a		F-100
NH_3	TKN content, decaked litter (dry weight basis)	0.3342	modest	F-101
H_2S	TKN content, decaked litter (dry weight basis)	0.1887	Slight or weak	F-102
PM_{10}	TKN content, decaked litter (dry weight basis)	b		
$PM_{2.5}$	TKN content, decaked litter (dry weight basis)	a		F-103
TSP	TKN content, decaked litter (dry weight basis)	a		F-104
NH_3	Solids Content, decaked litter	0.3014	modest	F-105
H_2S	Solids Content, decaked litter	0.4653	moderate	F-106
PM_{10}	Solids Content, decaked litter	b		
$PM_{2.5}$	Solids Content, decaked litter	b		
TSP	Solids Content, decaked litter	b		
NH_3	TKN, loadout litter (wet weight basis)	0.3979	modest	F-107
H_2S	TKN, loadout litter (wet weight basis)	0.3621	modest	F-108
PM_{10}	TKN, loadout litter (wet weight basis)	b		
$PM_{2.5}$	TKN, loadout litter (wet weight basis)	b		
TSP	TKN, loadout litter (wet weight basis)	b		
NH_3	TKN content, loadout litter (dry weight basis)	a		F-109
H_2S	TKN content, loadout litter (dry weight basis)	a		F-110
PM_{10}	TKN content, loadout litter (dry weight basis)	b		
$PM_{2.5}$	TKN content, loadout litter (dry weight basis)	b		
TSP	TKN content, loadout litter (dry weight basis)	b		
NH_3	Solids content, loadout litter	0.3348	modest	F-111
H_2S	Solids content, loadout litter	0.0454	Slight or weak	F-112
PM_{10}	Solids content, loadout litter	b		
$PM_{2.5}$	Solids content, loadout litter	b		
TSP	Solids content, loadout litter	b		

[a] EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

[b] No observations were collected that coincided with emission observations.

Inventory

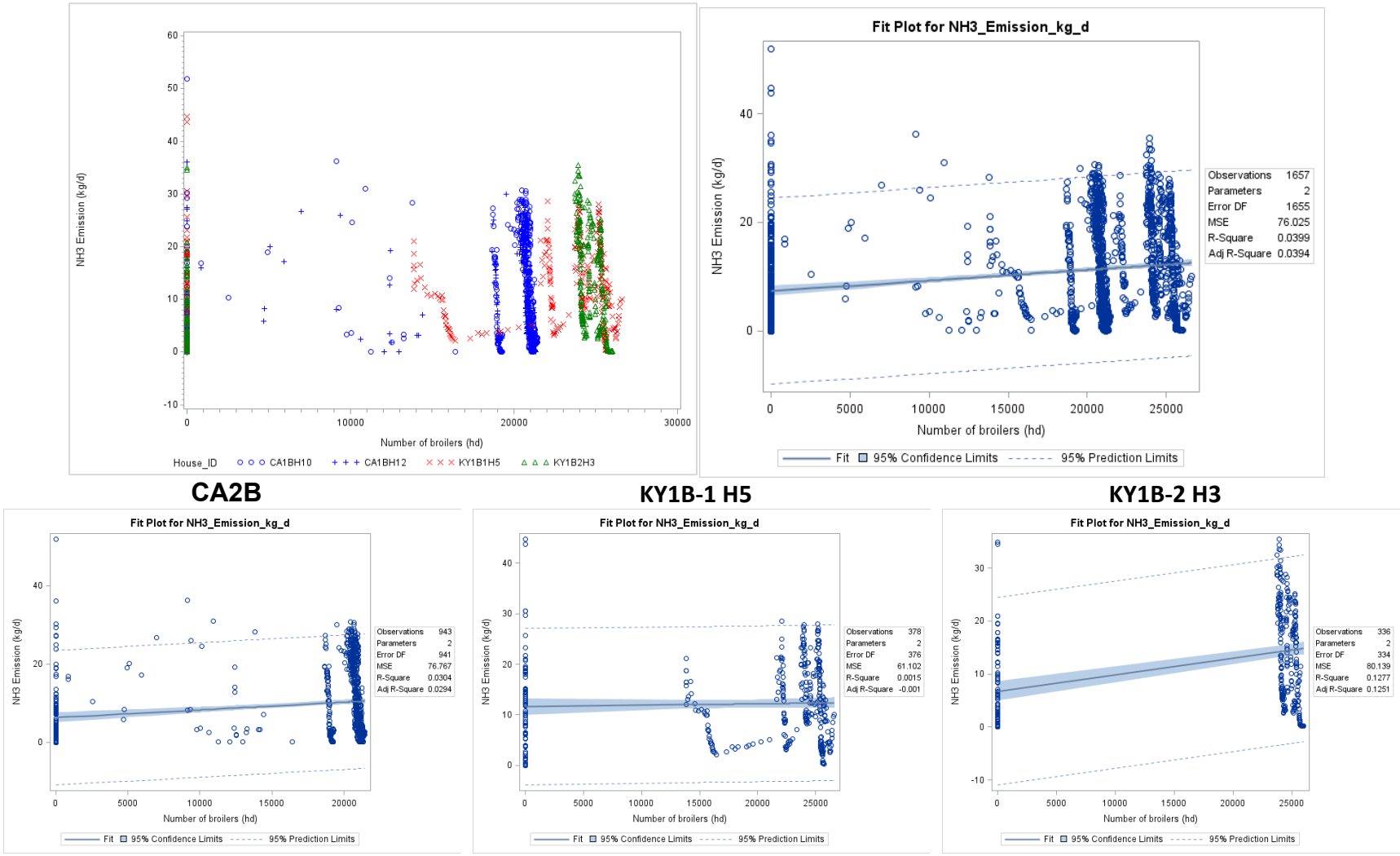
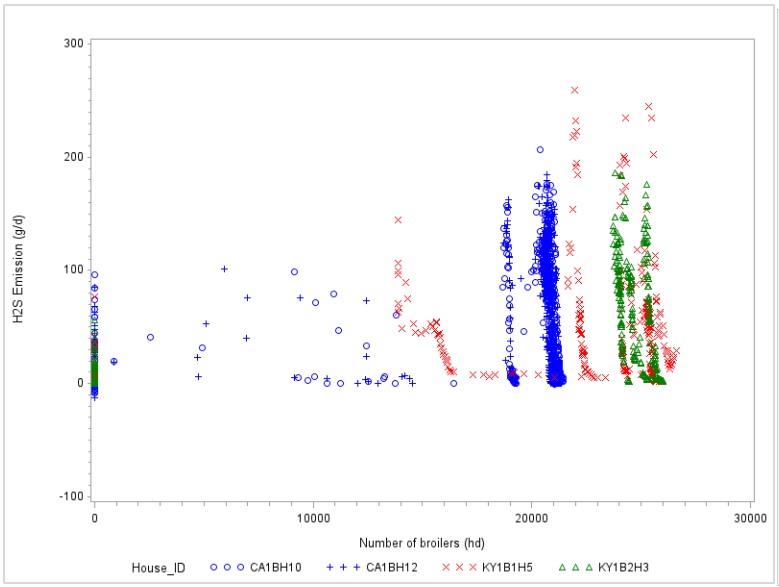
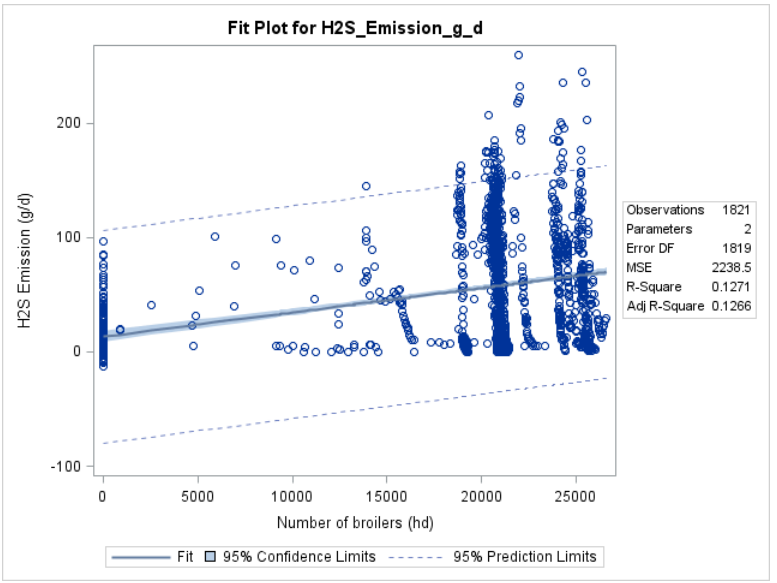
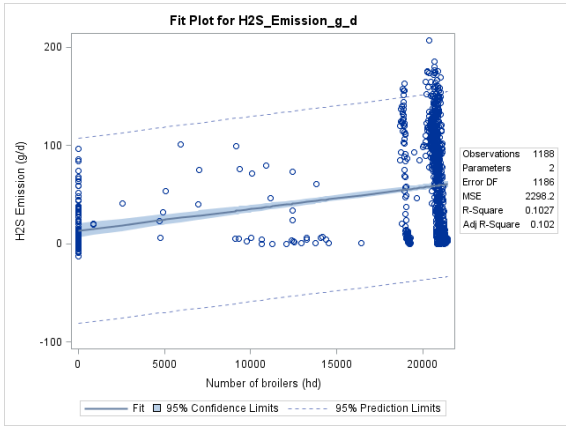


Figure F-1. Scatter plot of broiler NH_3 emissions versus inventory and scatter plot with regression.

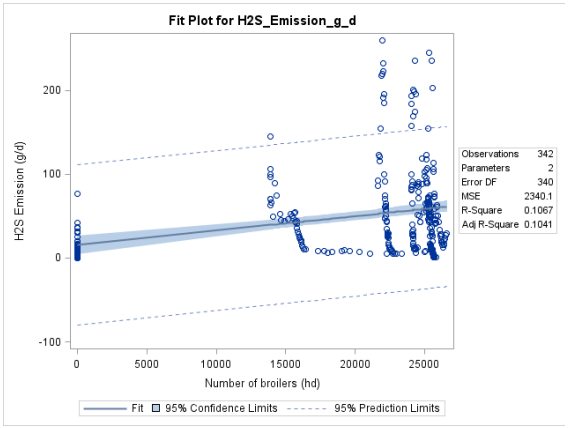




CA2B



KY1B-1 H5



KY1B-2 H3

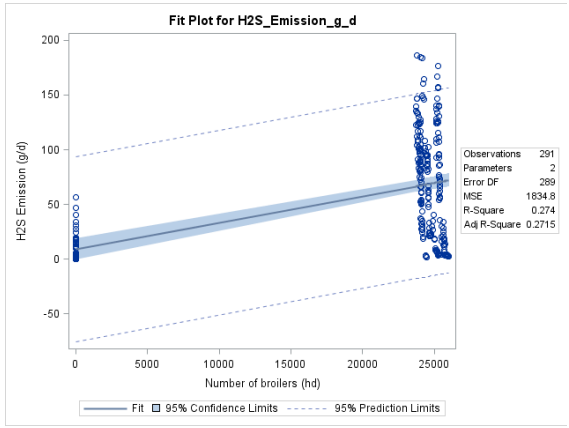
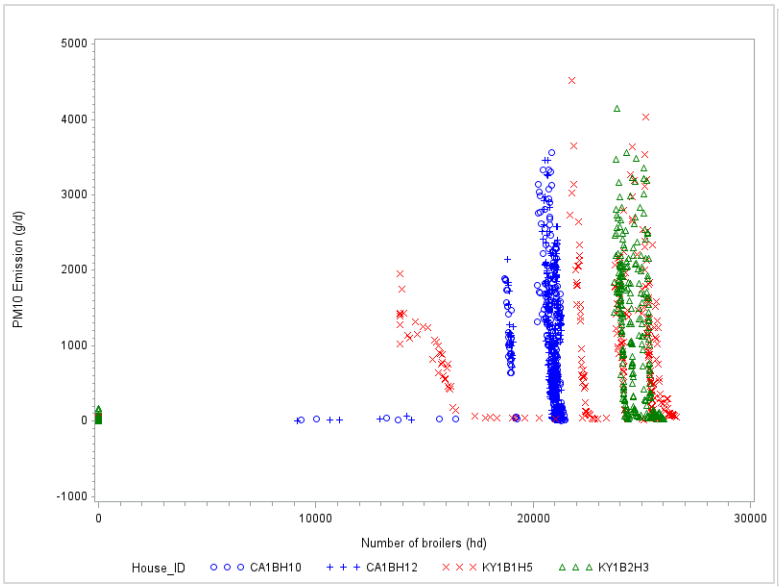
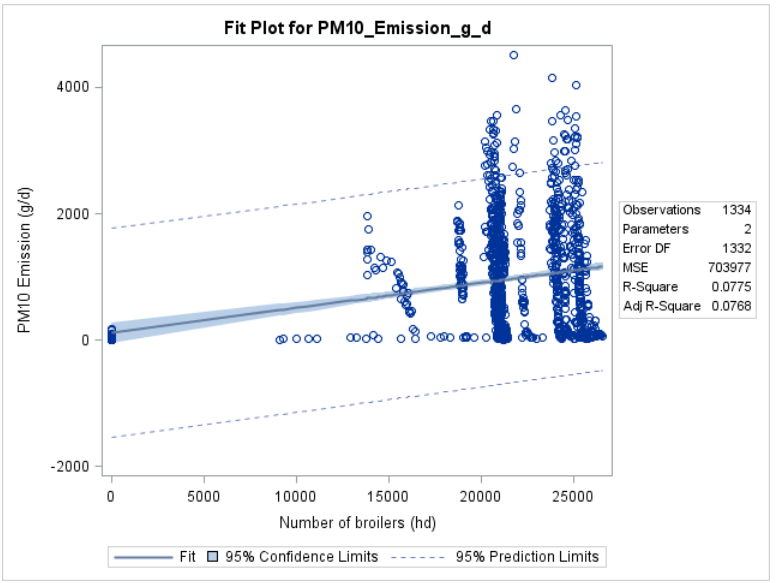


Figure F-2. Scatter plot of broiler H_2S emissions versus inventory and scatter plot with regression.





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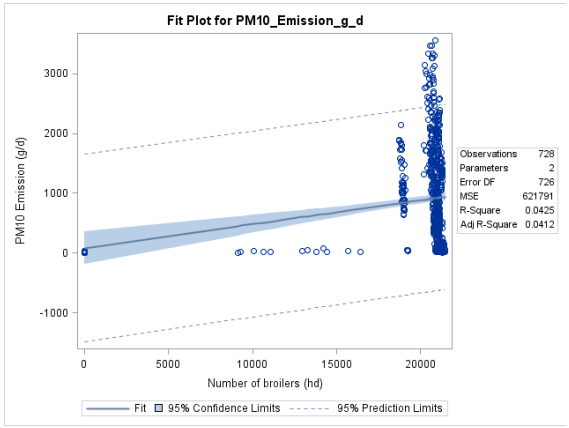
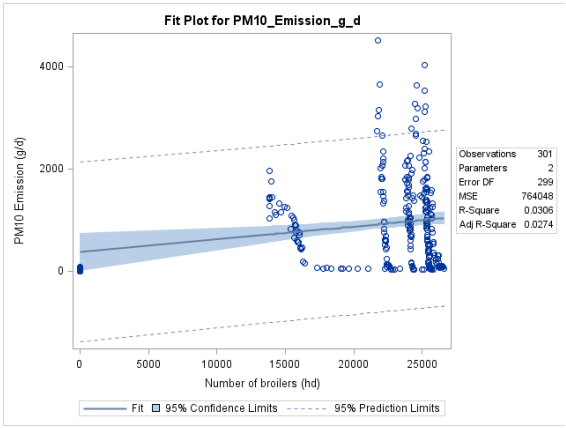


KY1B-1 H5



KY1B-2 H3

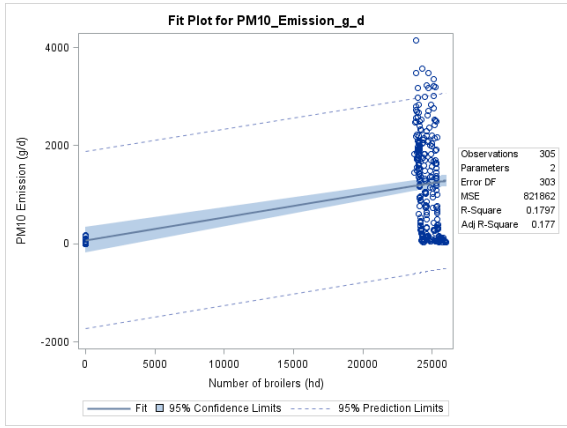


Figure F-3. Scatter plot of broiler PM_{10} emissions versus inventory and scatter plot with regression.

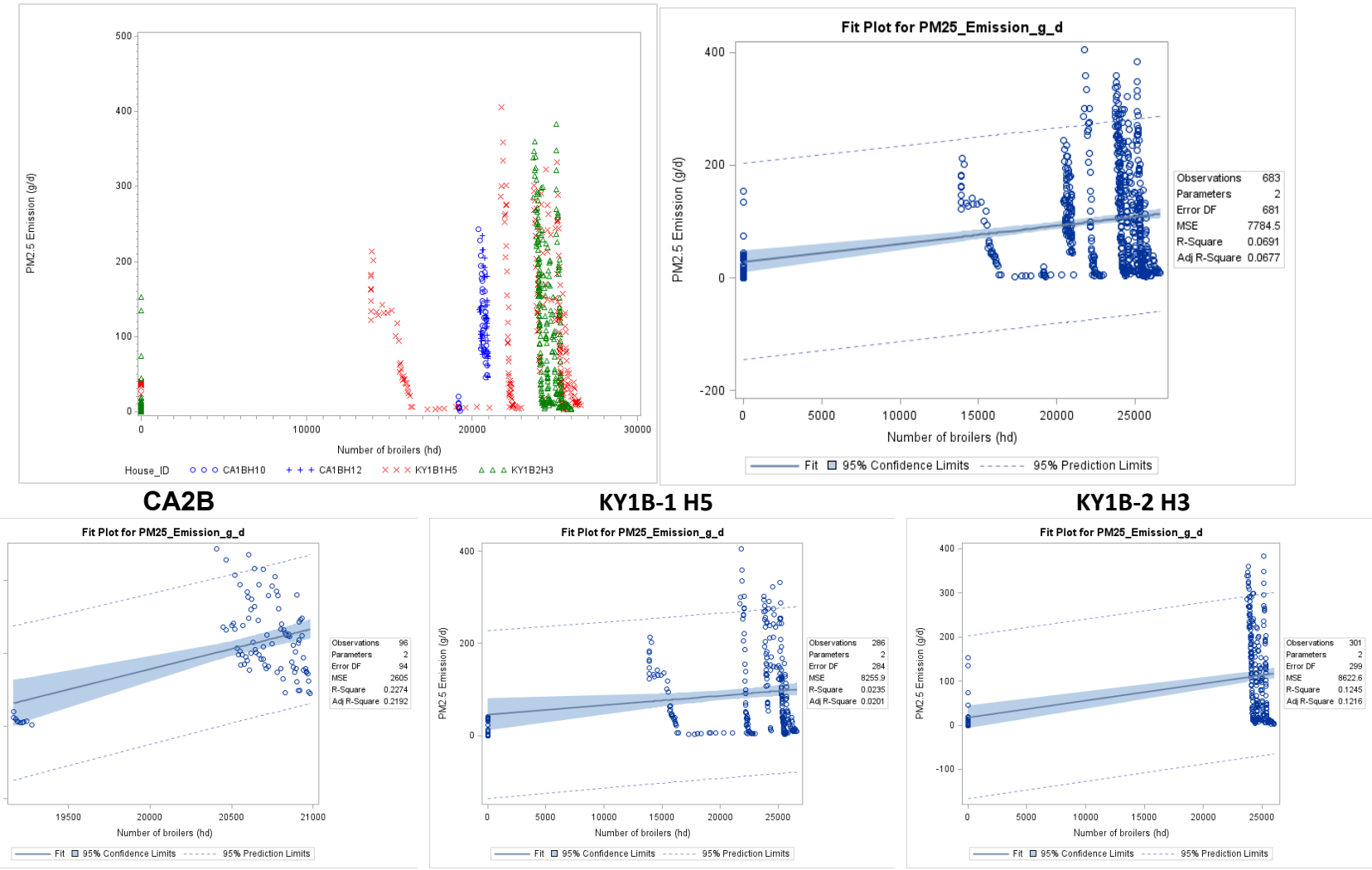


Figure F-4. Scatter plot of broiler $PM_{2.5}$ emissions versus inventory and scatter plot with regression.

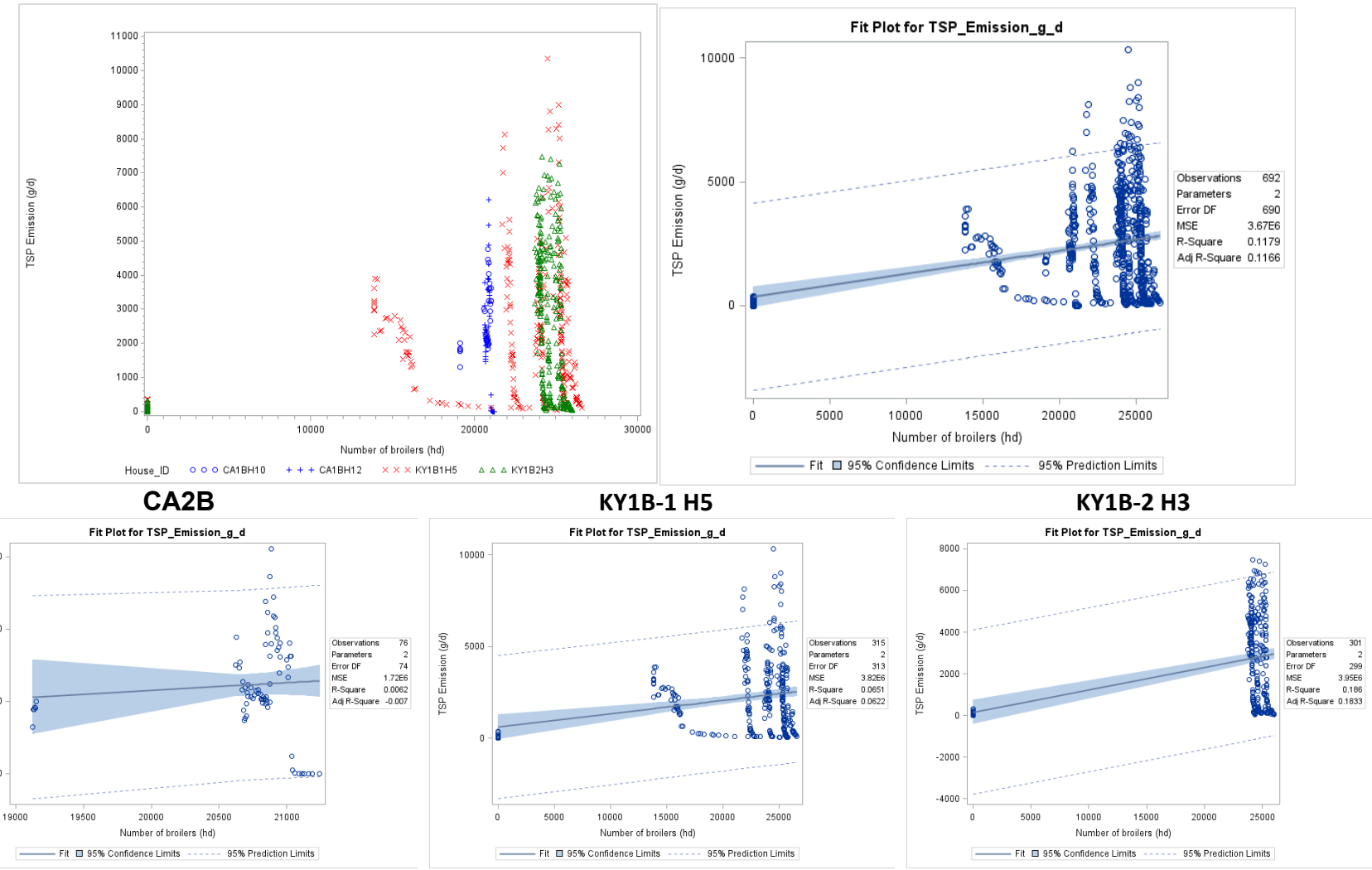
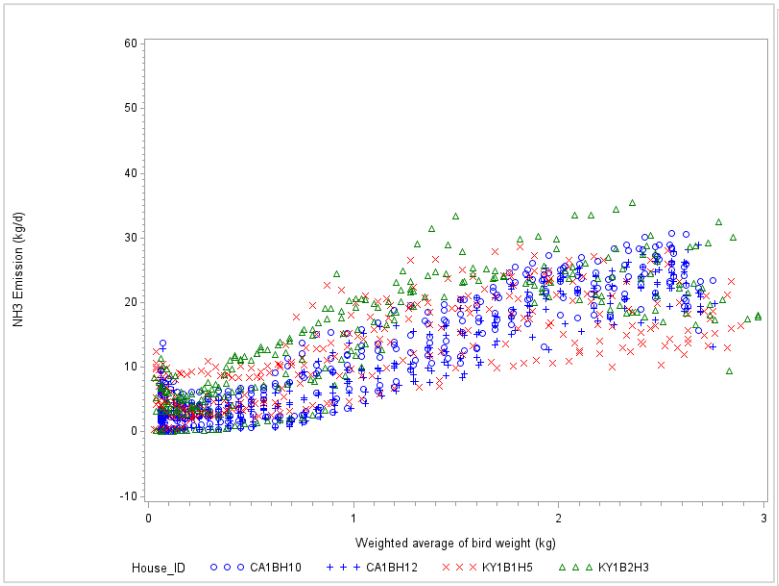
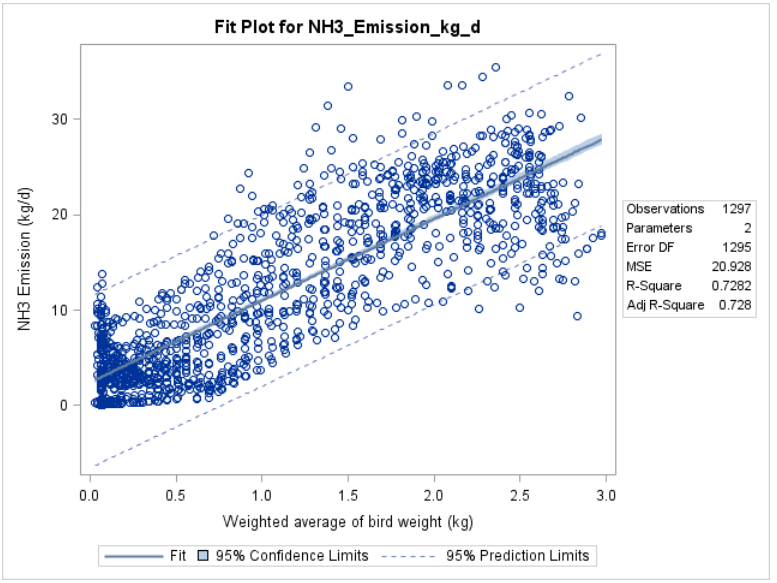


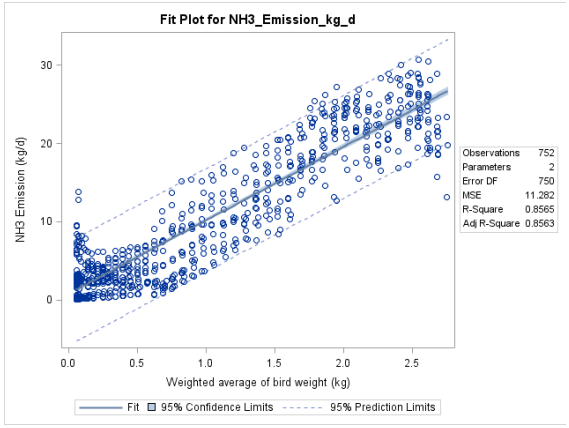
Figure F-5. Scatter plot of broiler TSP emissions versus inventory and scatter plot with regression.

Average Bird Weight

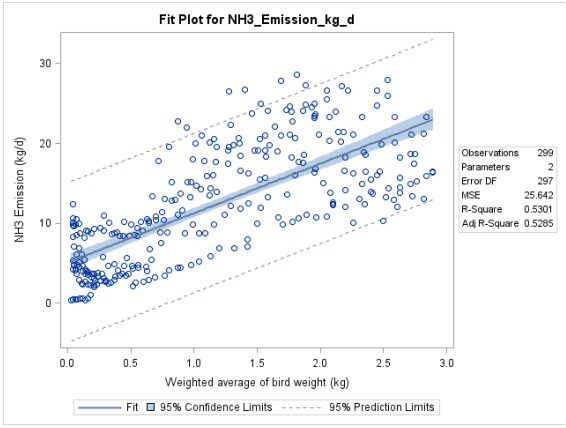




CA2B



KY1B-1 H5



KY1B-2 H3

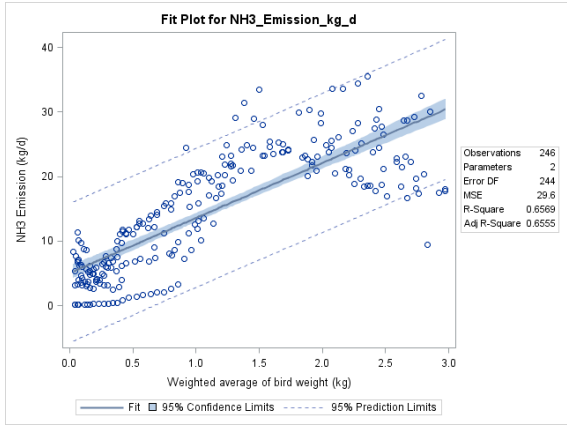
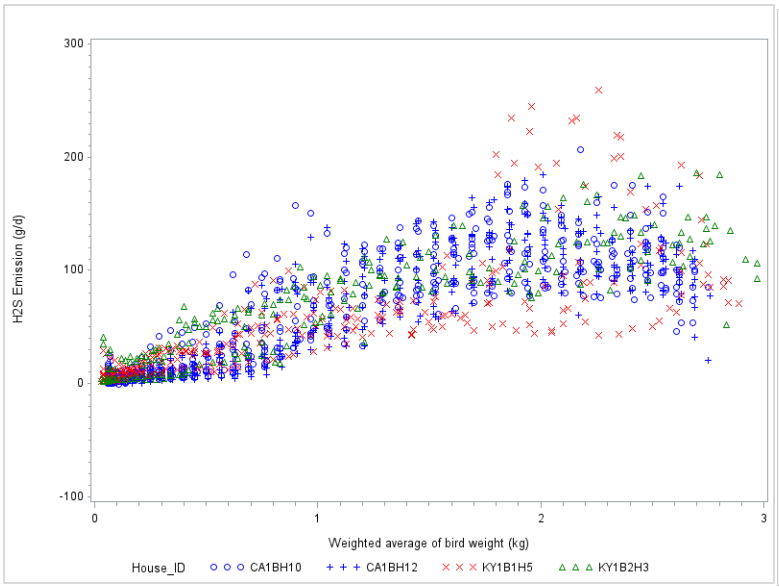
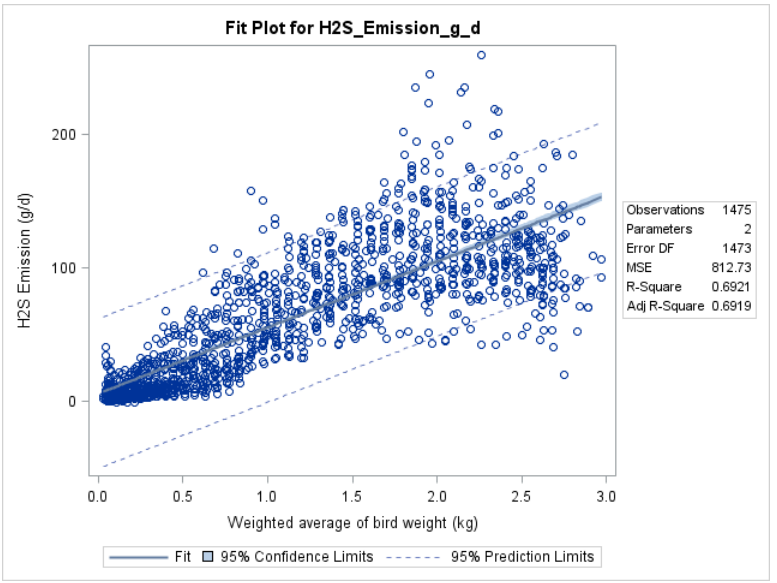


Figure F-6. Scatter plot of broiler NH_3 emissions versus average bird weight and scatter plot with regression.





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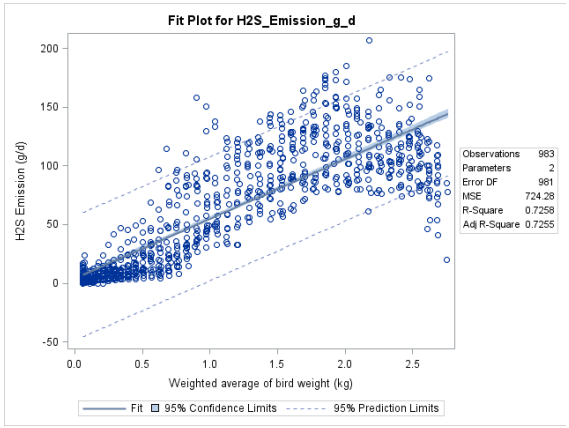
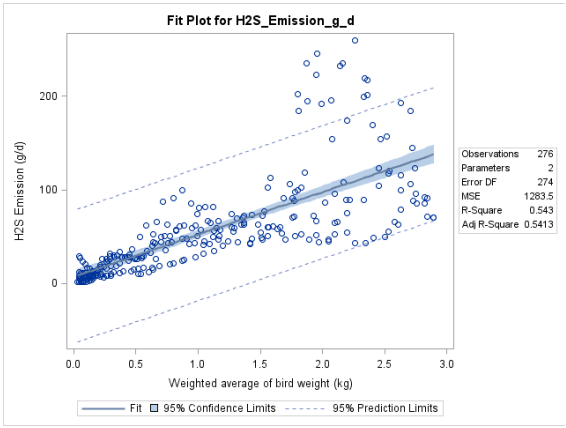


KY1B-1 H5



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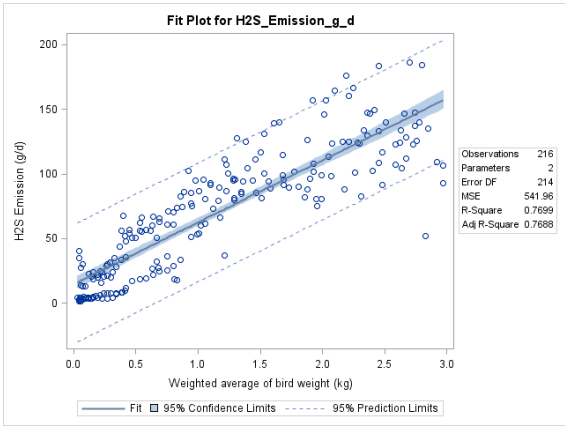


Figure F-7. Scatter plot of broiler H_2S emissions versus average bird weight and scatter plot with regression.

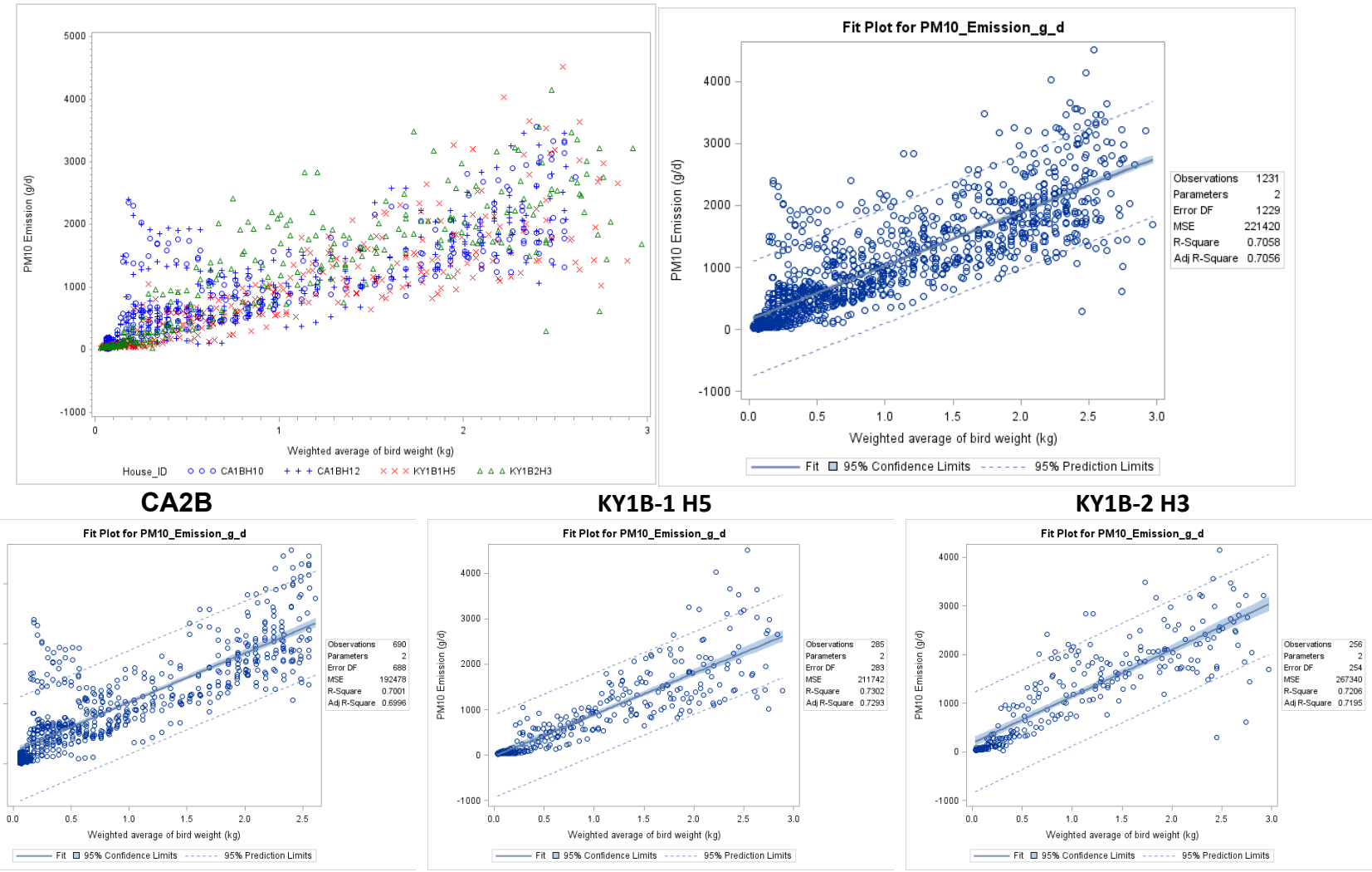
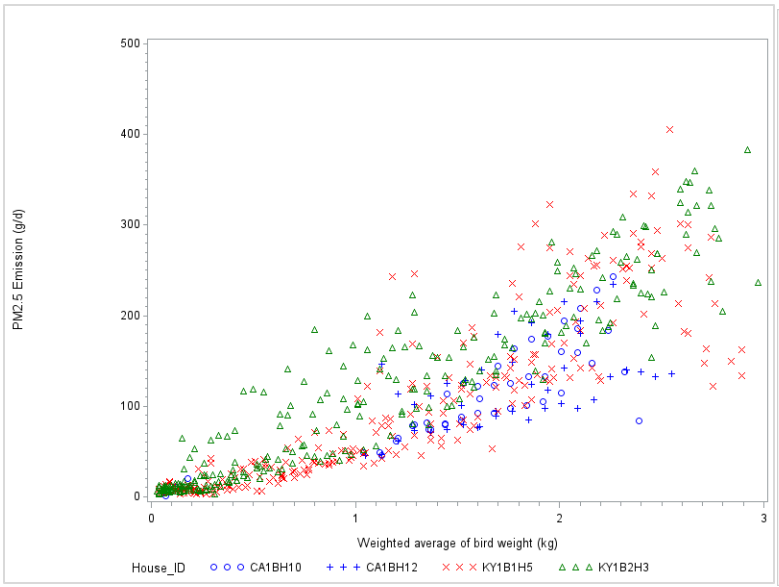
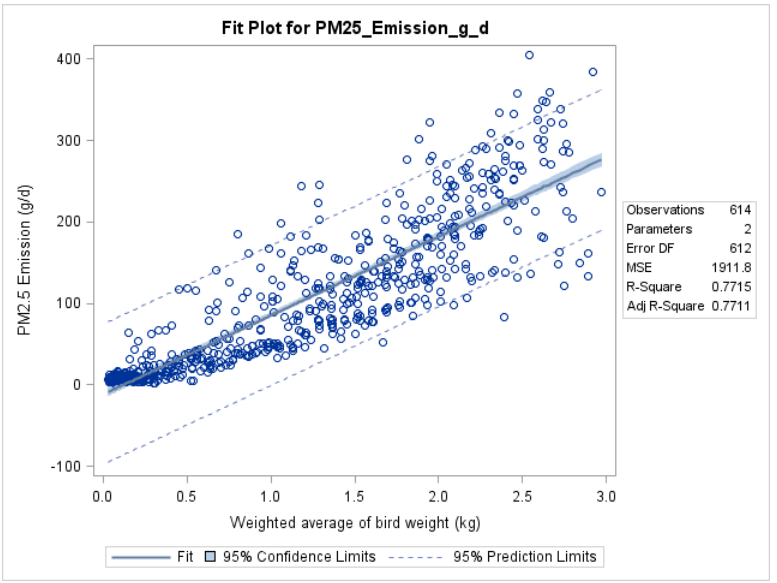


Figure F-8. Scatter plot of broiler PM_{10} emissions versus average bird weight and scatter plot with regression.





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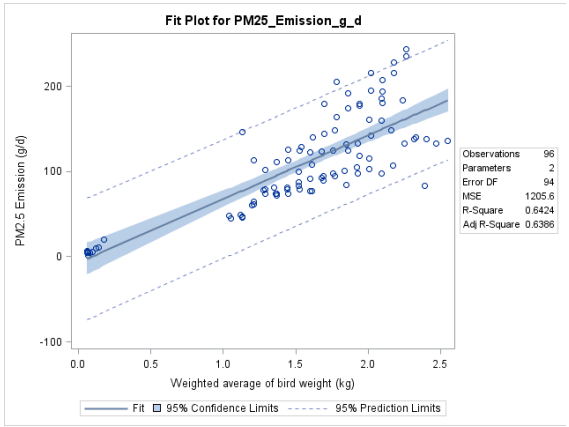
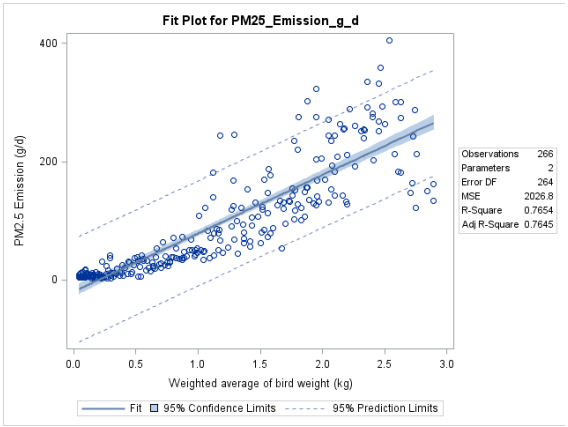


KY1B-1 H5



KY1B-2 H3

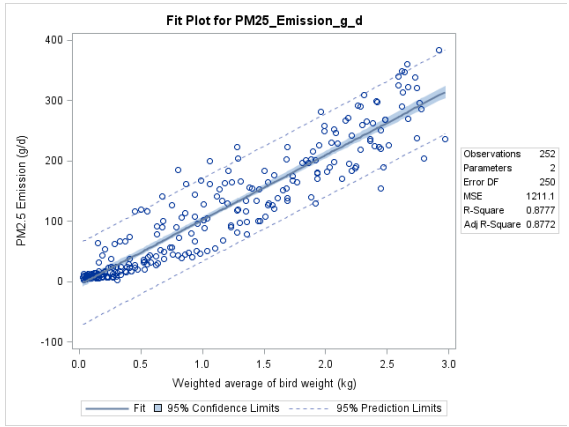
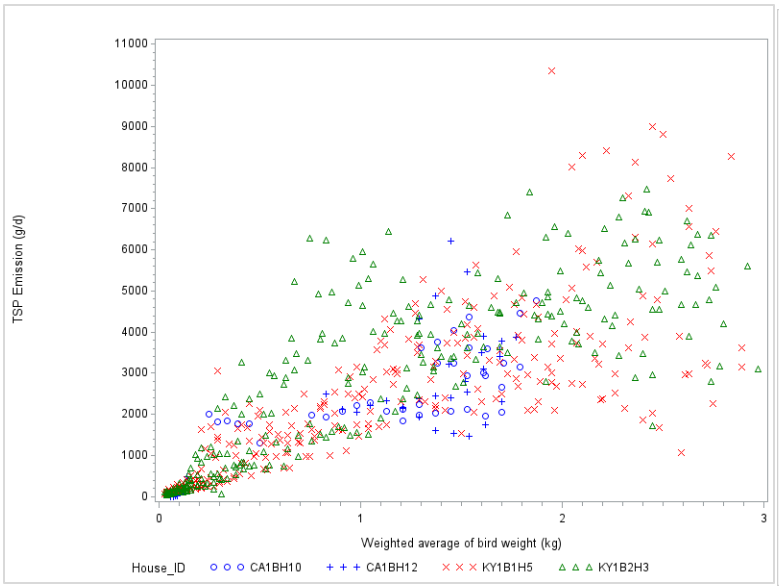
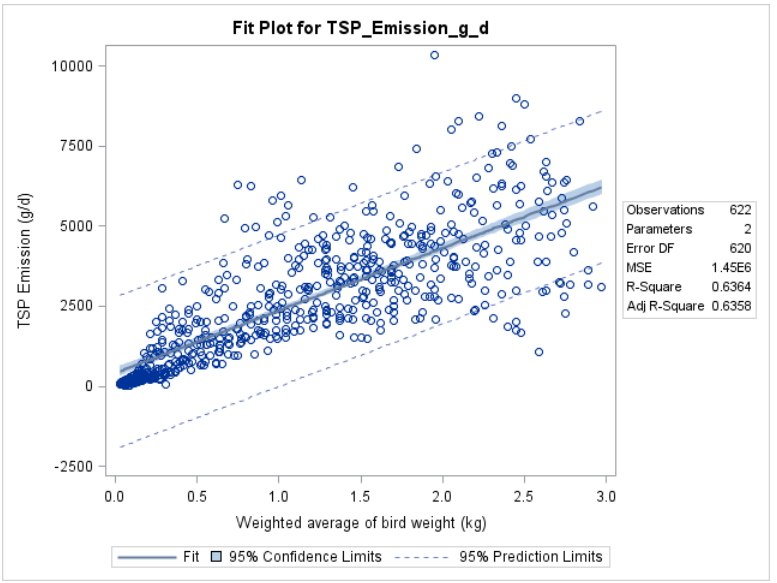


Figure F-9. Scatter plot of broiler $PM_{2.5}$ emissions versus average bird weight and scatter plot with regression.





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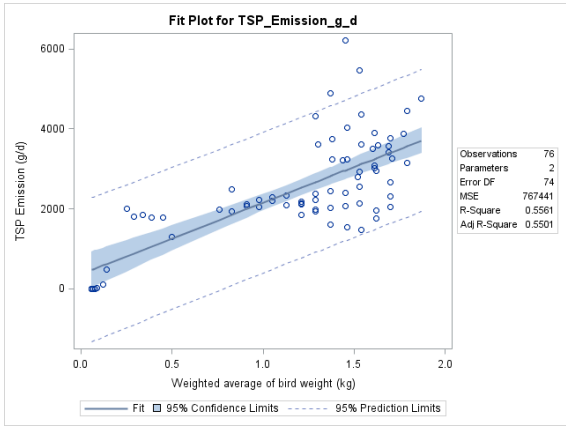
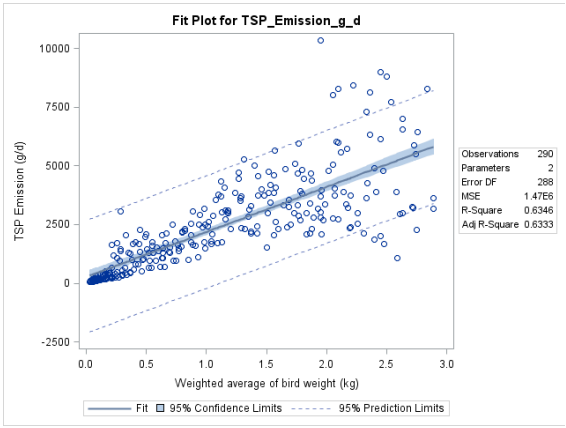


KY1B-1 H5



KY1B-2 H3

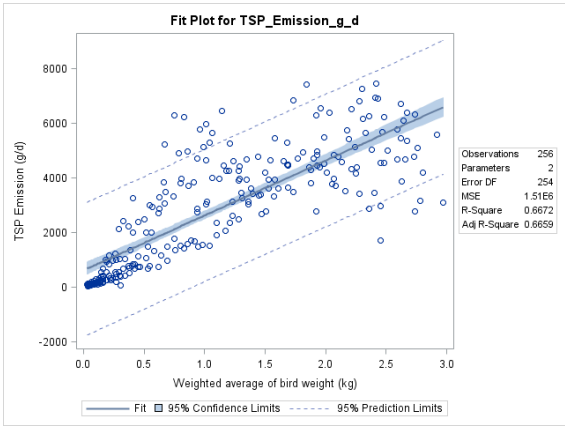


Figure F-10. Scatter plot of broiler TSP emissions versus average bird weight and scatter plot with regression.

Live Animal Weight

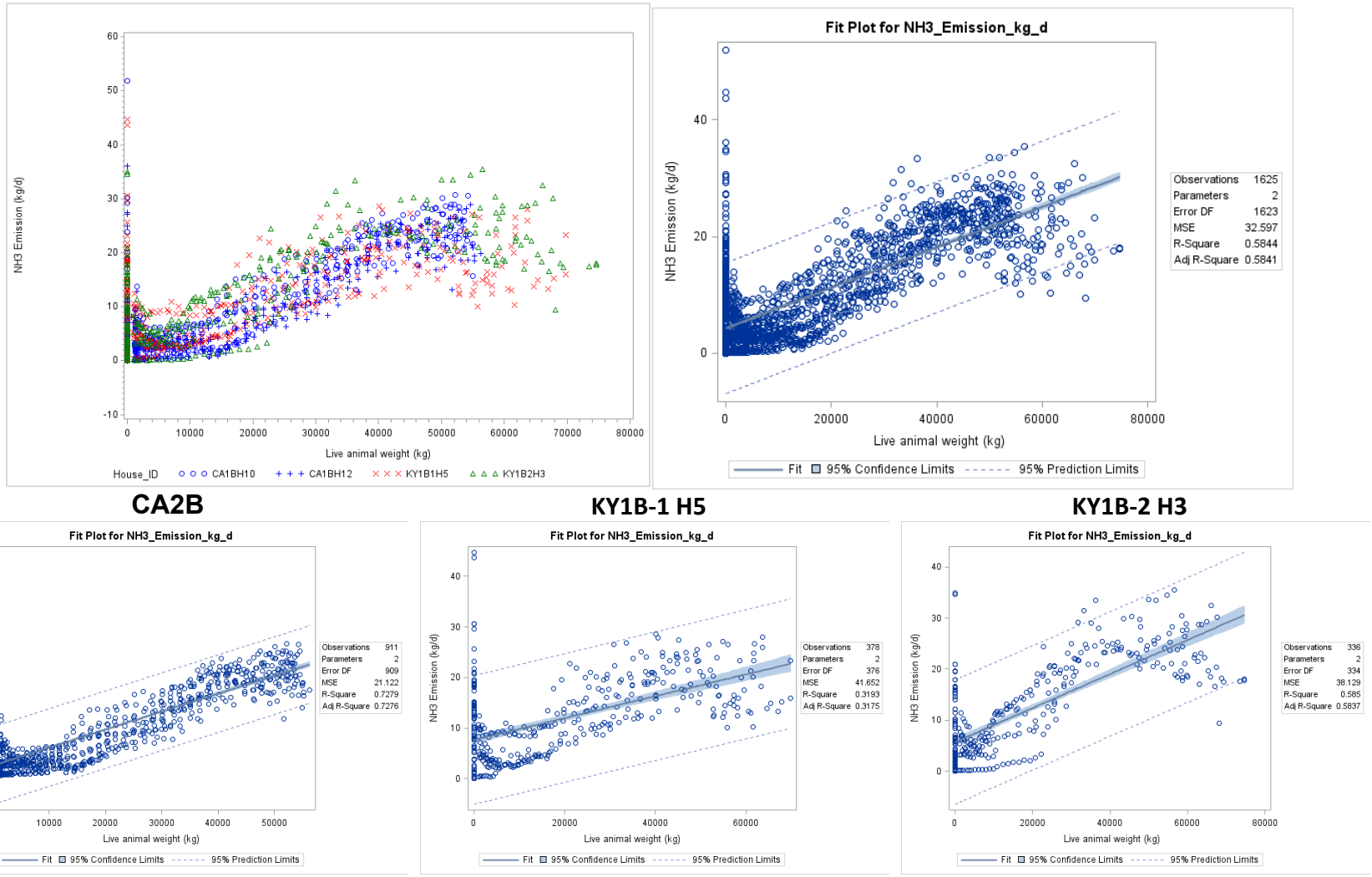
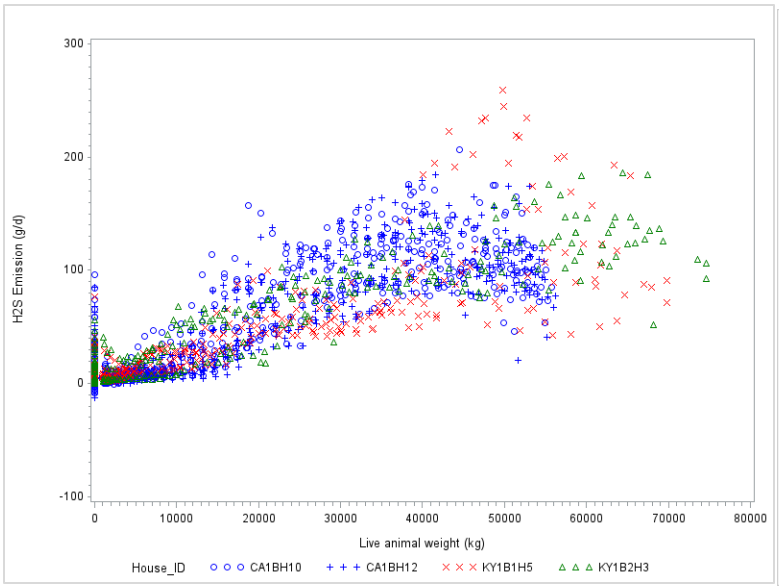
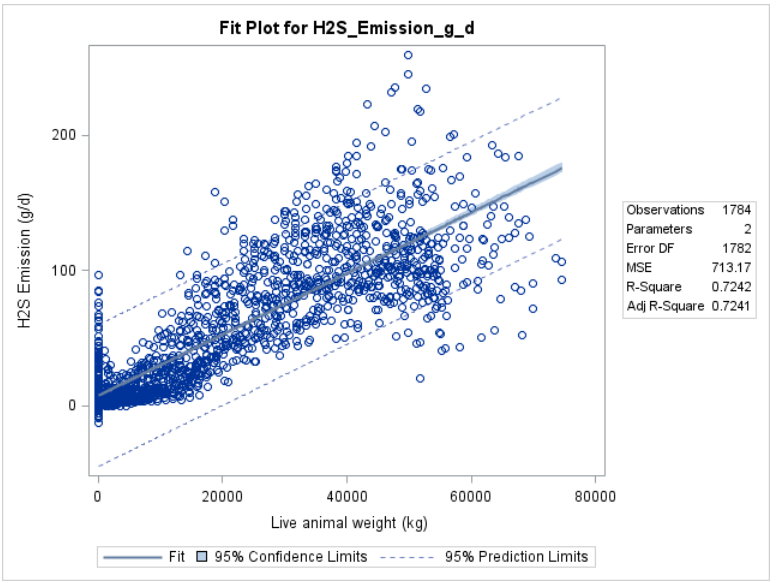
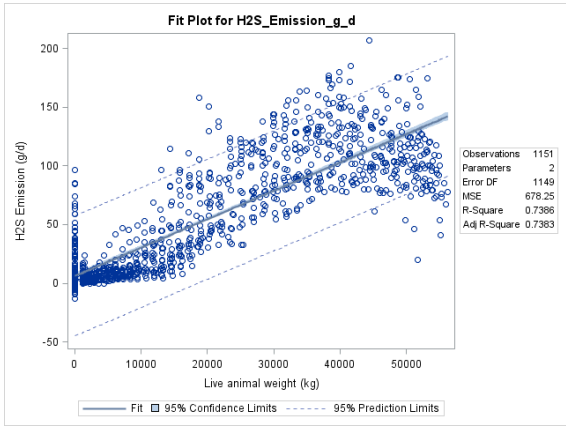


Figure F-11. Scatter plot of broiler NH_3 emissions versus live animal weight and scatter plot with regression.

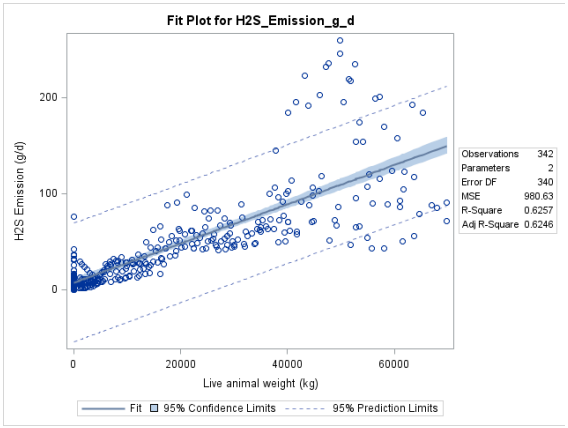




CA2B



KY1B-1 H5



KY1B-2 H3

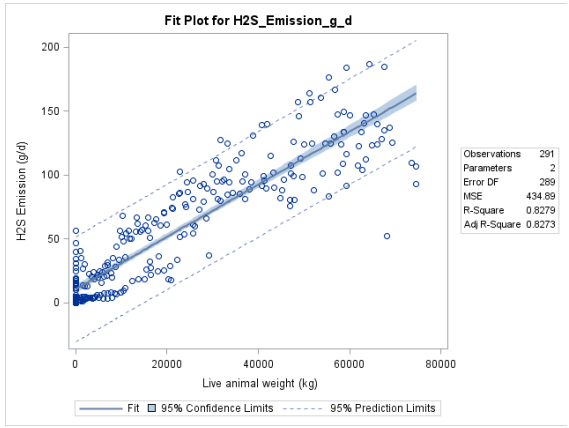


Figure F-12. Scatter plot of broiler H_2S emissions versus live animal weight and scatter plot with regression.

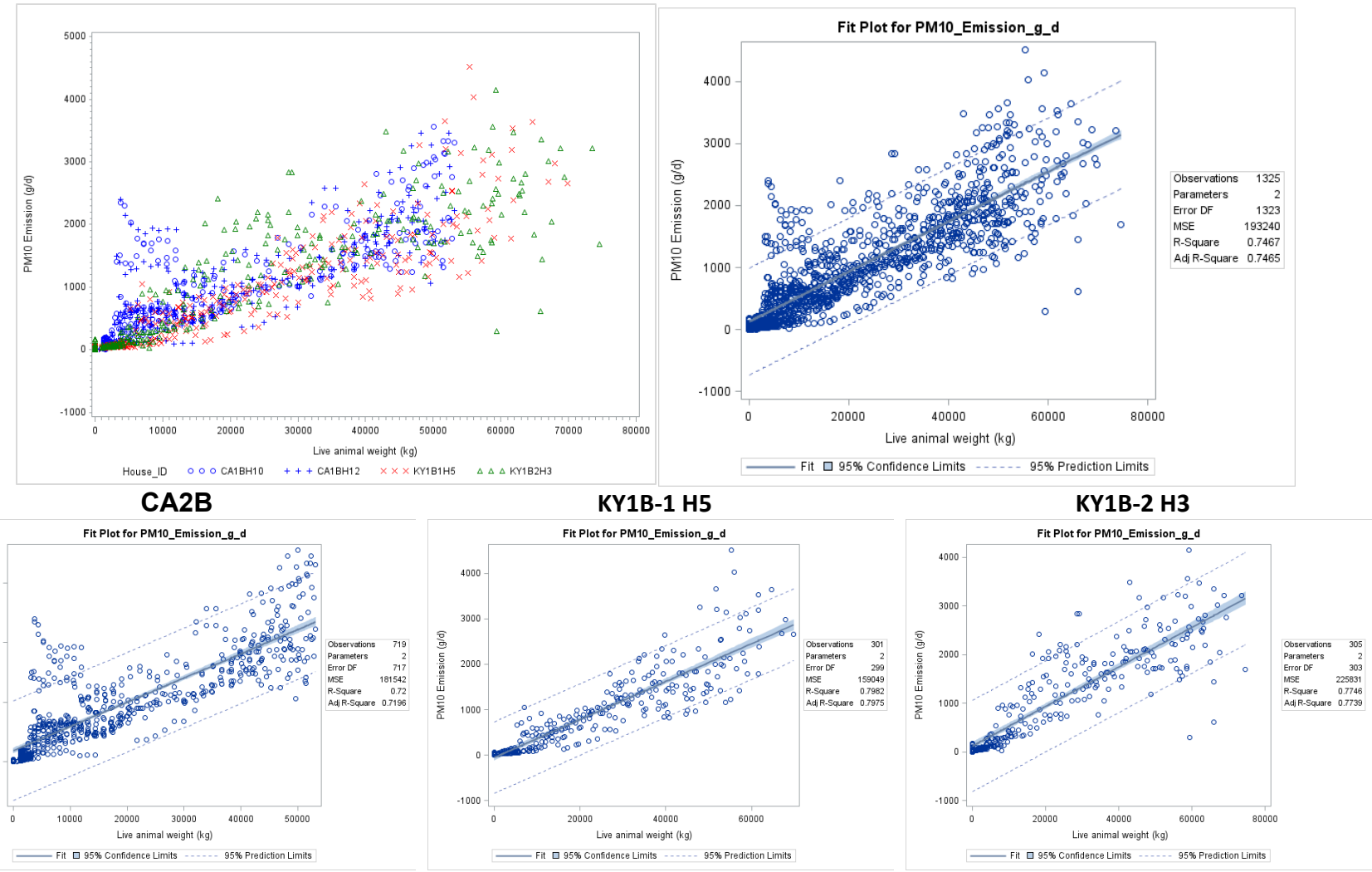
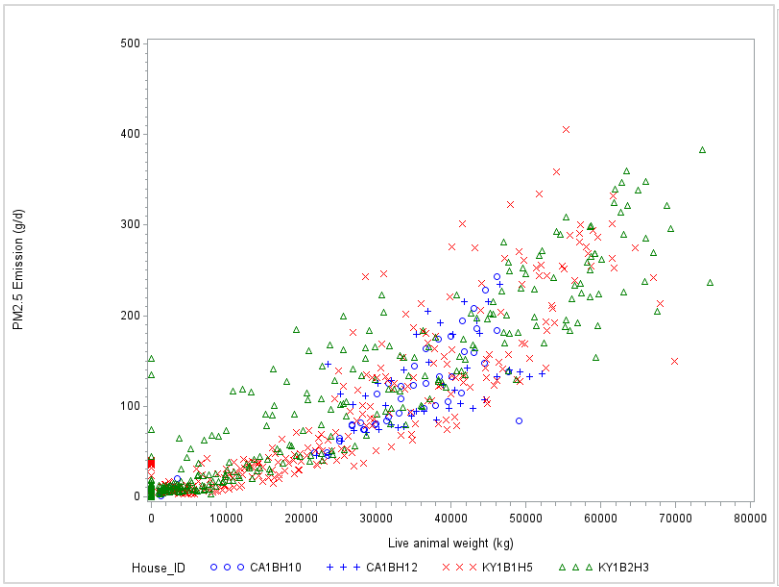
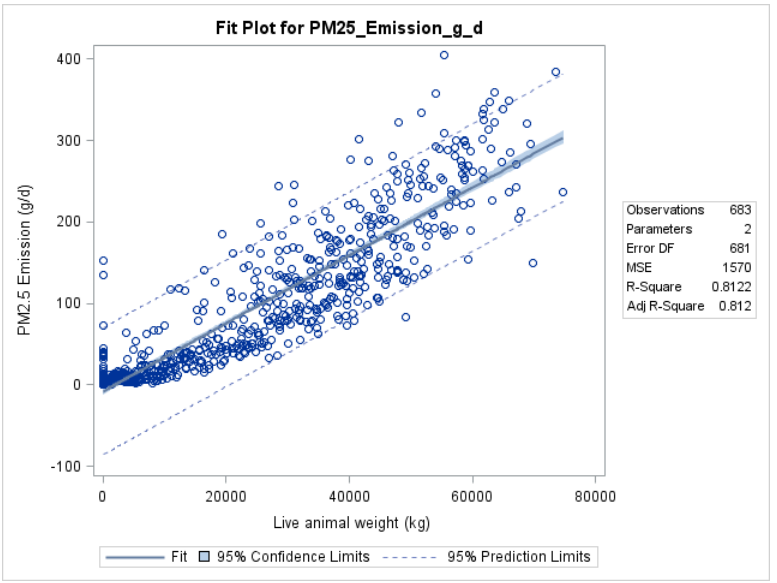
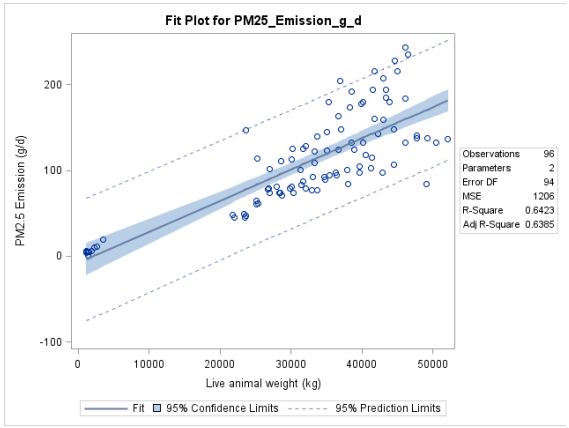


Figure F-13. Scatter plot of broiler PM_{10} emissions versus live animal weight and scatter plot with regression.

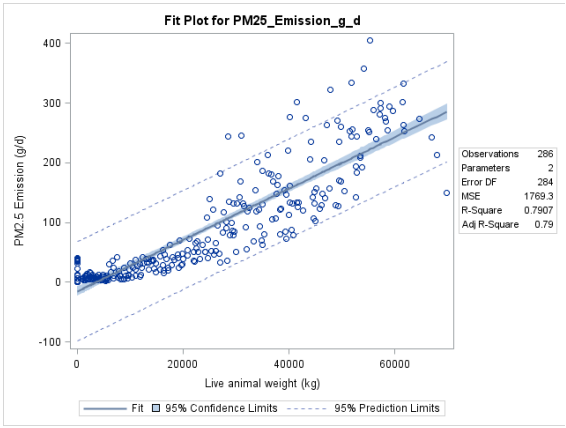




CA2B



KY1B-1 H5



KY1B-2 H3

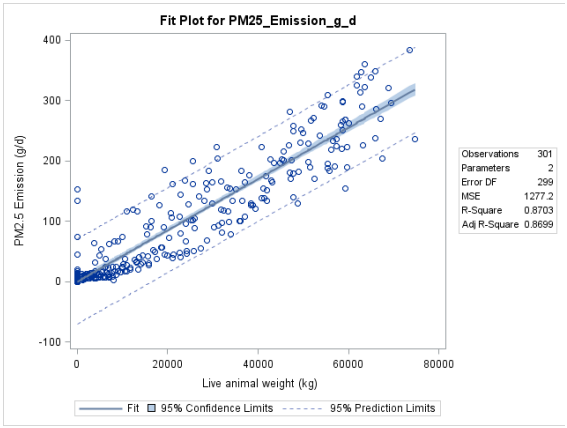


Figure F-14. Scatter plot of broiler $PM_{2.5}$ emissions versus live animal weight and scatter plot with regression.

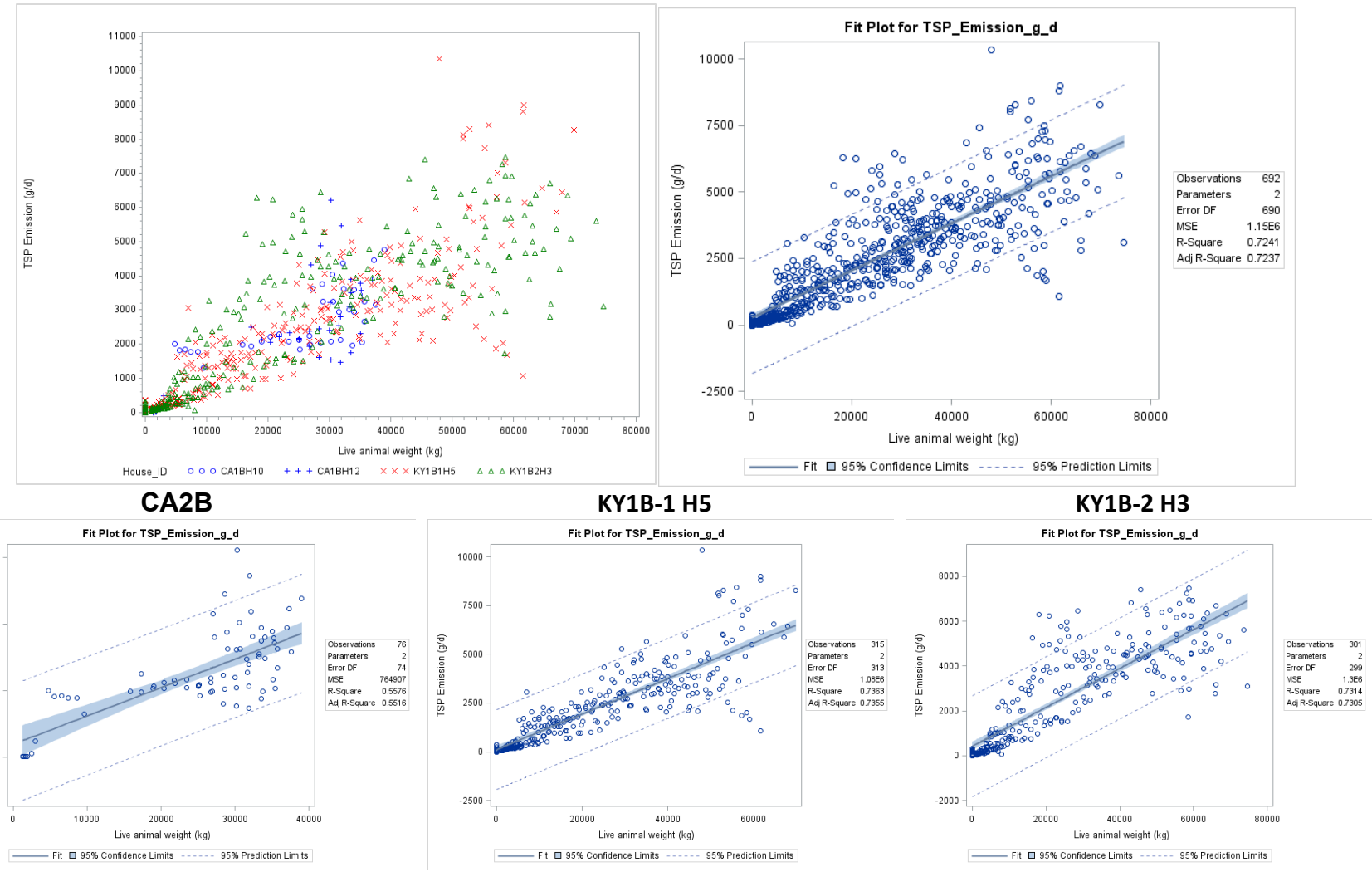


Figure F-15. Scatter plot of broiler TSP emissions versus live animal weight and scatter plot with regression.

Flock Age (0 between flocks)

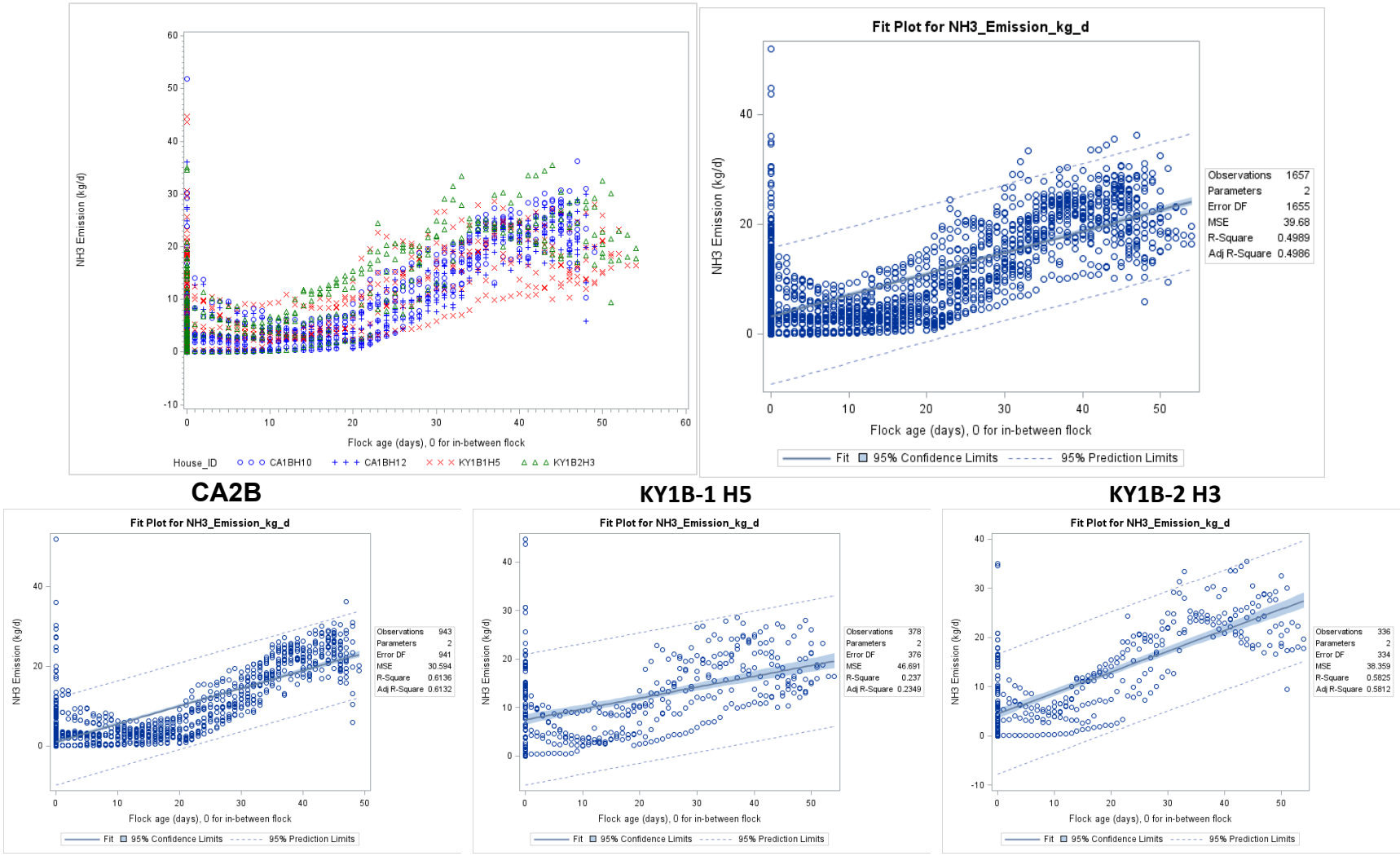


Figure F-16. Scatter plot of broiler NH_3 emissions versus flock age (set to zero between flocks) and scatter plot with regression.

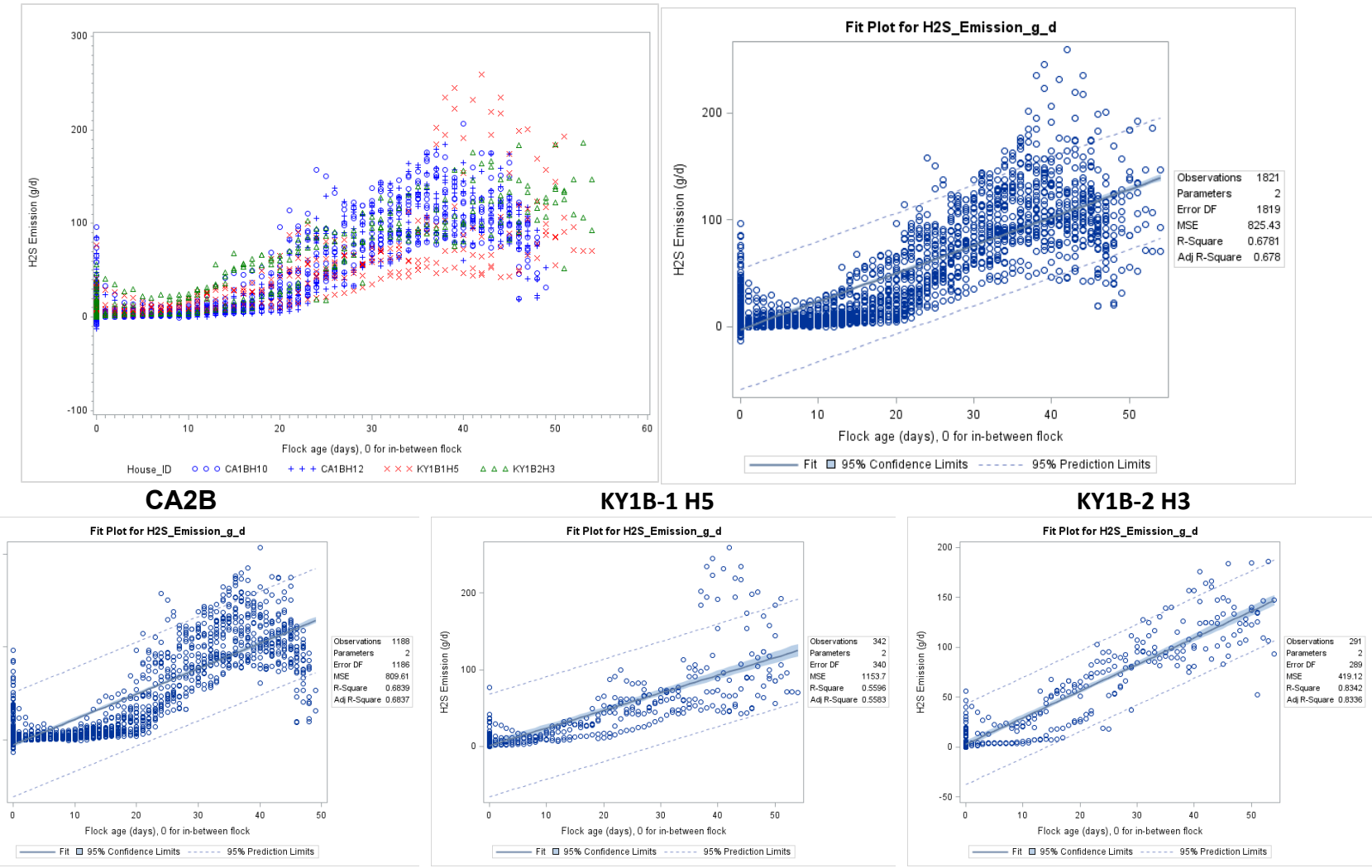
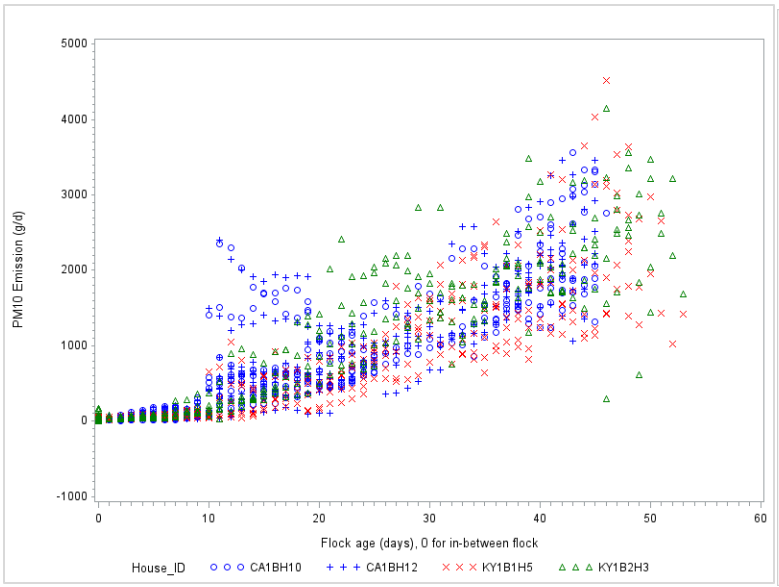
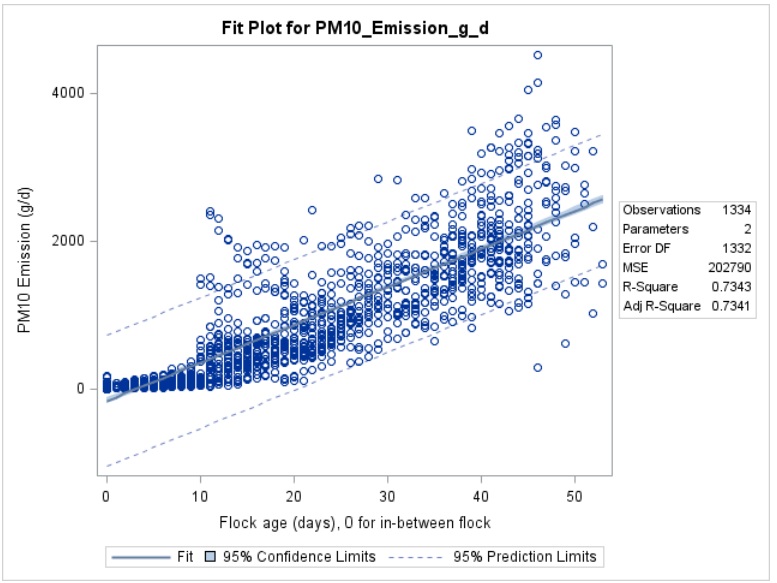


Figure F-17. Scatter plot of broiler H_2S emissions versus flock age (set to zero between flocks) and scatter plot with regression.





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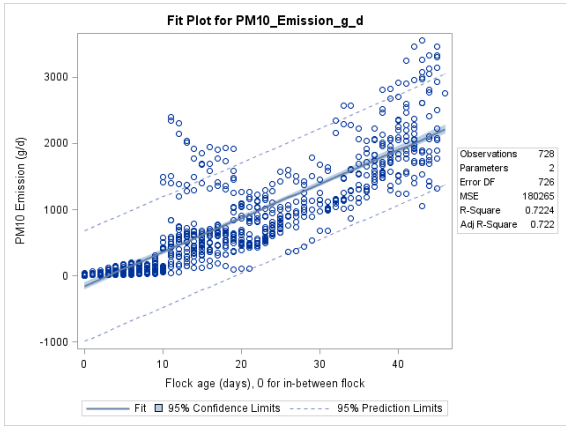
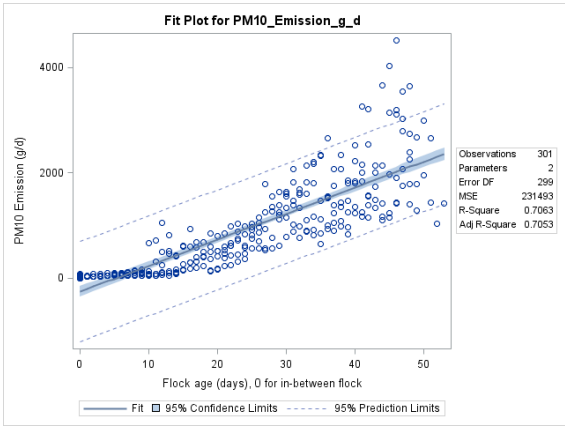


KY1B-1 H5



KY1B-2 H3

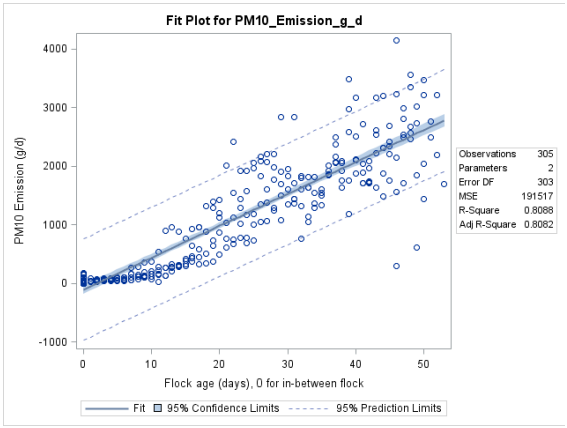


Figure F-18. Scatter plot of broiler PM_{10} emissions versus flock age (set to zero between flocks) and scatter plot with regression.

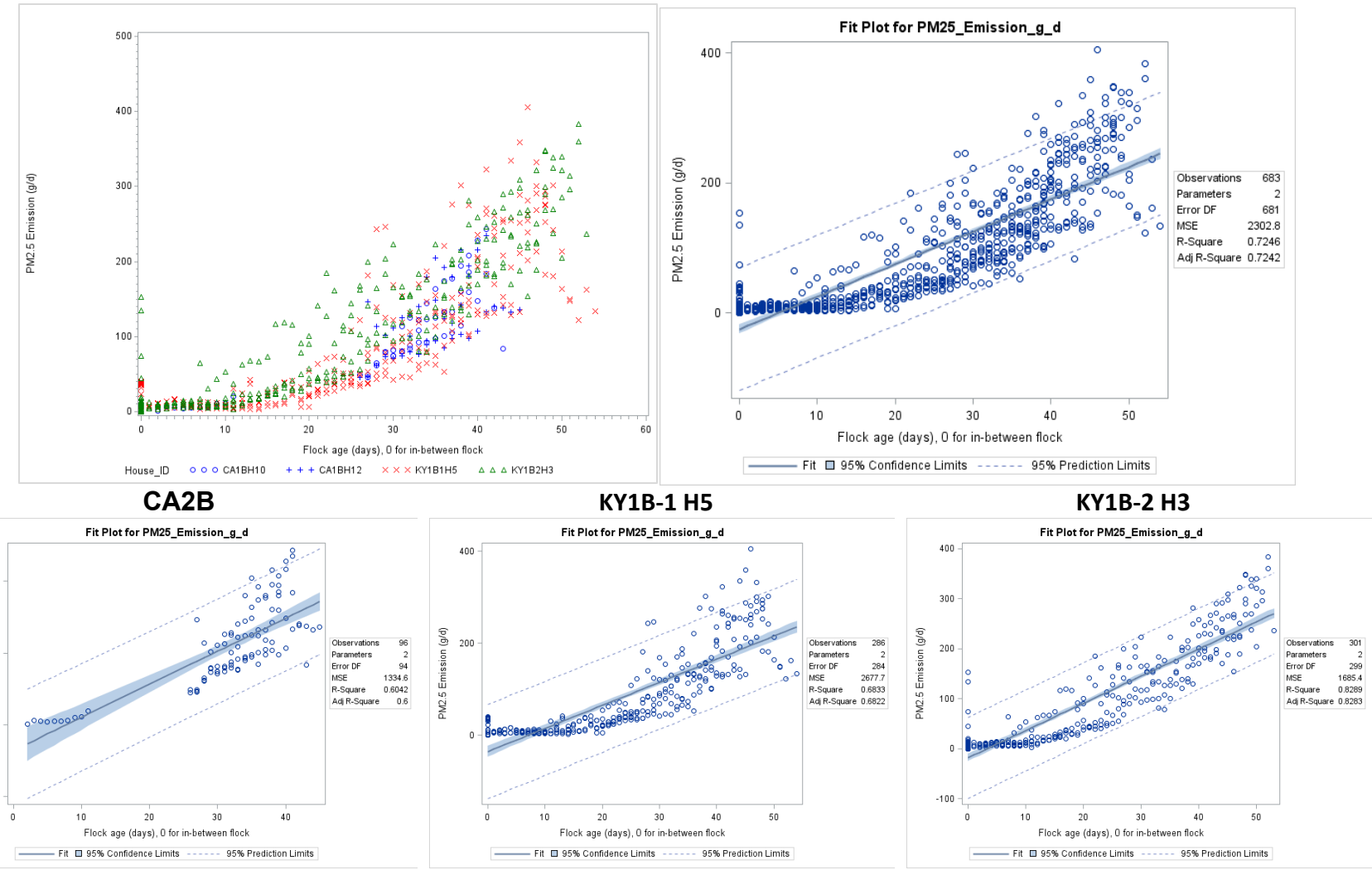


Figure F-19. Scatter plot of broiler $PM_{2.5}$ emissions versus flock age (set to zero between flocks) and scatter plot with regression.

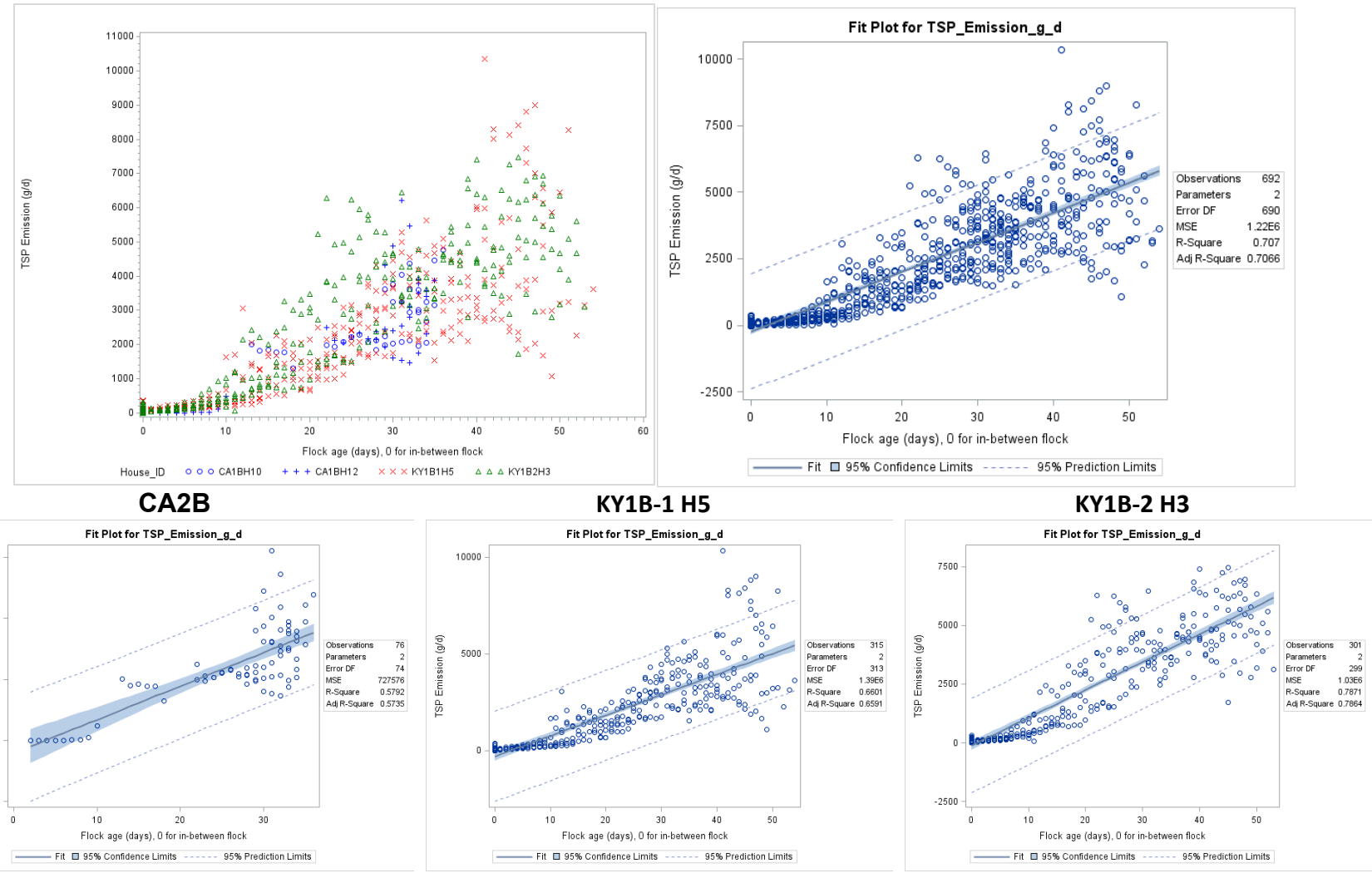


Figure F-20. Scatter plot of broiler TSP emissions versus flock age (set to zero between flocks) and scatter plot with regression.

Flock age (continues to increase between flocks)

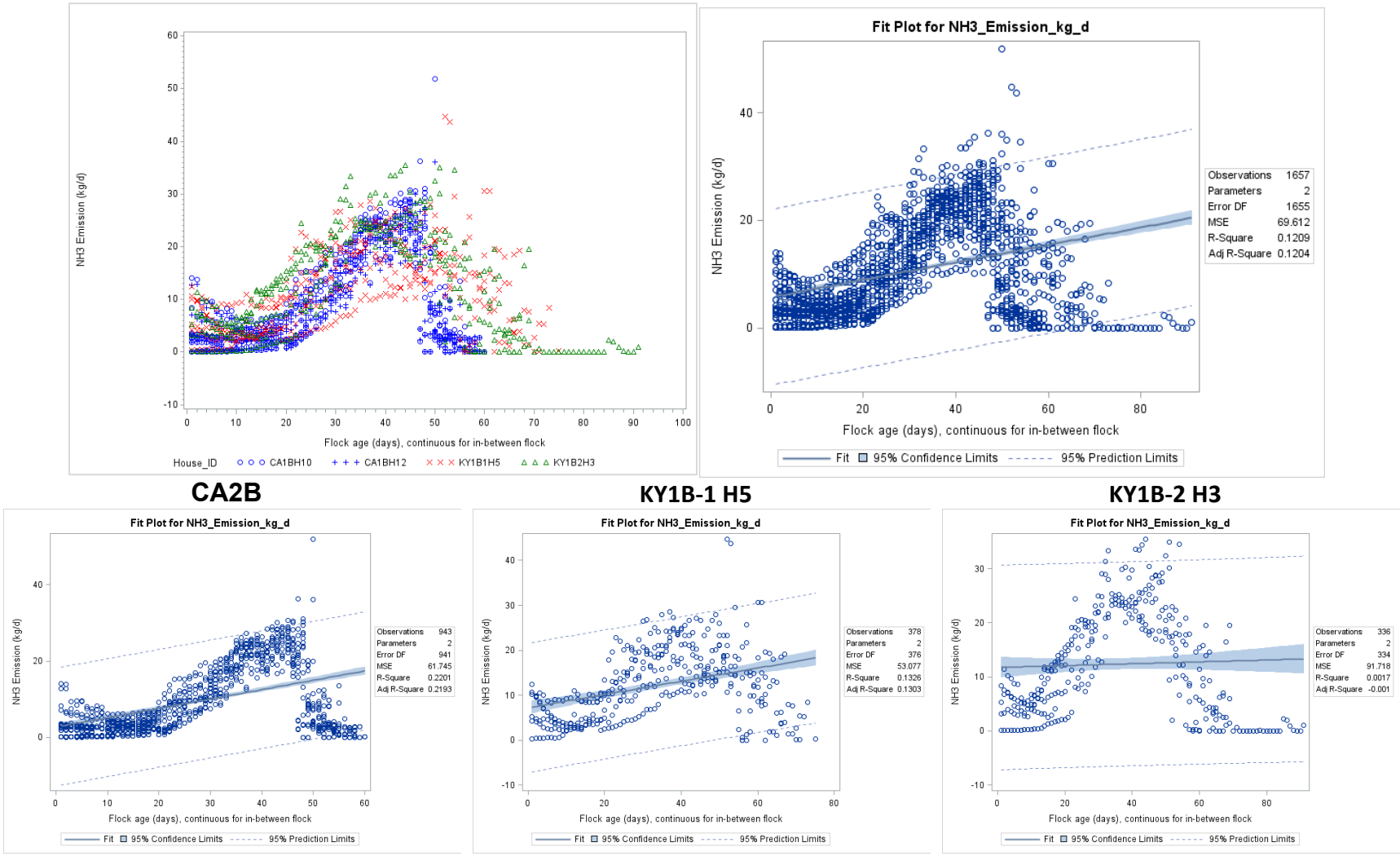
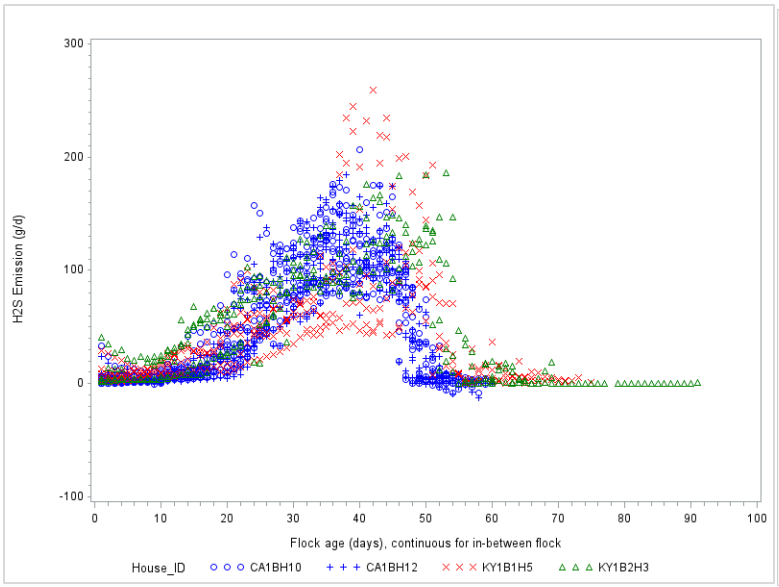
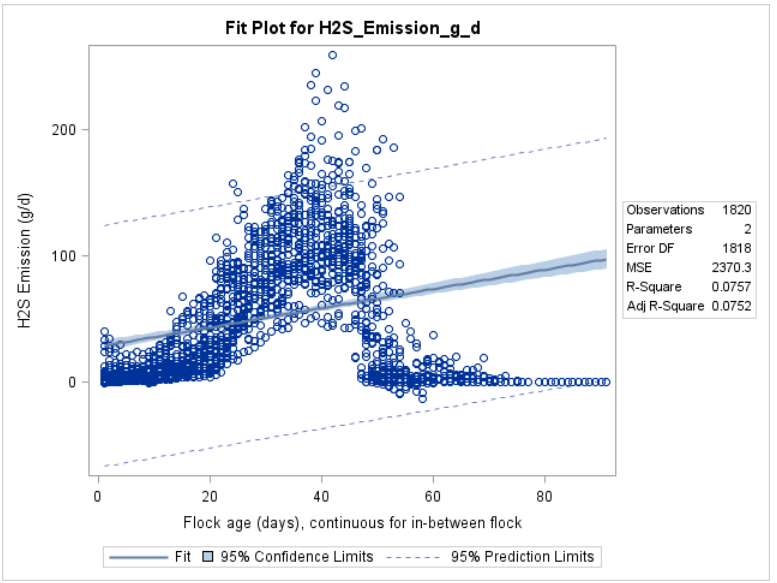
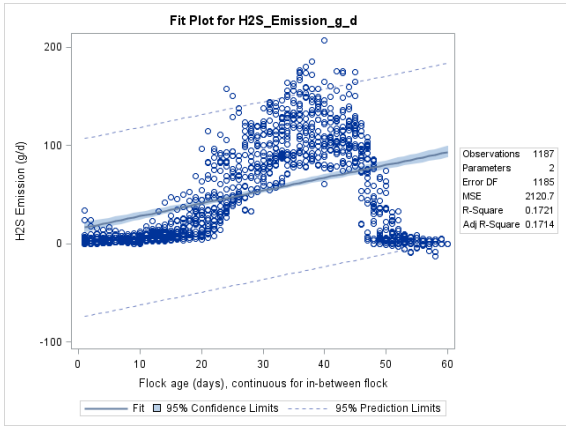


Figure F-21. Scatter plot of broiler NH_3 emissions versus flock age (continues to increase between flocks) and scatter plot with regression.

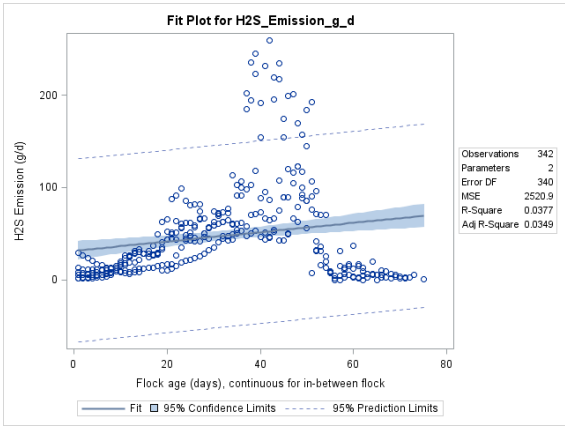




CA2B



KY1B-1 H5



KY1B-2 H3

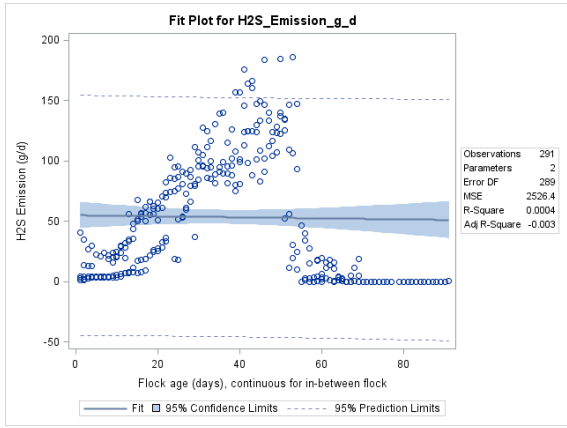
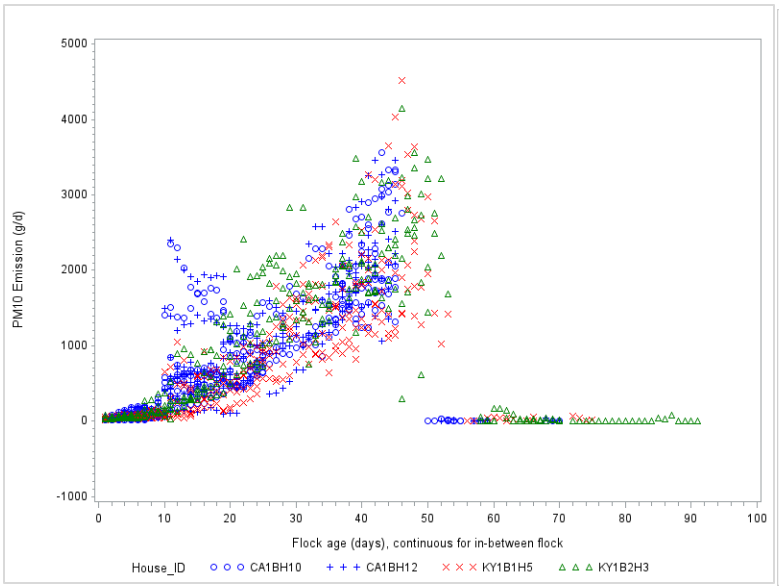
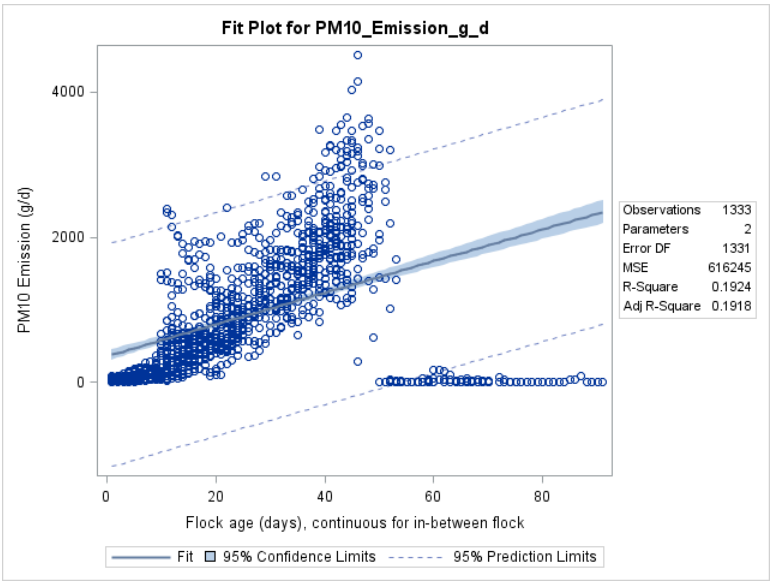


Figure F-22. Scatter plot of broiler H_2S emissions versus flock age (continues to increase between flocks) and scatter plot with regression.





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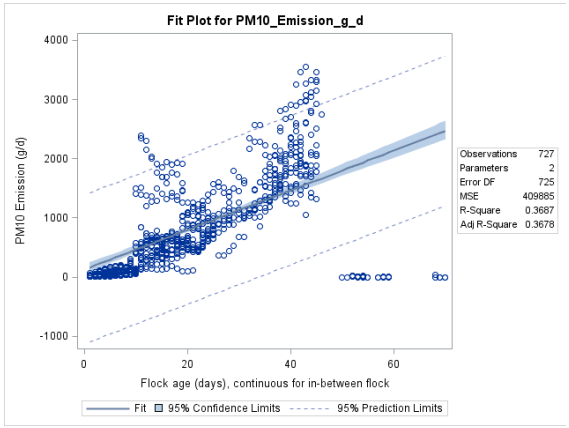
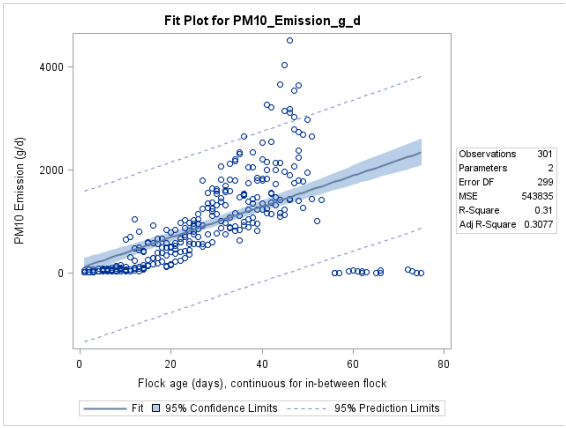


KY1B-1 H5



KY1B-2 H3

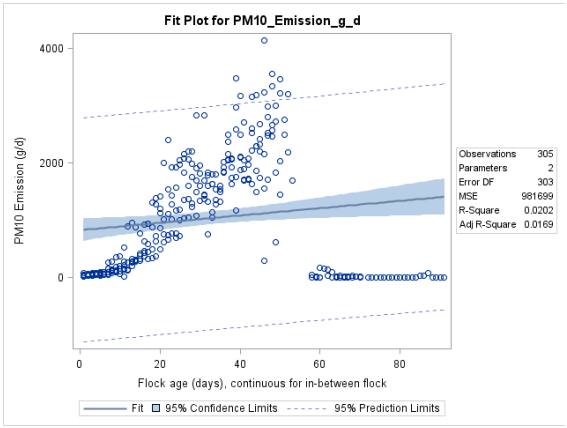
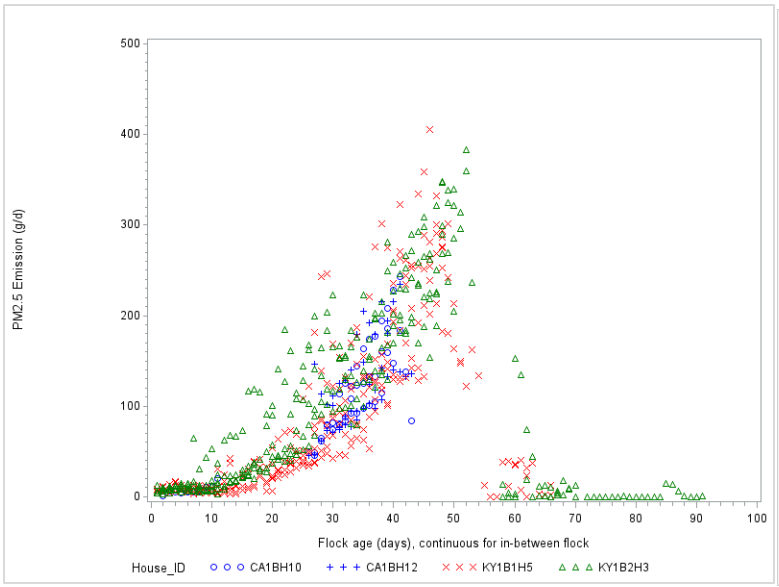
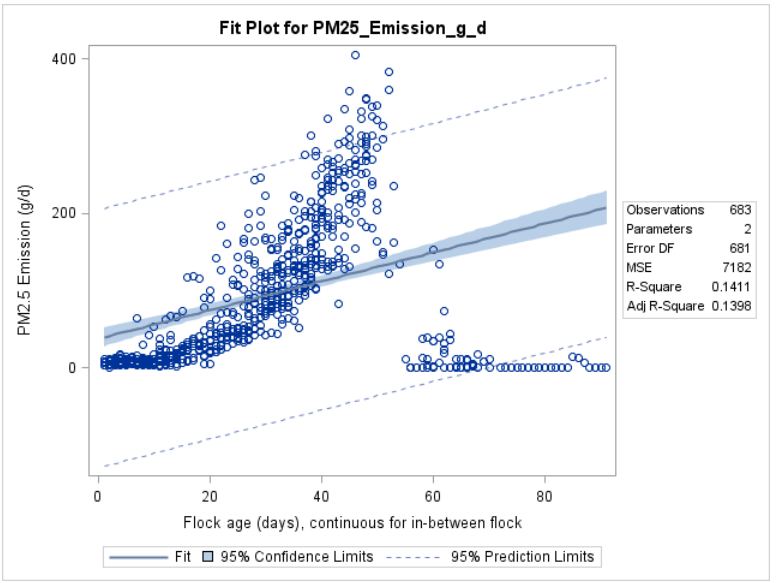


Figure F-23. Scatter plot of broiler PM_{10} emissions versus flock age (continues to increase between flocks) and scatter plot with regression.





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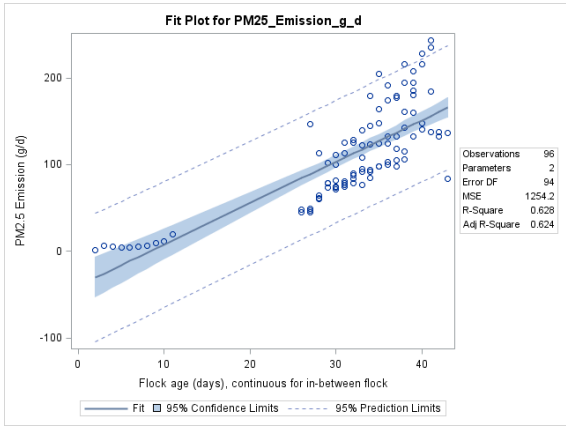
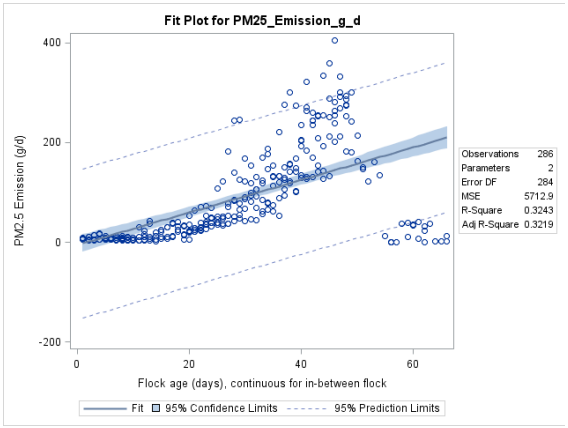


KY1B-1 H5



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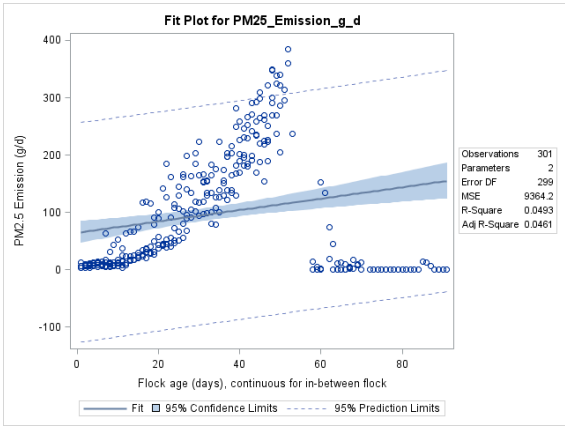


Figure F-24. Scatter plot of broiler $PM_{2.5}$ emissions versus flock age (continues to increase between flocks) and scatter plot with regression.

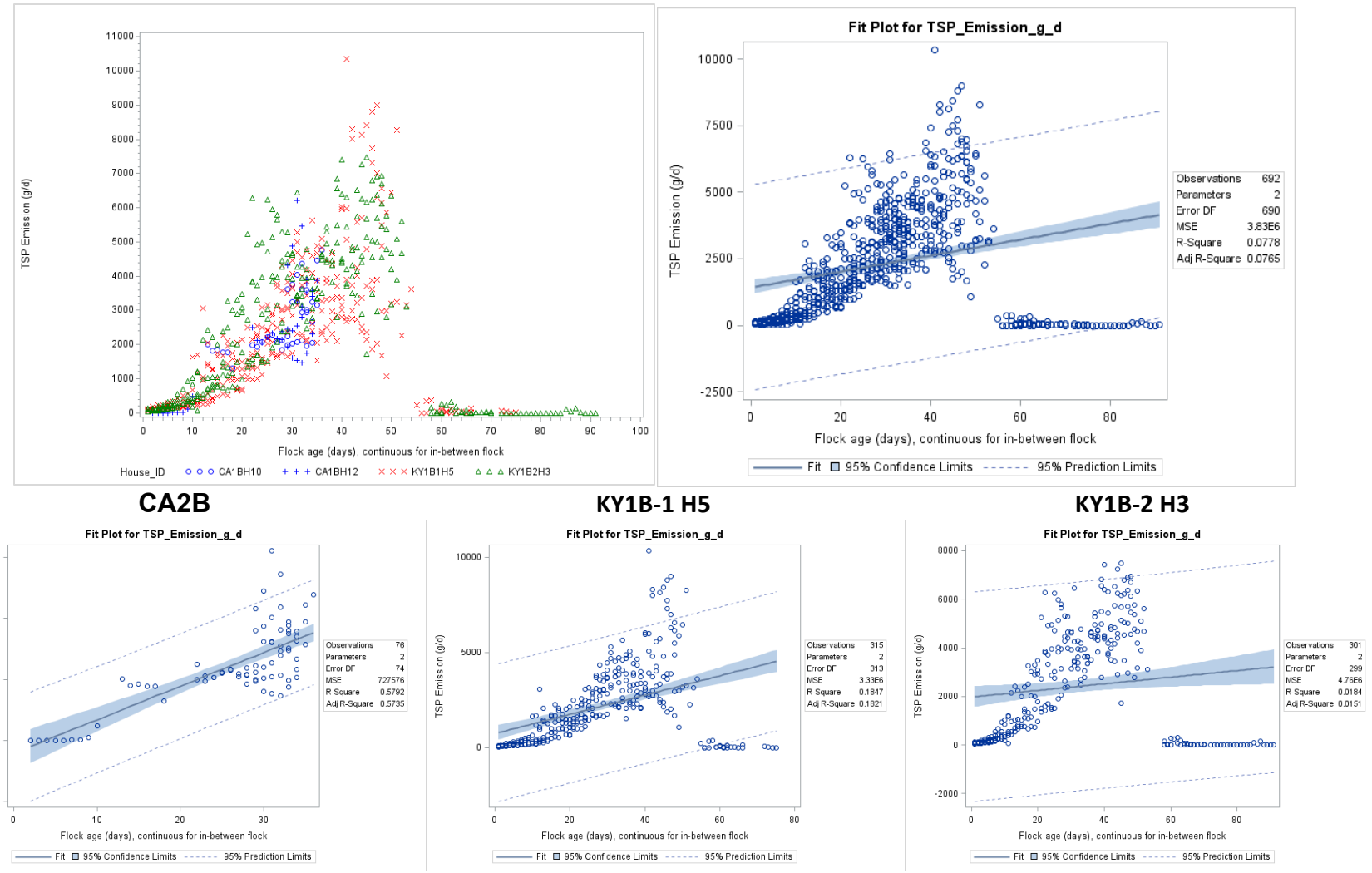


Figure F-25. Scatter plot of broiler TSP emissions versus flock age (continues to increase between flocks) and scatter plot with regression.

Bird age

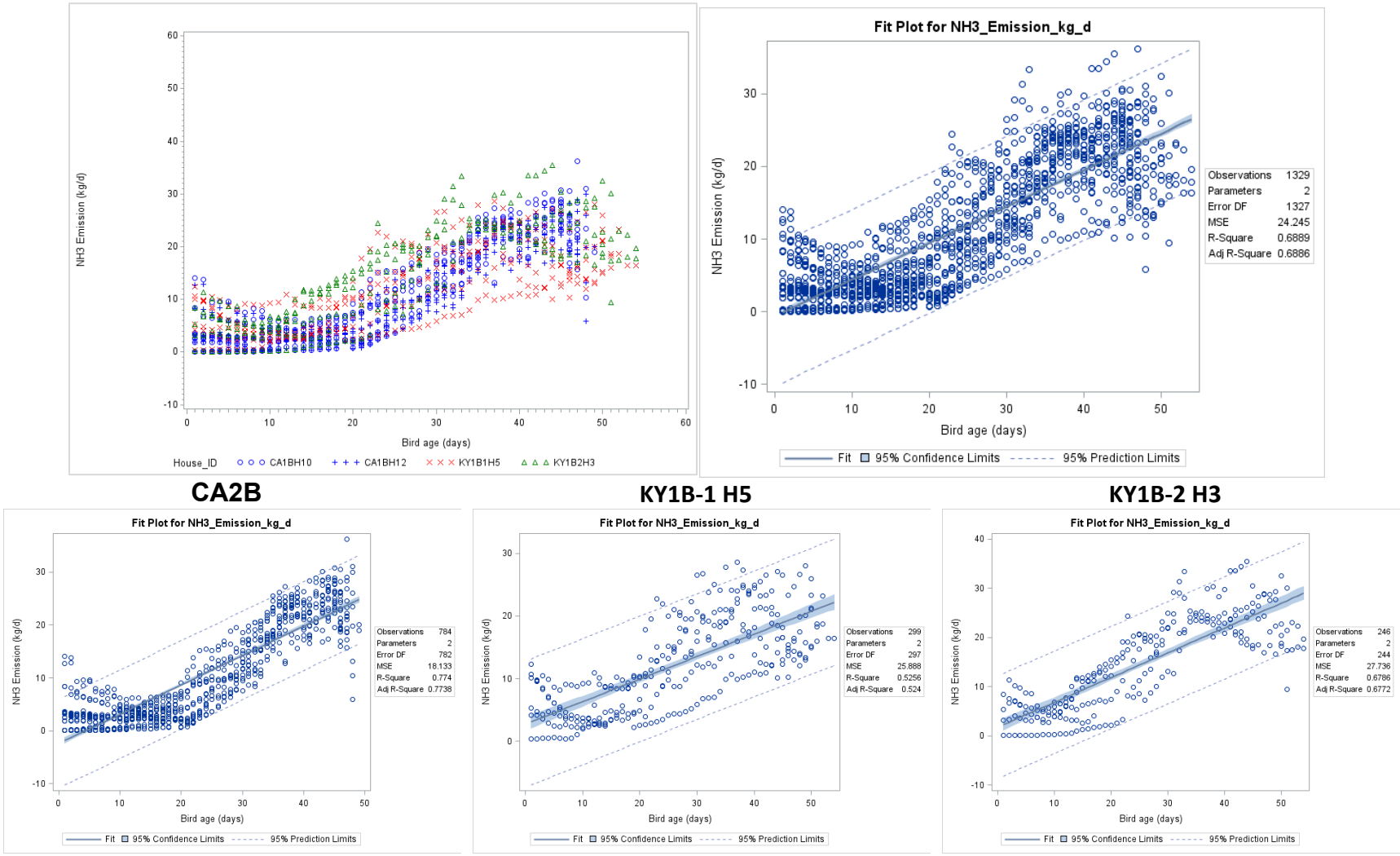


Figure F-26. Scatter plot of broiler NH_3 emissions versus bird age and scatter plot with regression.

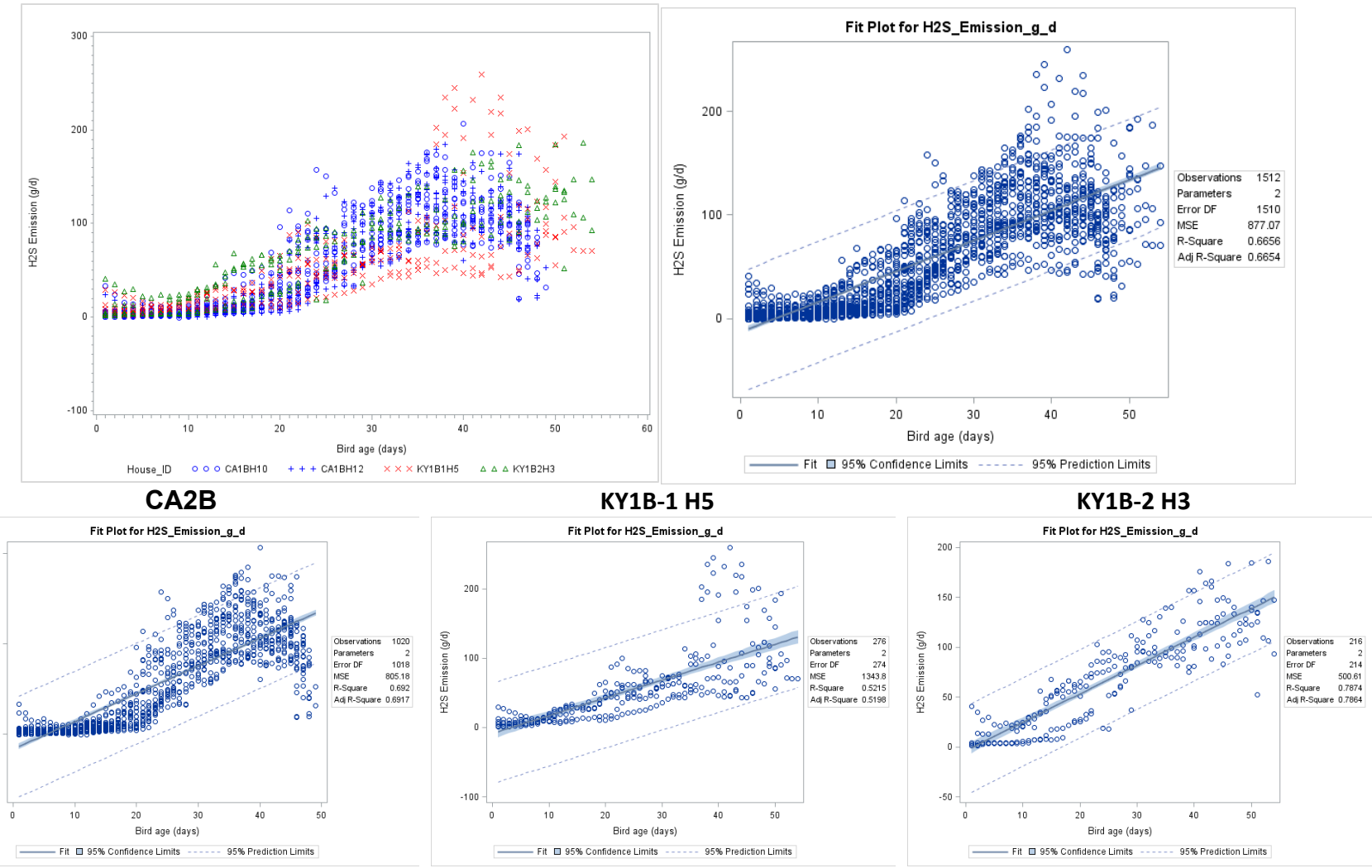


Figure F-27. Scatter plot of broiler H_2S emissions versus bird age and scatter plot with regression.

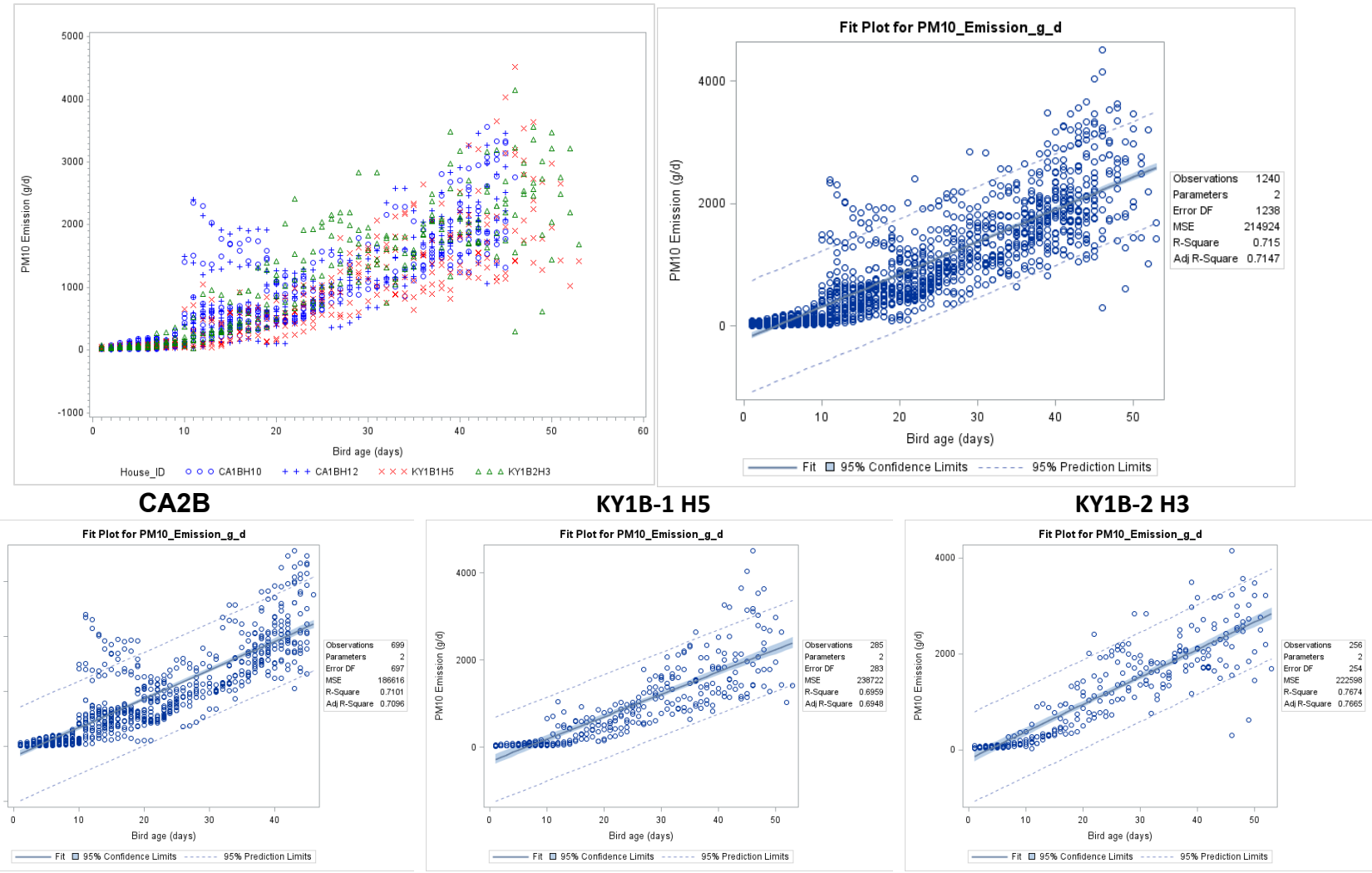


Figure F-28. Scatter plot of broiler PM_{10} emissions versus bird age and scatter plot with regression.

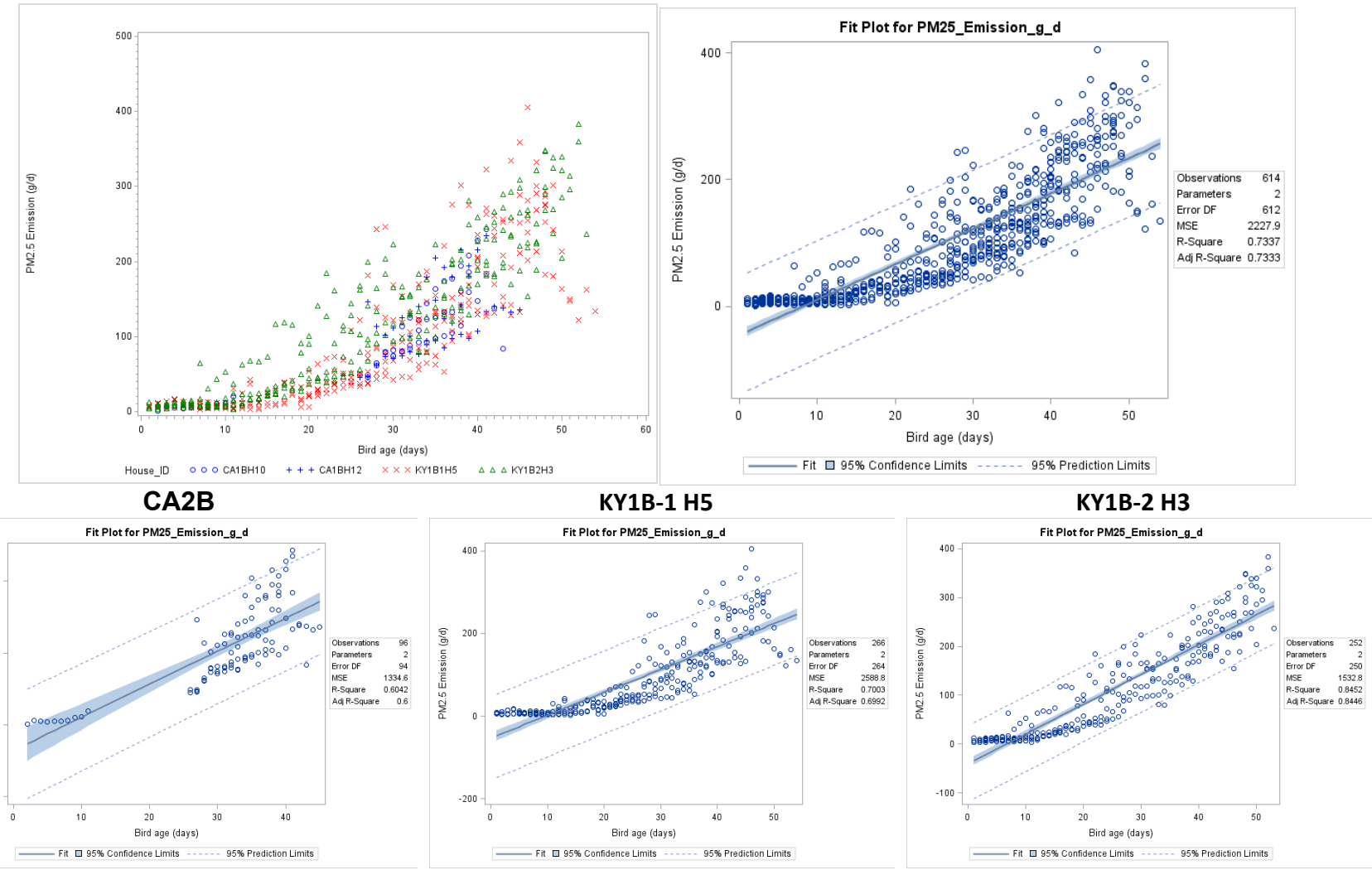


Figure F-29. Scatter plot of broiler $PM_{2.5}$ emissions versus bird age and scatter plot with regression.

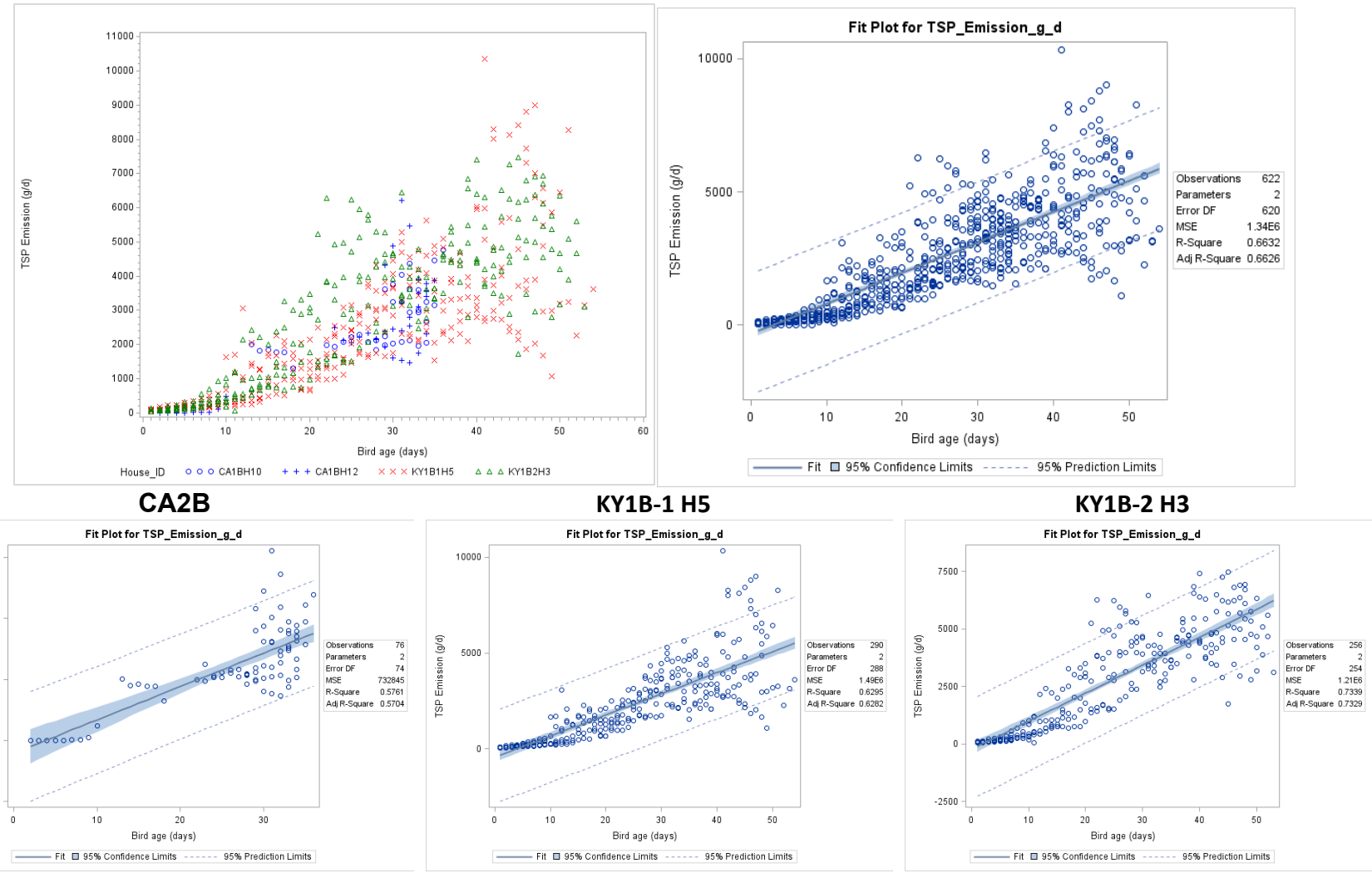


Figure F-30. Scatter plot of broiler TSP emissions versus bird age and scatter plot with regression.

Barn Exhaust Temperature

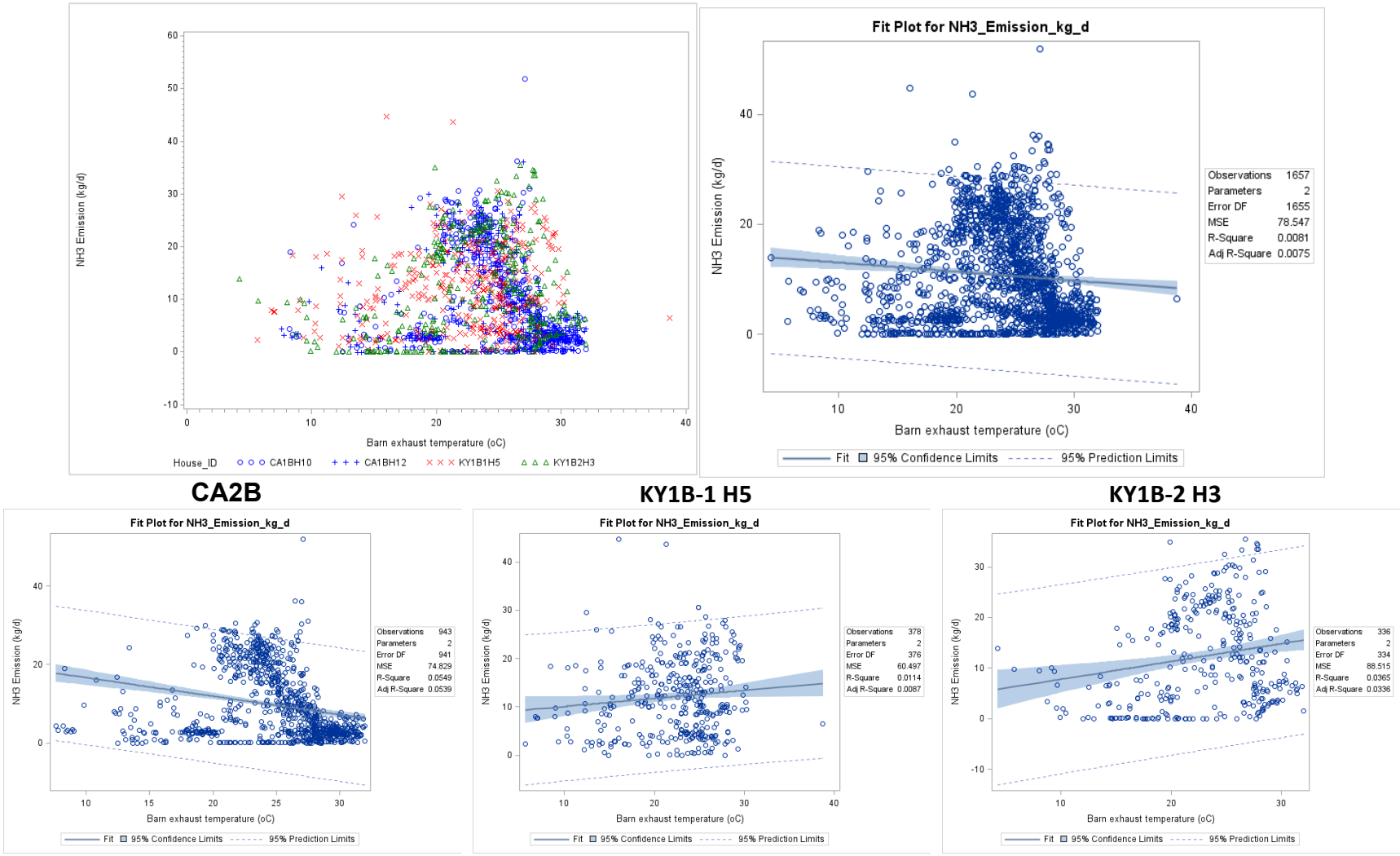


Figure F-31. Scatter plot of broiler NH_3 emissions versus barn exhaust temperature and scatter plot with regression.

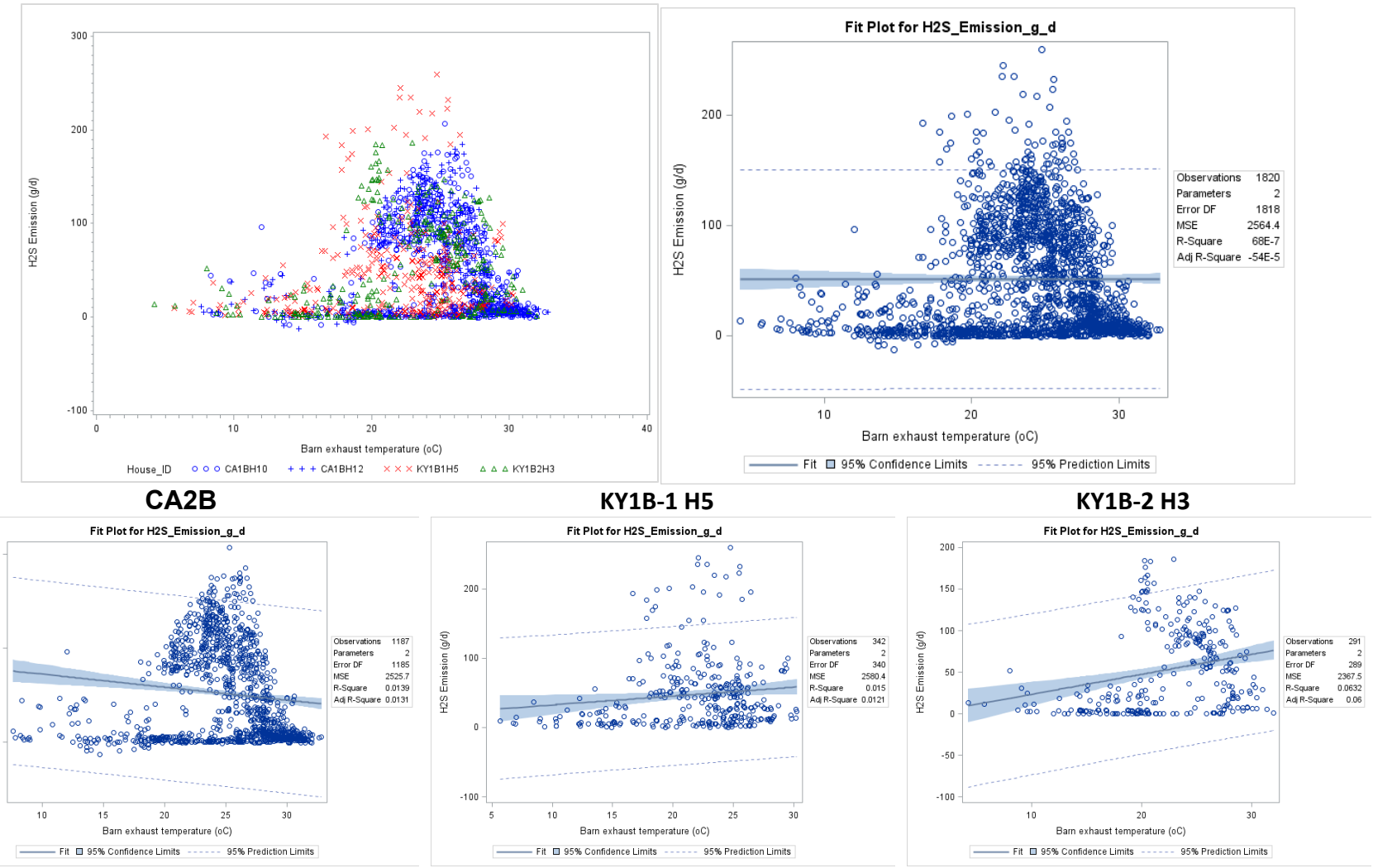


Figure F-32. Scatter plot of broiler H_2S emissions versus barn exhaust temperature and scatter plot with regression.

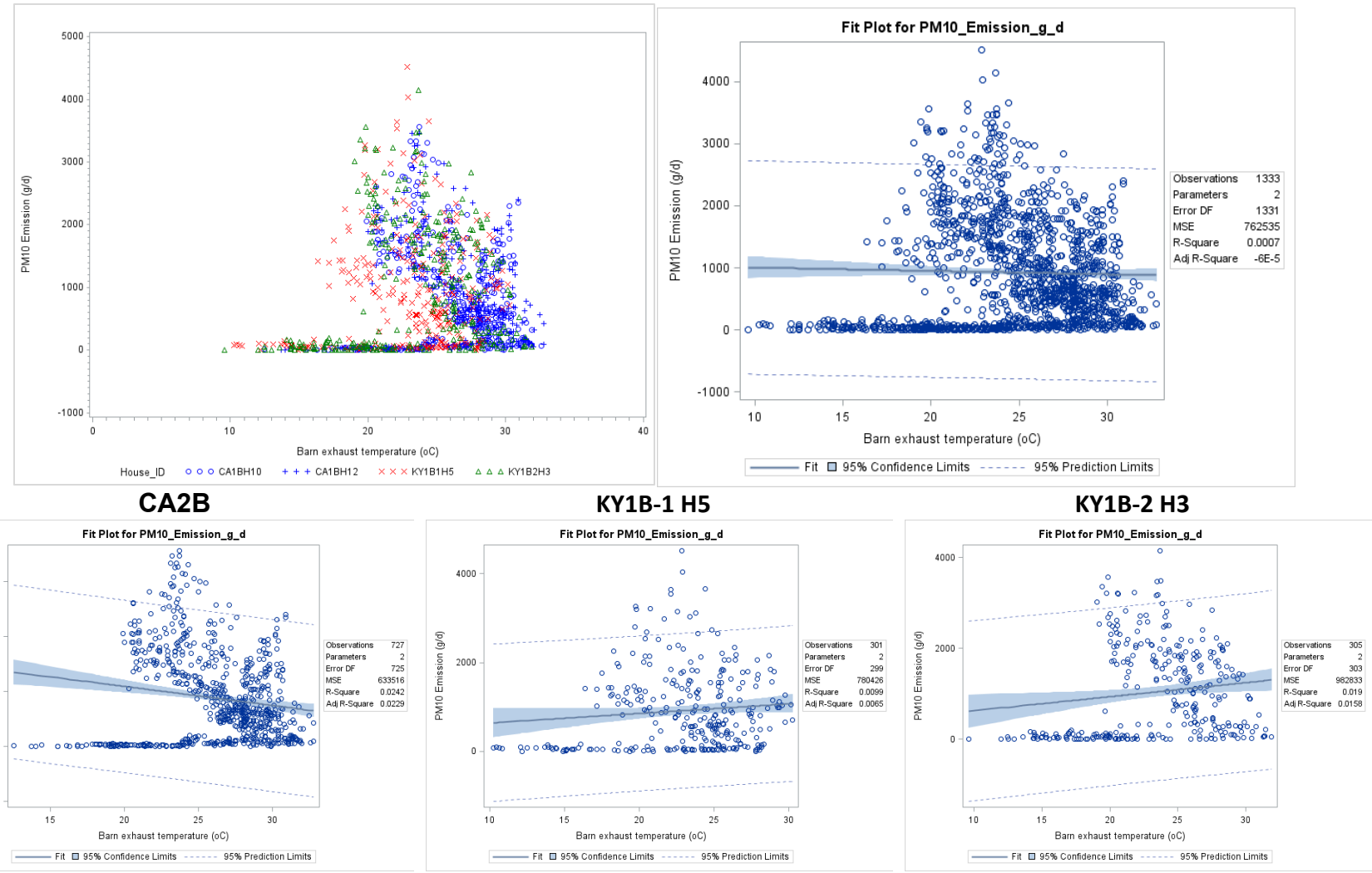


Figure F-33. Scatter plot of broiler PM_{10} emissions versus barn exhaust temperature and scatter plot with regression.

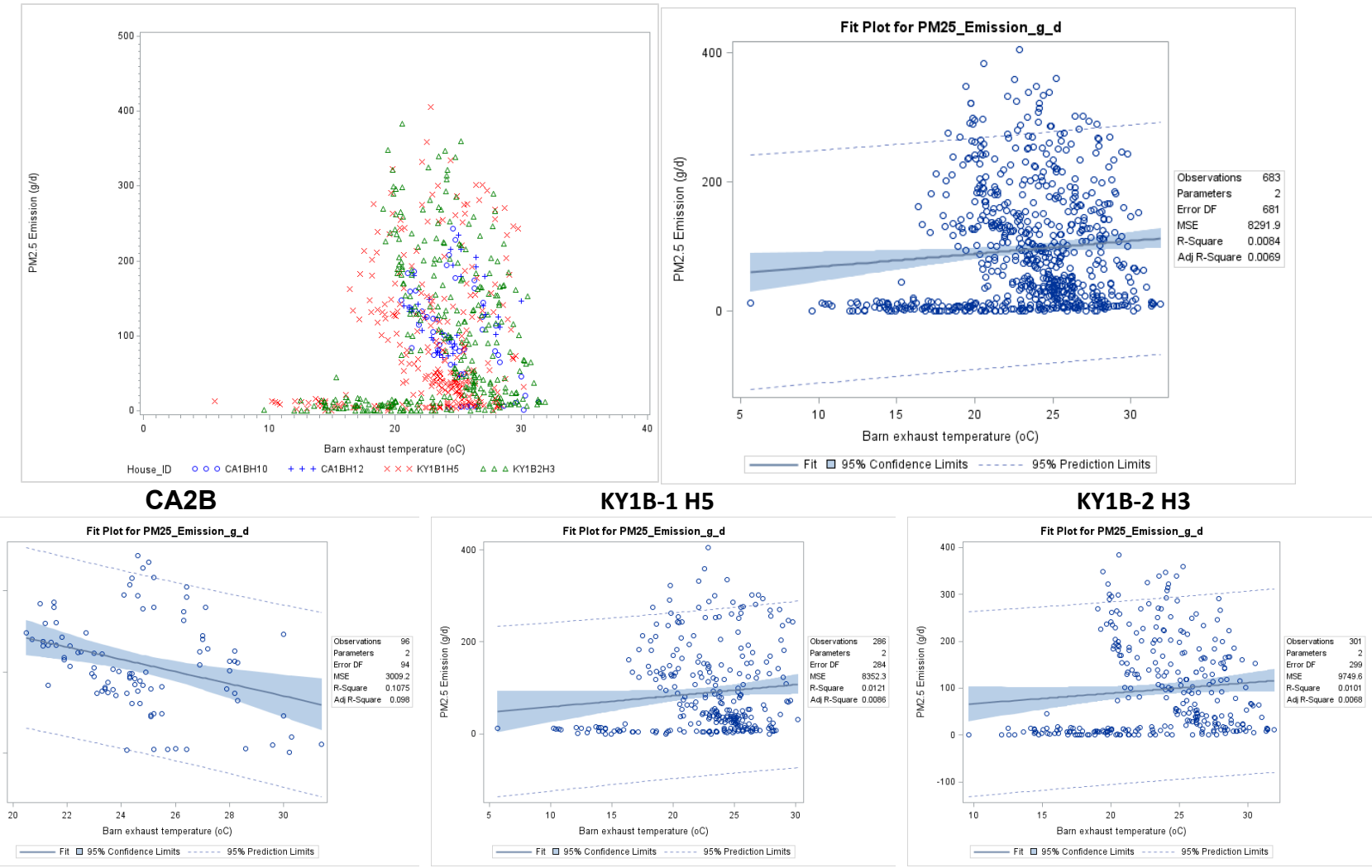


Figure F-34. Scatter plot of broiler $PM_{2.5}$ emissions versus barn exhaust temperature and scatter plot with regression.

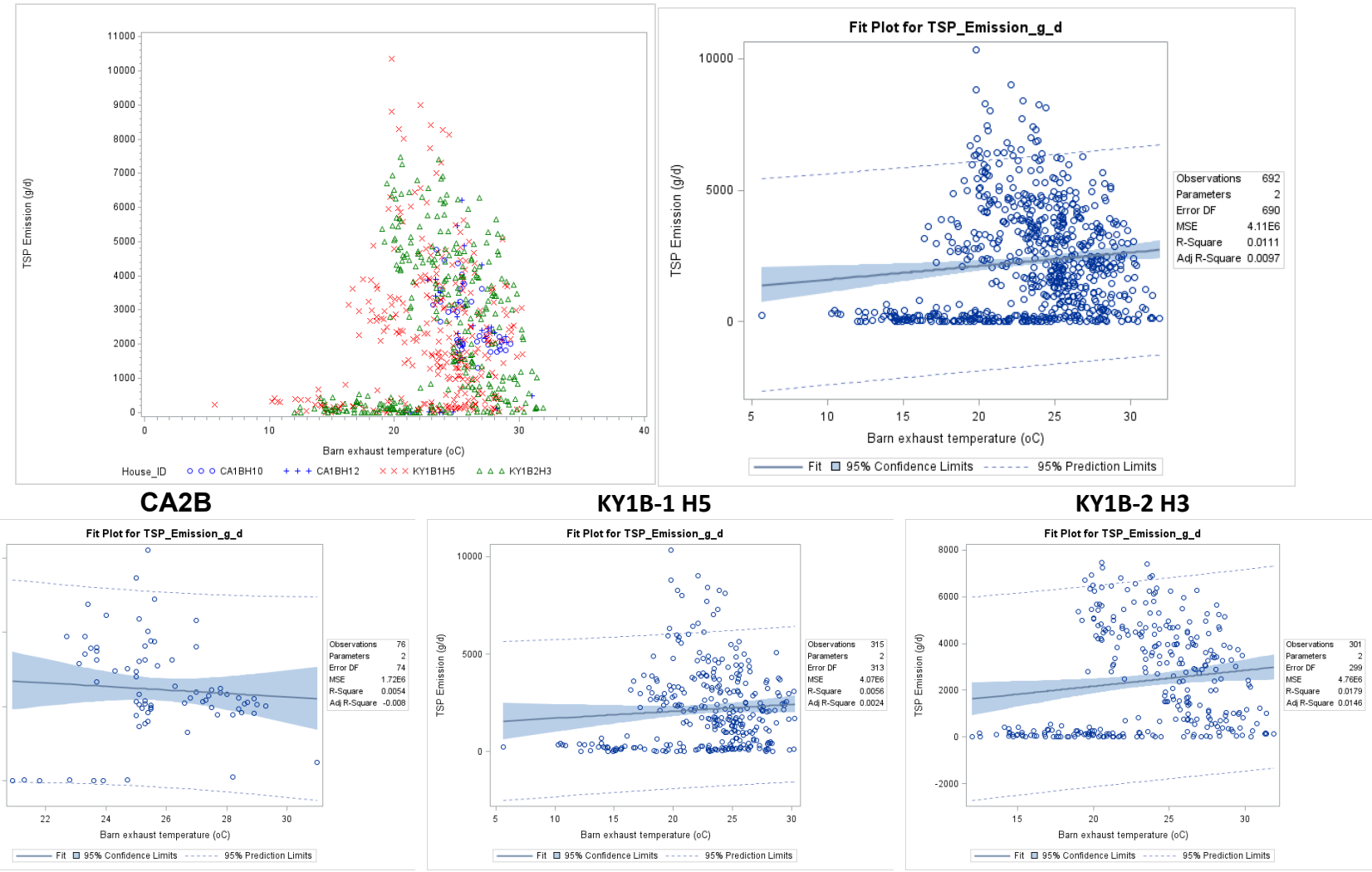


Figure F-35. Scatter plot of broiler TSP emissions versus barn exhaust temperature and scatter plot with regression.

Barn relativity humidity

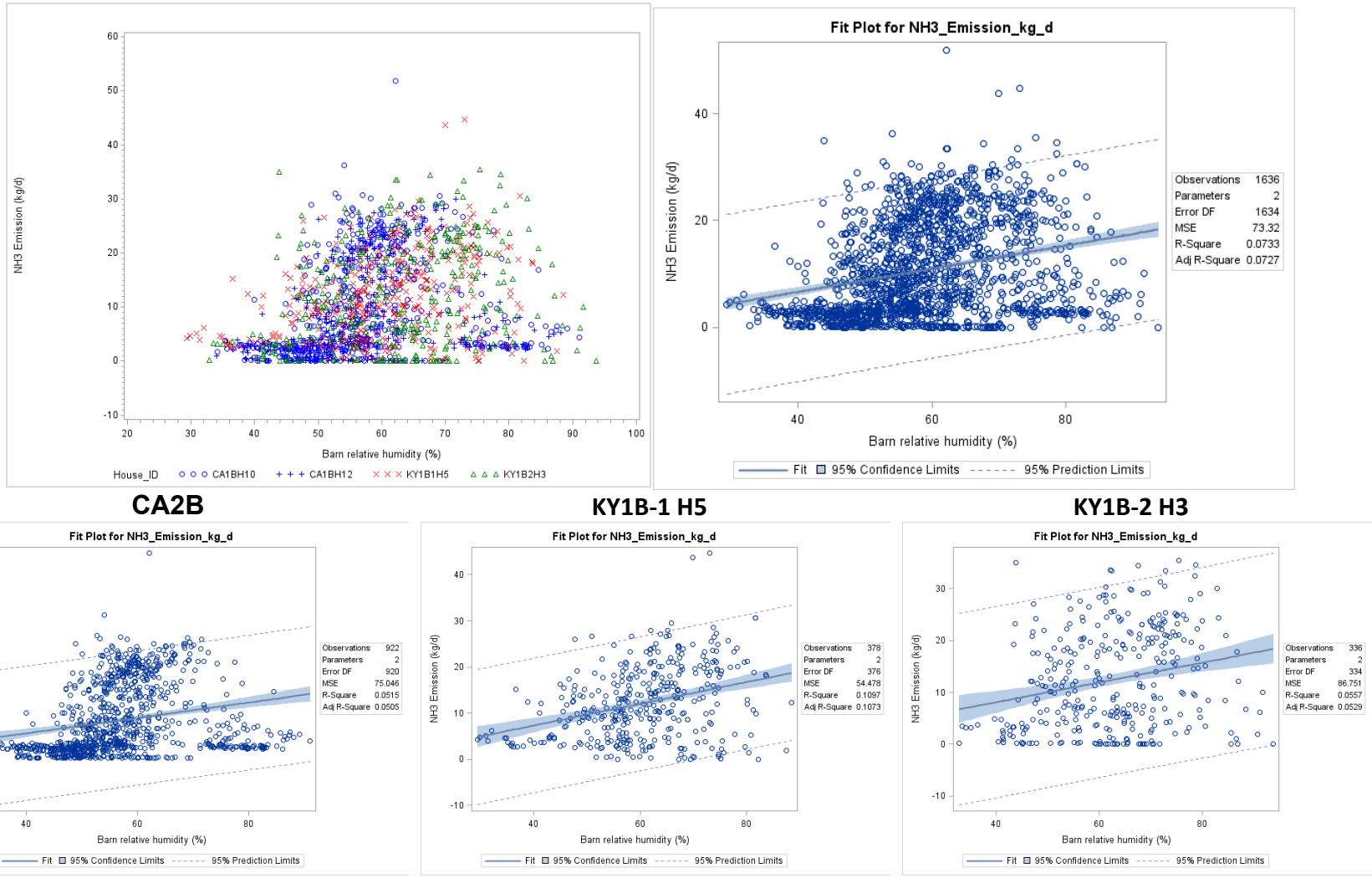


Figure F-36. Scatter plot of broiler NH_3 emissions versus barn relative humidity and scatter plot with regression.

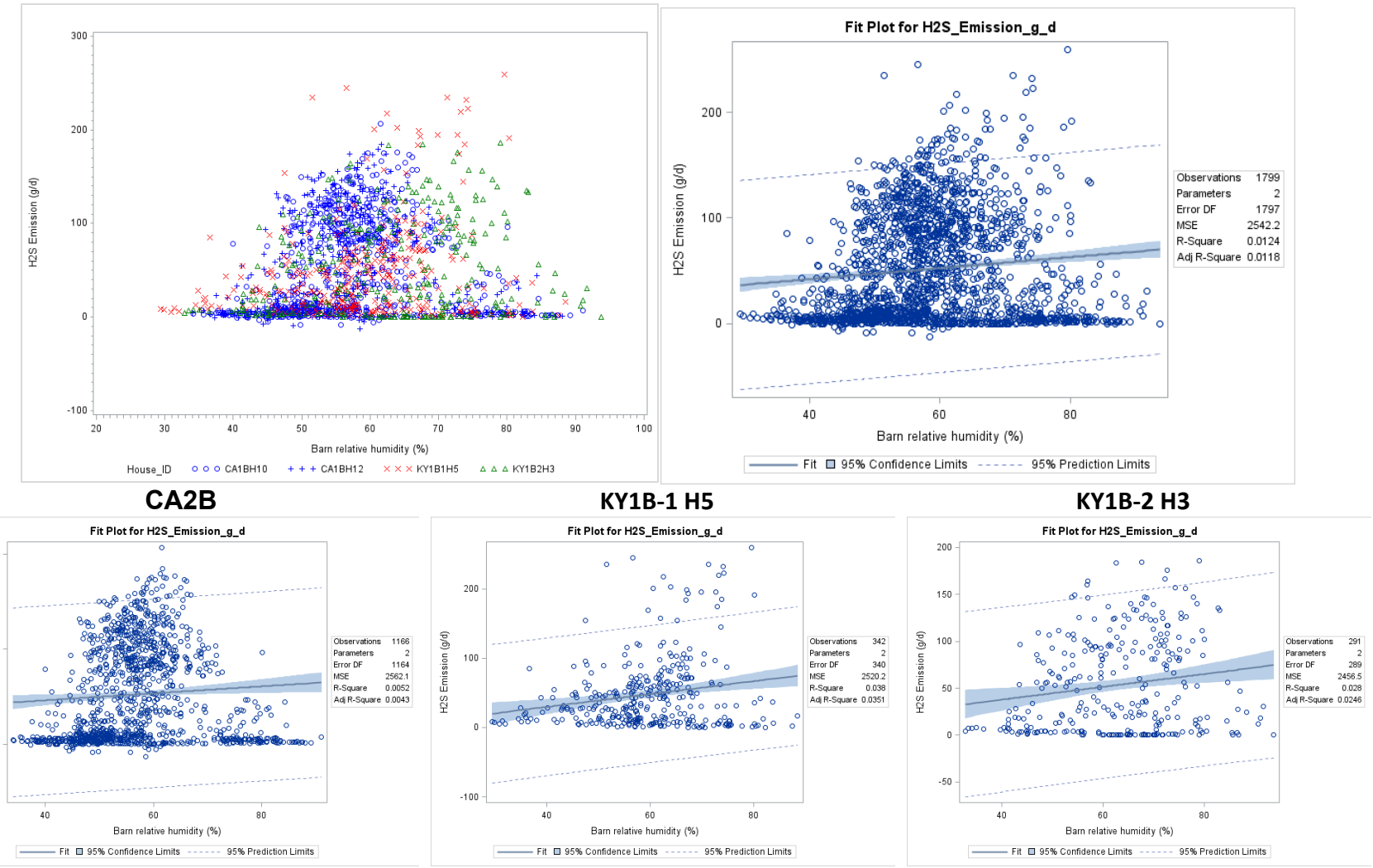


Figure F-37. Scatter plot of broiler H_2S emissions versus barn relative humidity and scatter plot with regression.

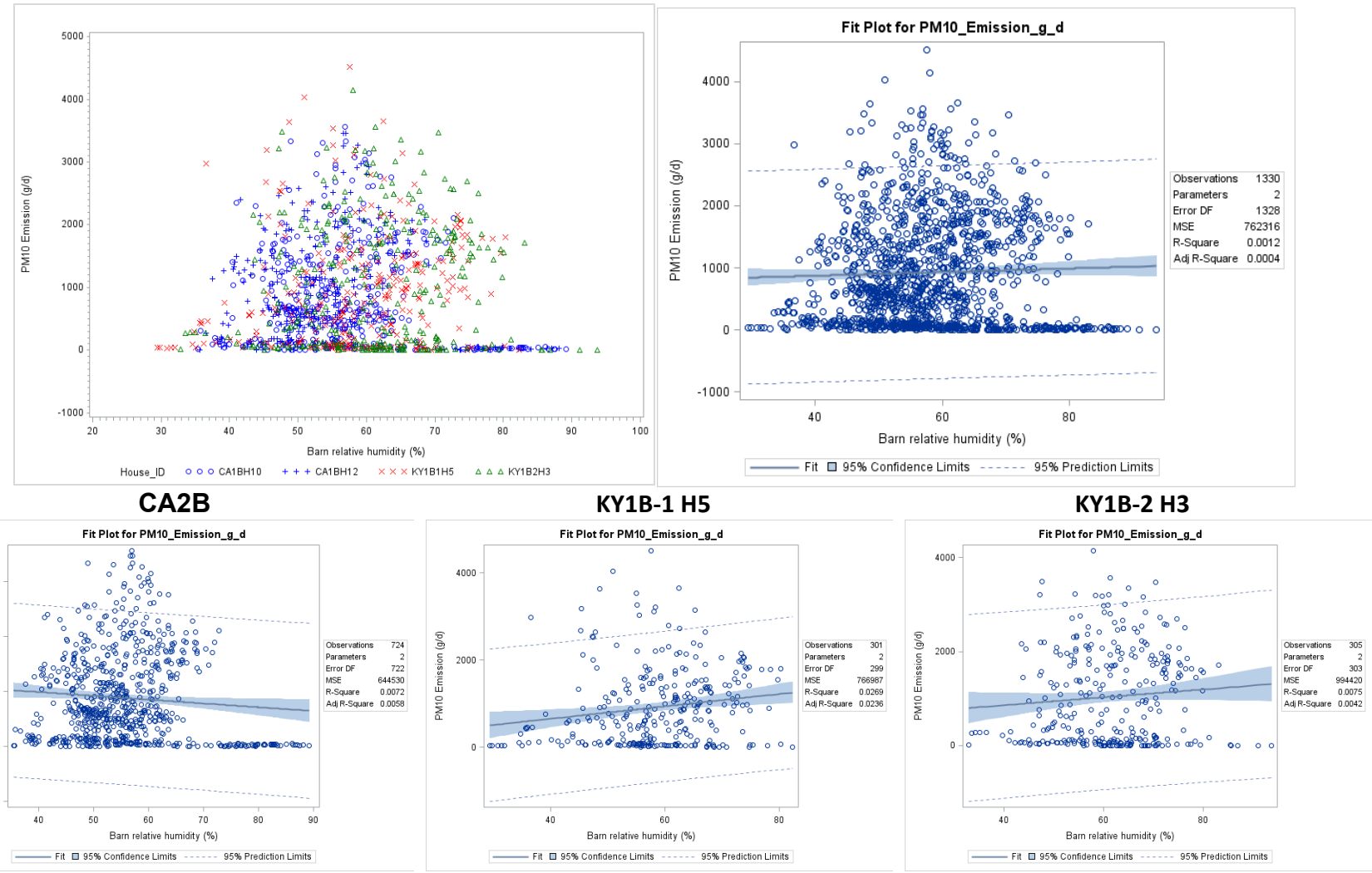


Figure F-38. Scatter plot of broiler PM_{10} emissions versus barn relative humidity and scatter plot with regression.

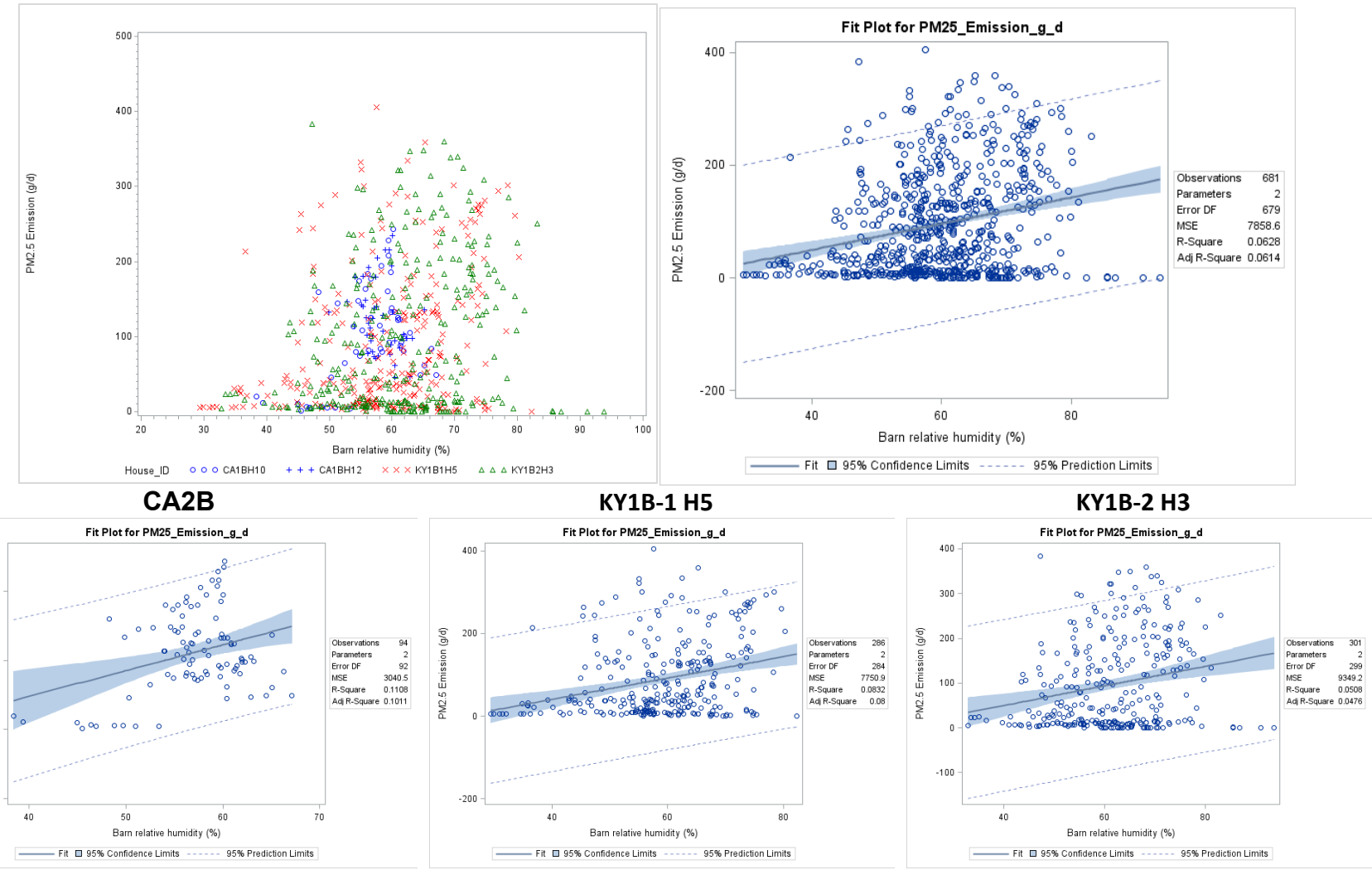


Figure F-39. Scatter plot of broiler $PM_{2.5}$ emissions versus barn relative humidity and scatter plot with regression.

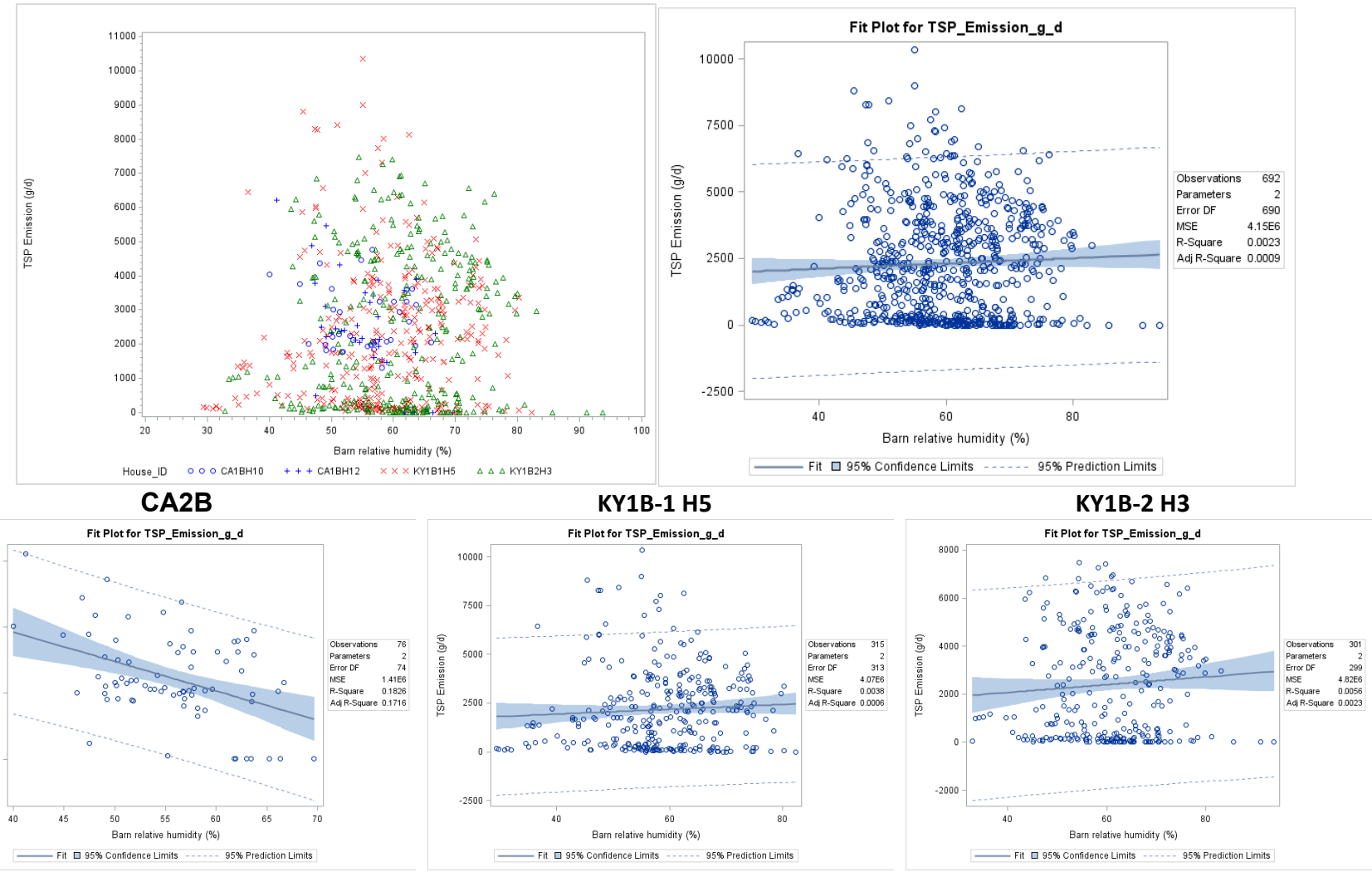


Figure F-40. Scatter plot of broiler TSP emissions versus barn relative humidity and scatter plot with regression.

Airflow

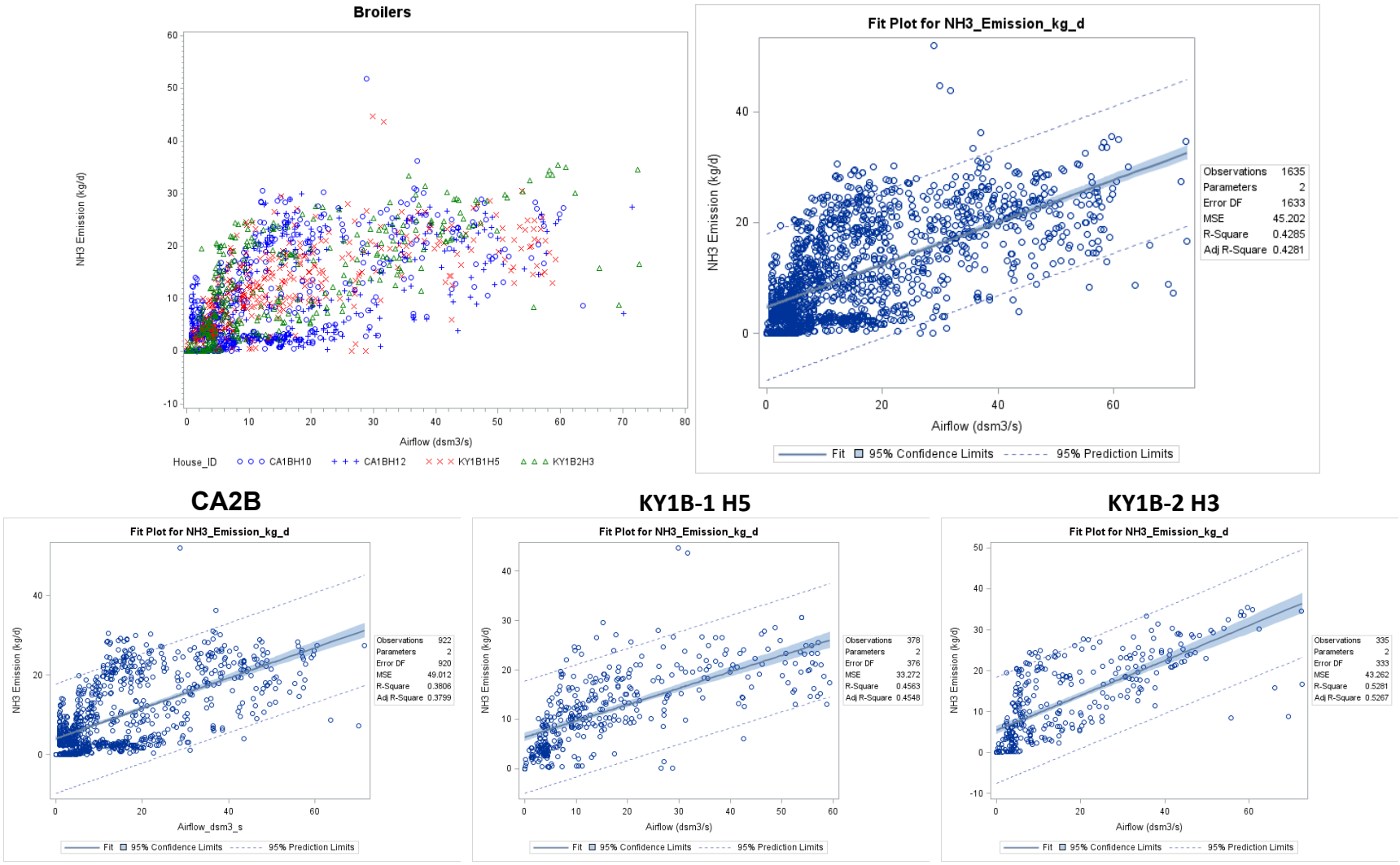


Figure F-41. Scatter plot of broiler NH_3 emissions versus airflow and scatter plot with regression.

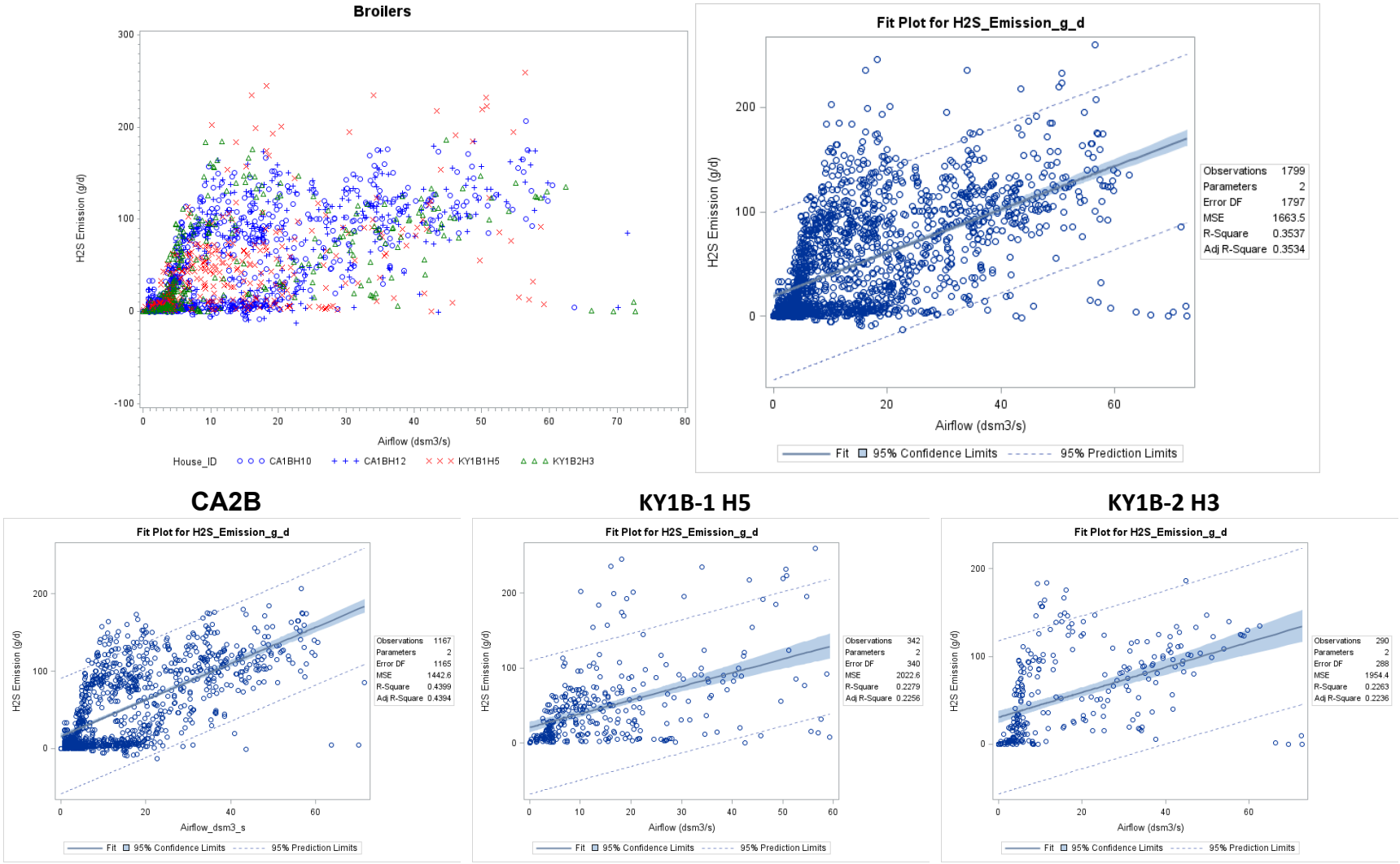


Figure F-42. Scatter plot of broiler H_2S emissions versus airflow and scatter plot with regression.

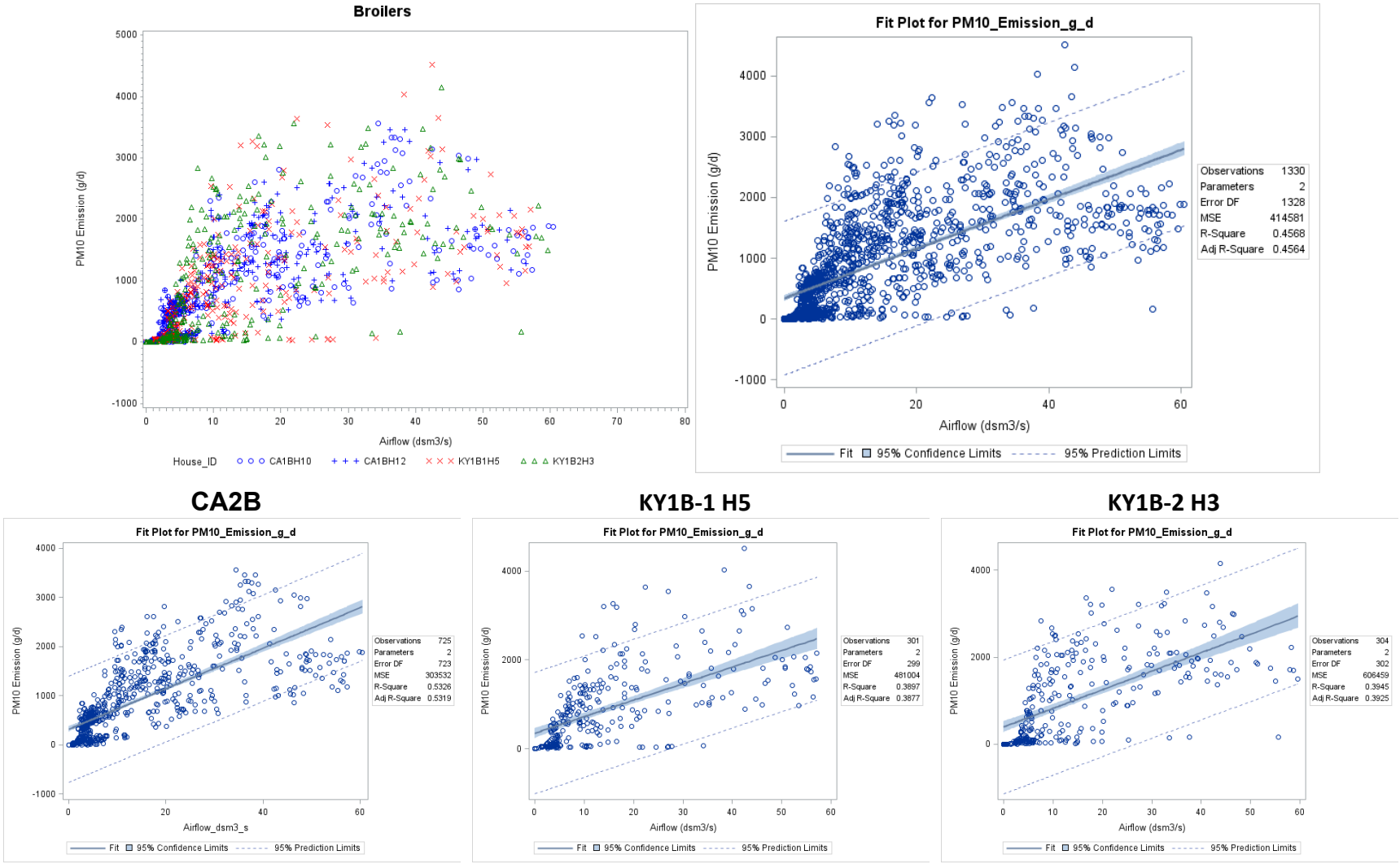


Figure F-43. Scatter plot of broiler PM_{10} emissions versus airflow and scatter plot with regression.

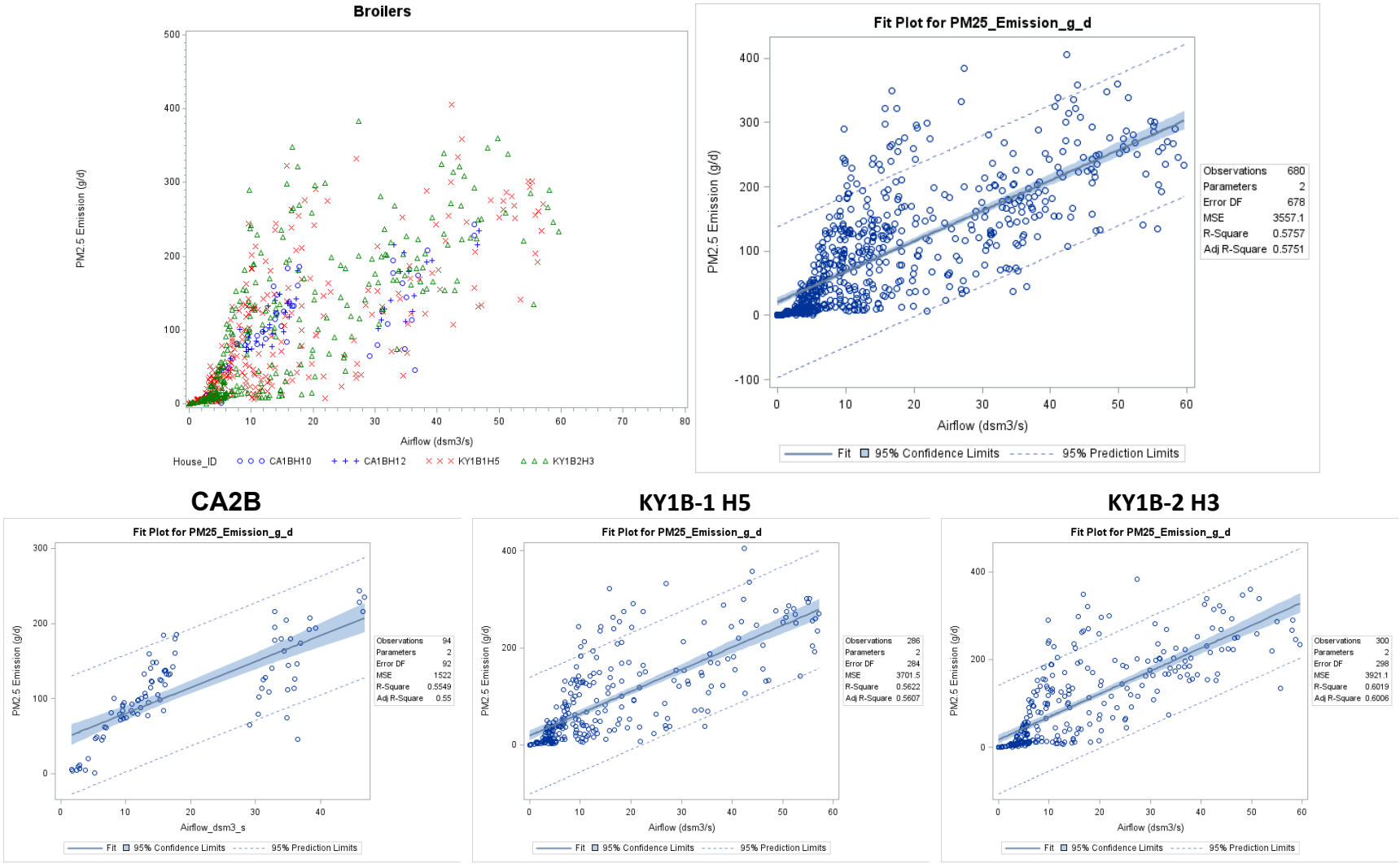


Figure F-44. Scatter plot of broiler $PM_{2.5}$ emissions versus airflow and scatter plot with regression.

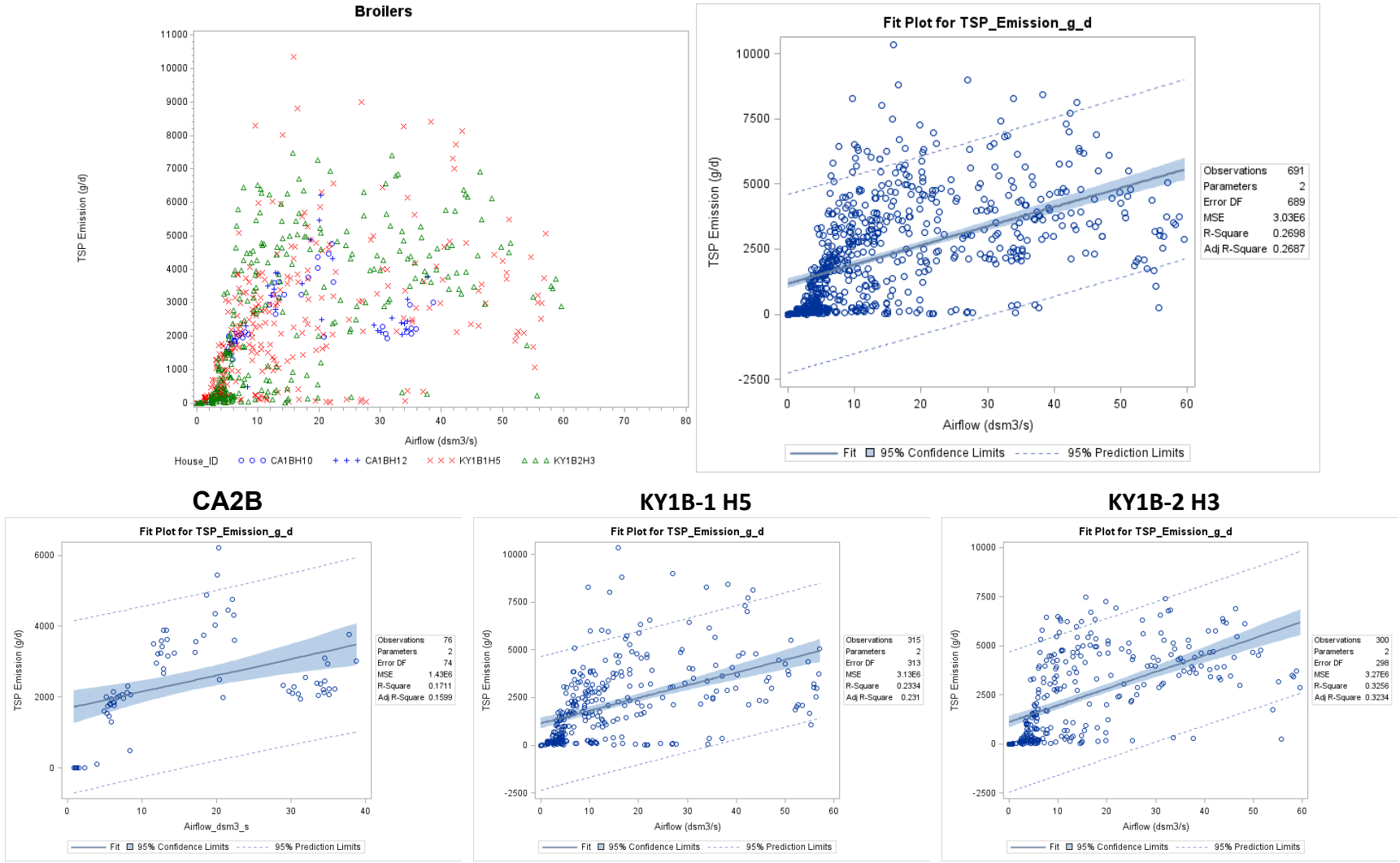
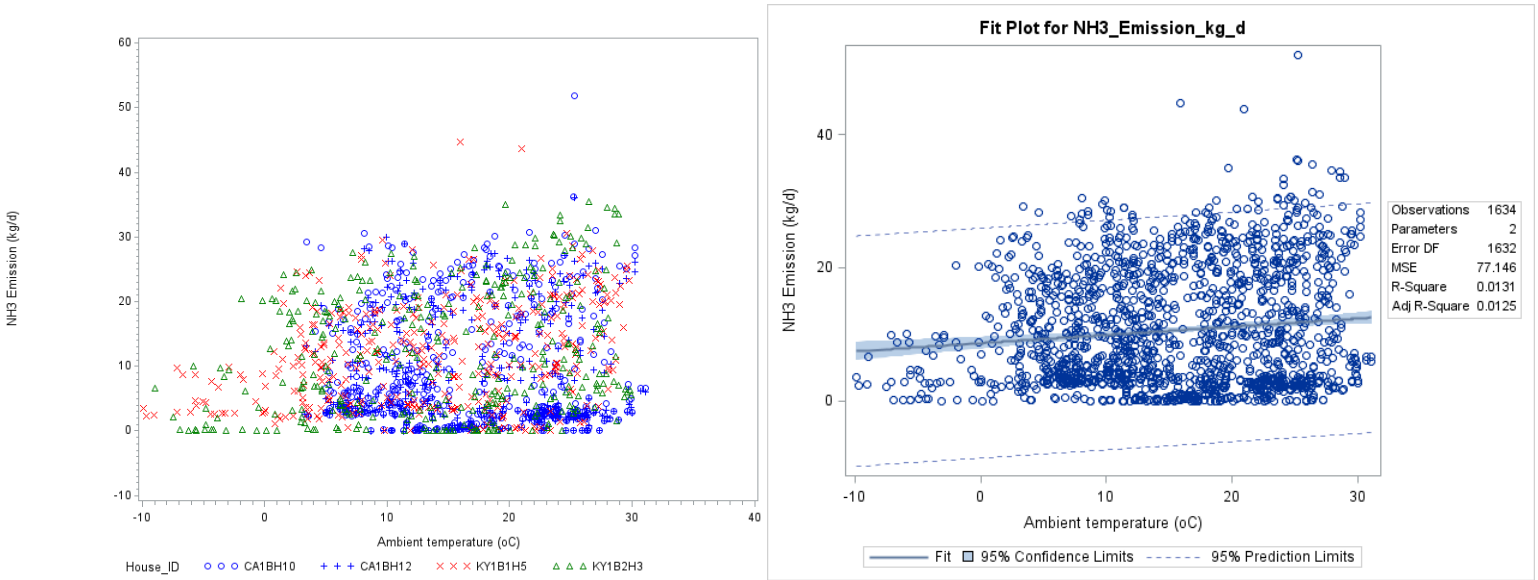
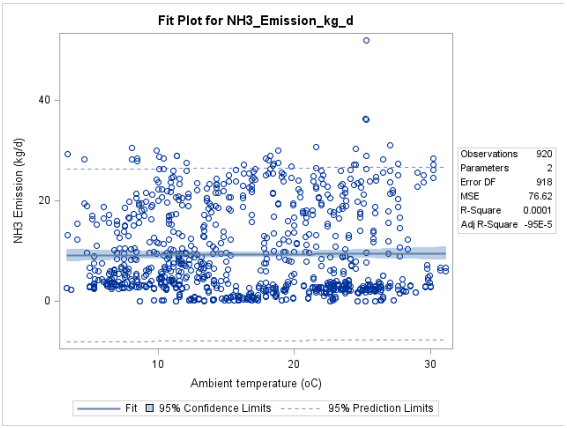


Figure F-45. Scatter plot of broiler TSP emissions versus airflow and scatter plot with regression.

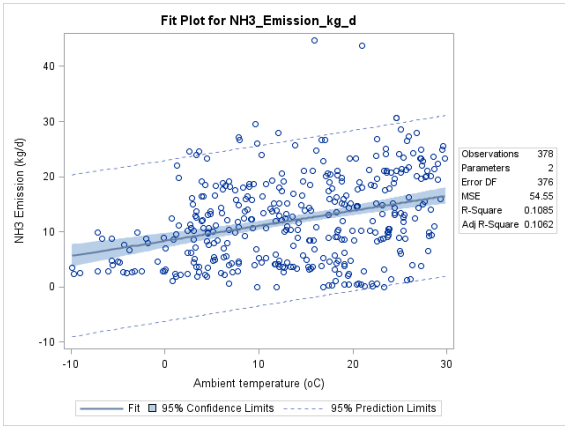
Ambient Temperature



CA2B



KY1B-1 H5



KY1B-2 H3

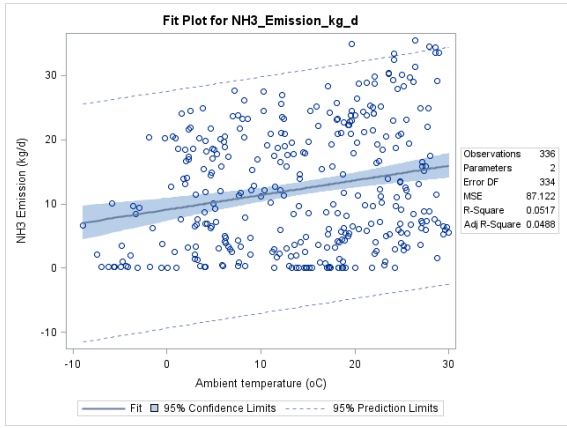


Figure F-46. Scatter plot of broiler NH_3 emissions versus ambient temperature and scatter plot with regression.

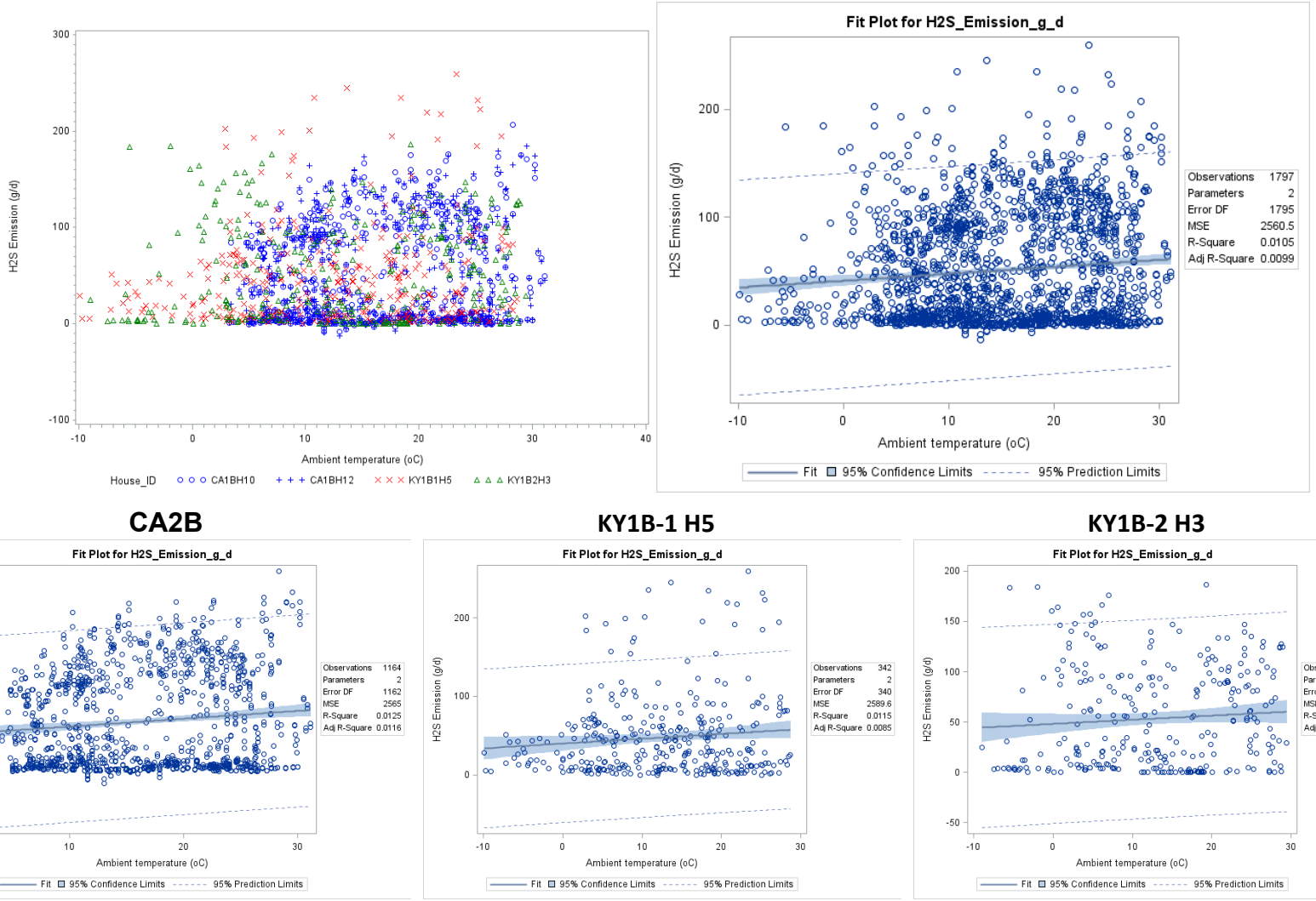


Figure F-47. Scatter plot of broiler H_2S emissions versus ambient temperature and scatter plot with regression.

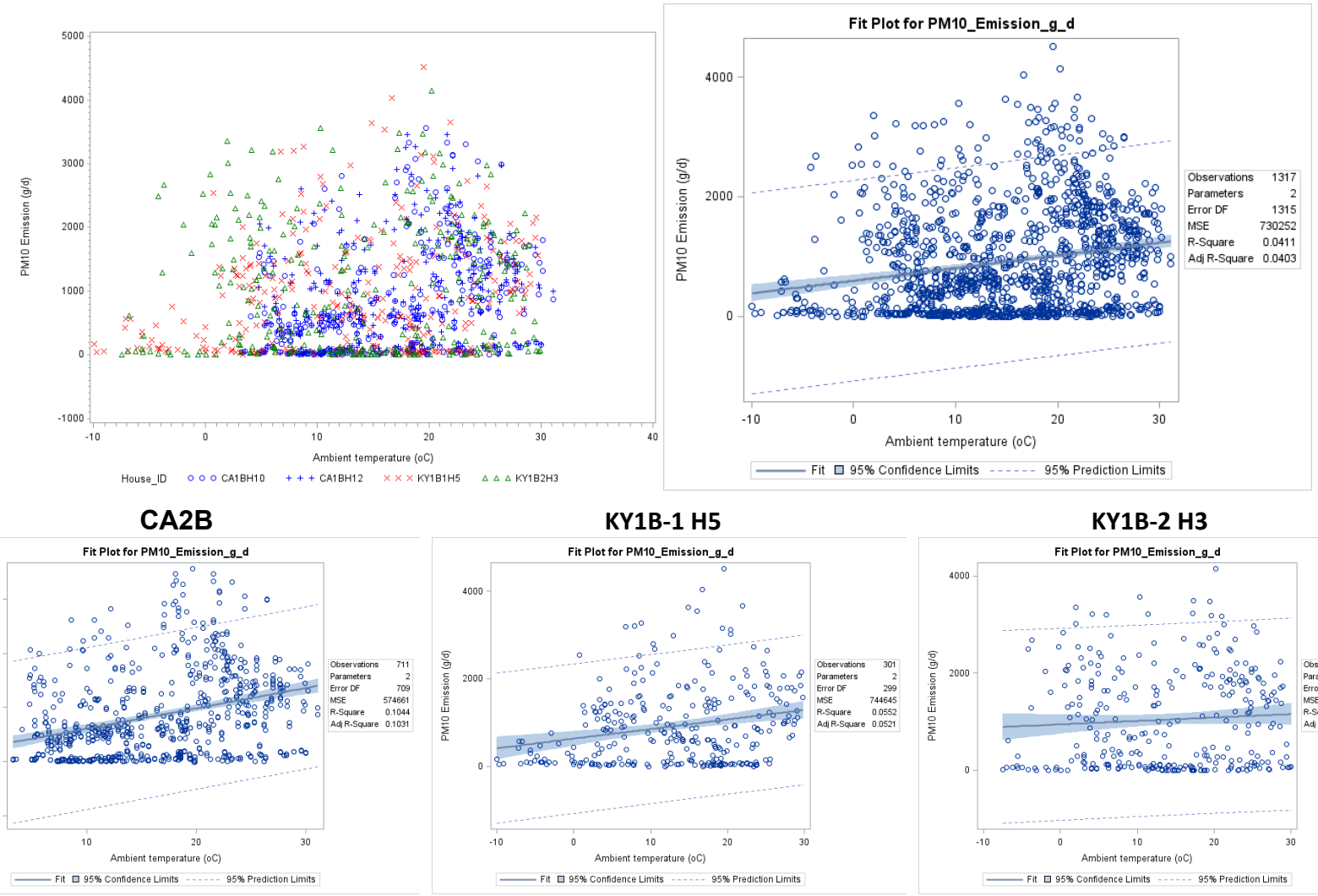


Figure F-48. Scatter plot of broiler PM_{10} emissions versus ambient temperature and scatter plot with regression.

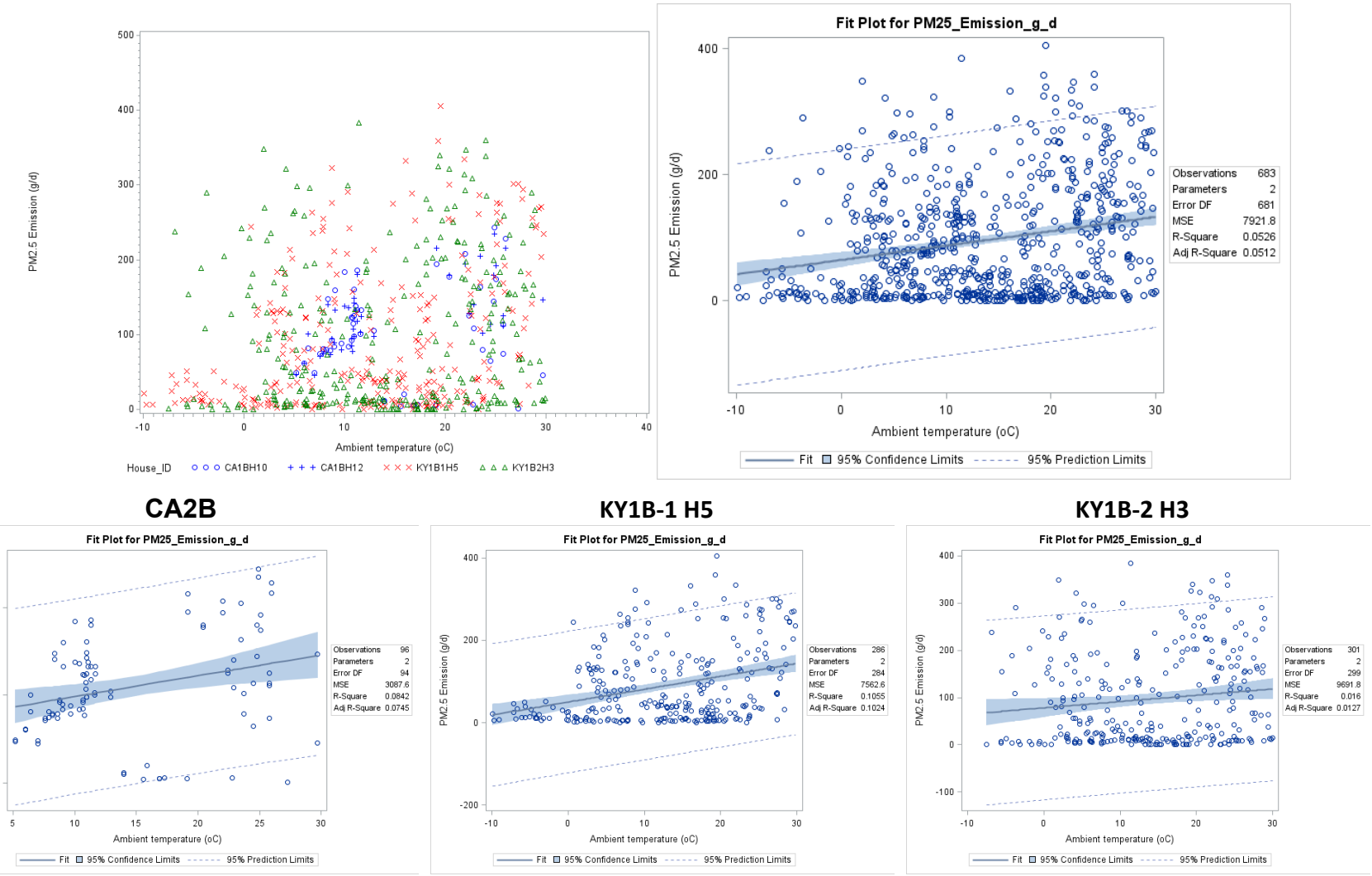


Figure F-49. Scatter plot of broiler $PM_{2.5}$ emissions versus ambient temperature and scatter plot with regression.

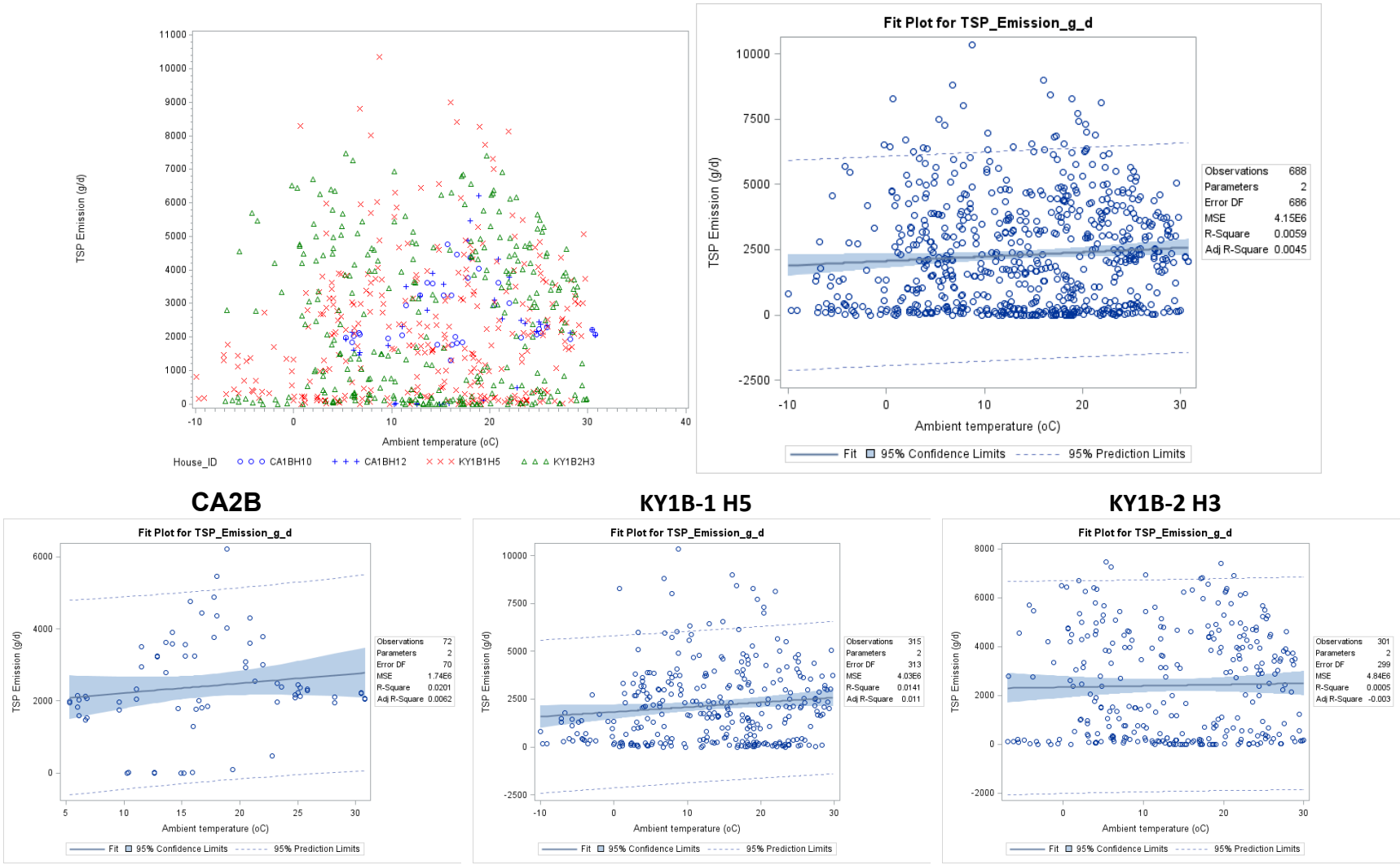


Figure F-50. Scatter plot of broiler TSP emissions versus ambient temperature and scatter plot with regression.

Ambient relative Humidity

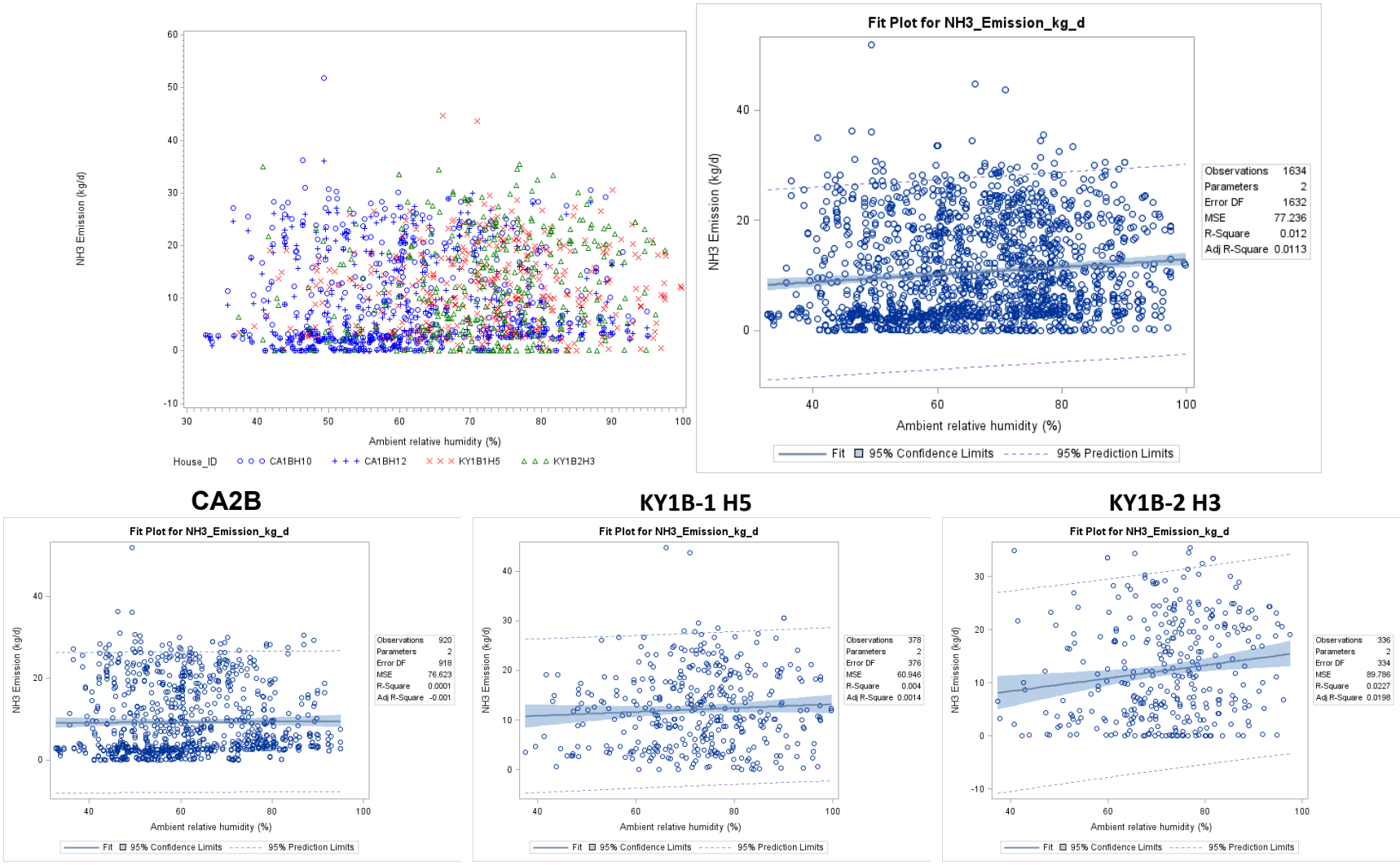


Figure F-51. Scatter plot of broiler NH_3 emissions versus ambient relative humidity and scatter plot with regression.

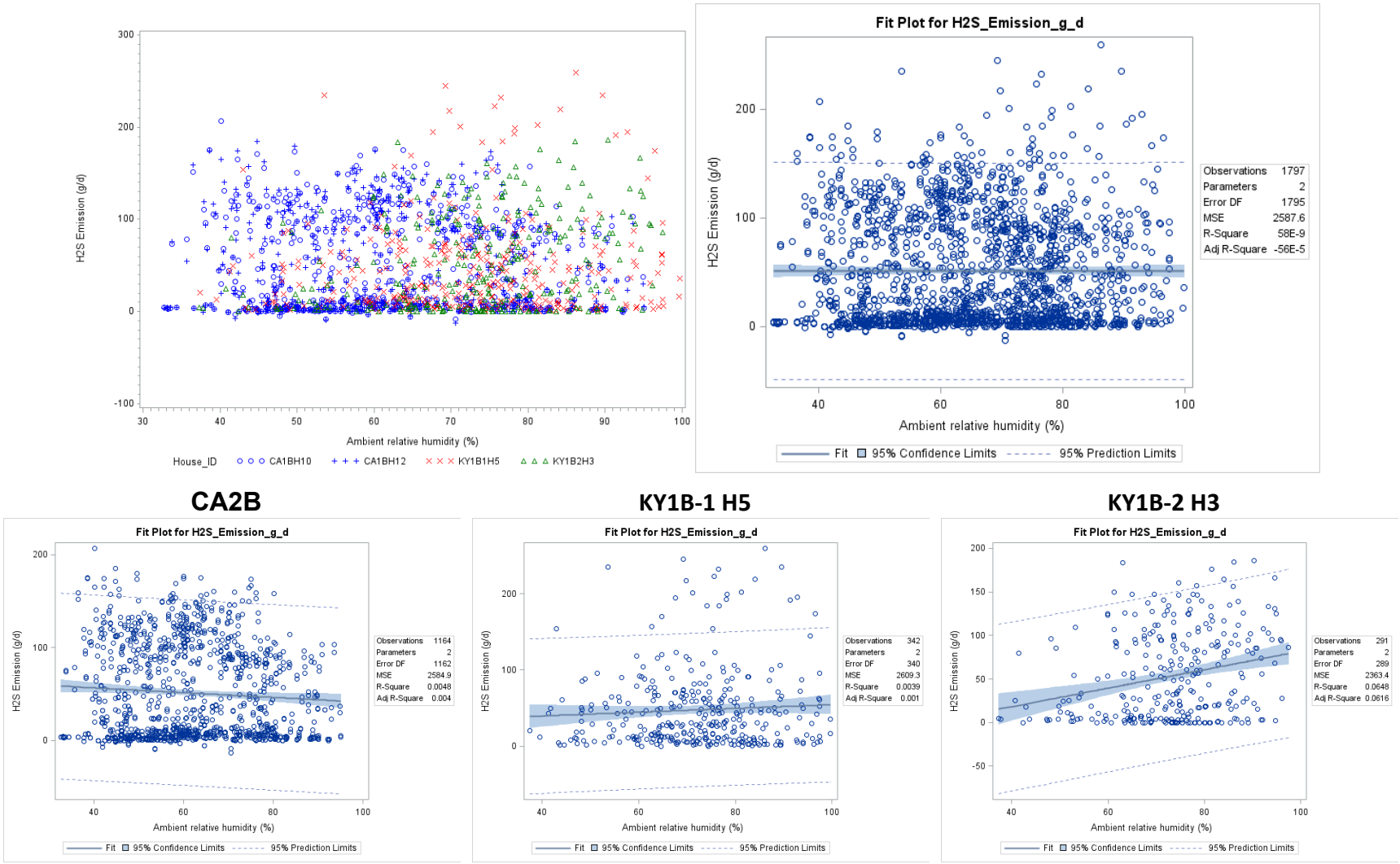


Figure F-52. Scatter plot of broiler H_2S emissions versus ambient relative humidity and scatter plot with regression.

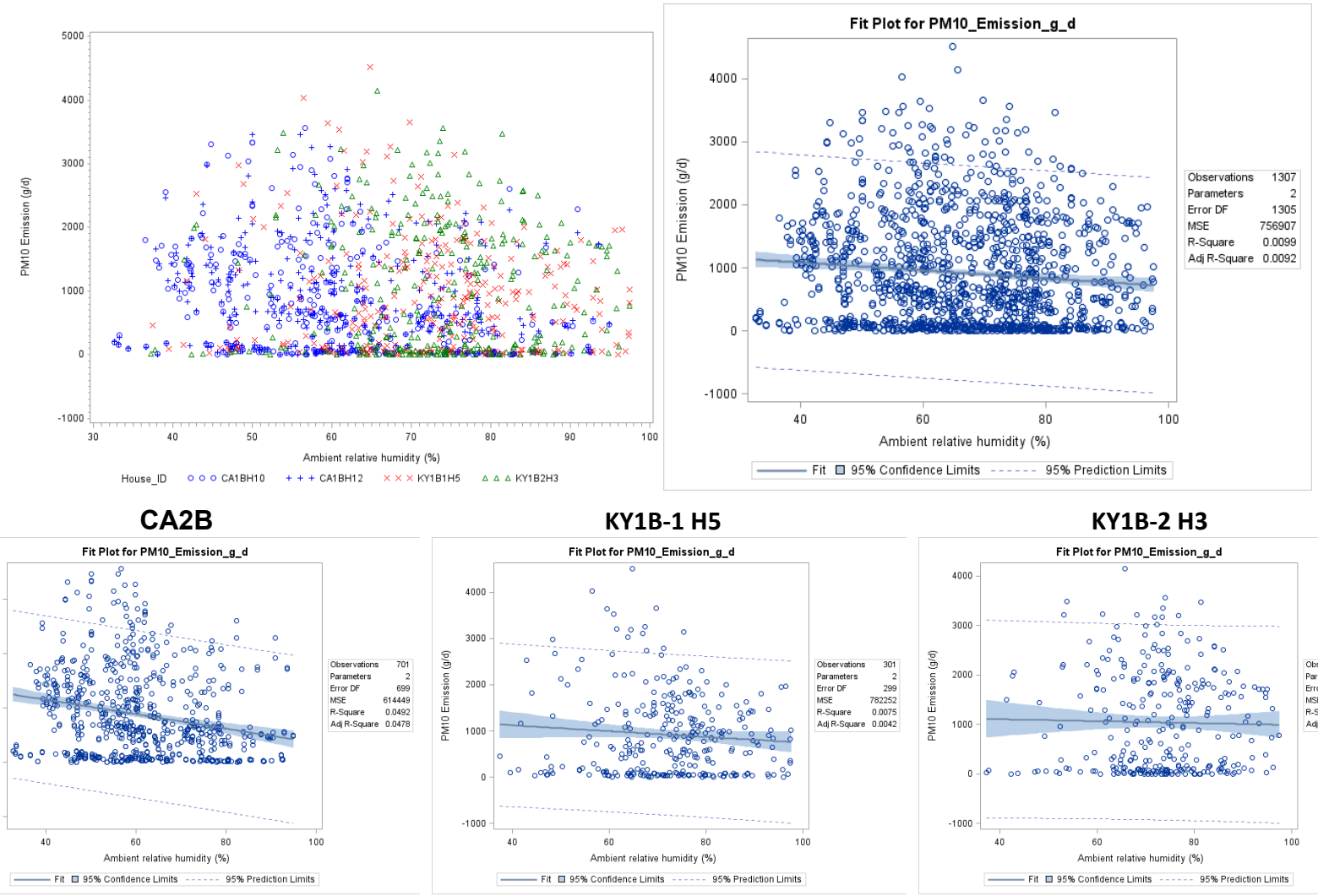


Figure F-53. Scatter plot of broiler PM_{10} emissions versus ambient relative humidity and scatter plot with regression.

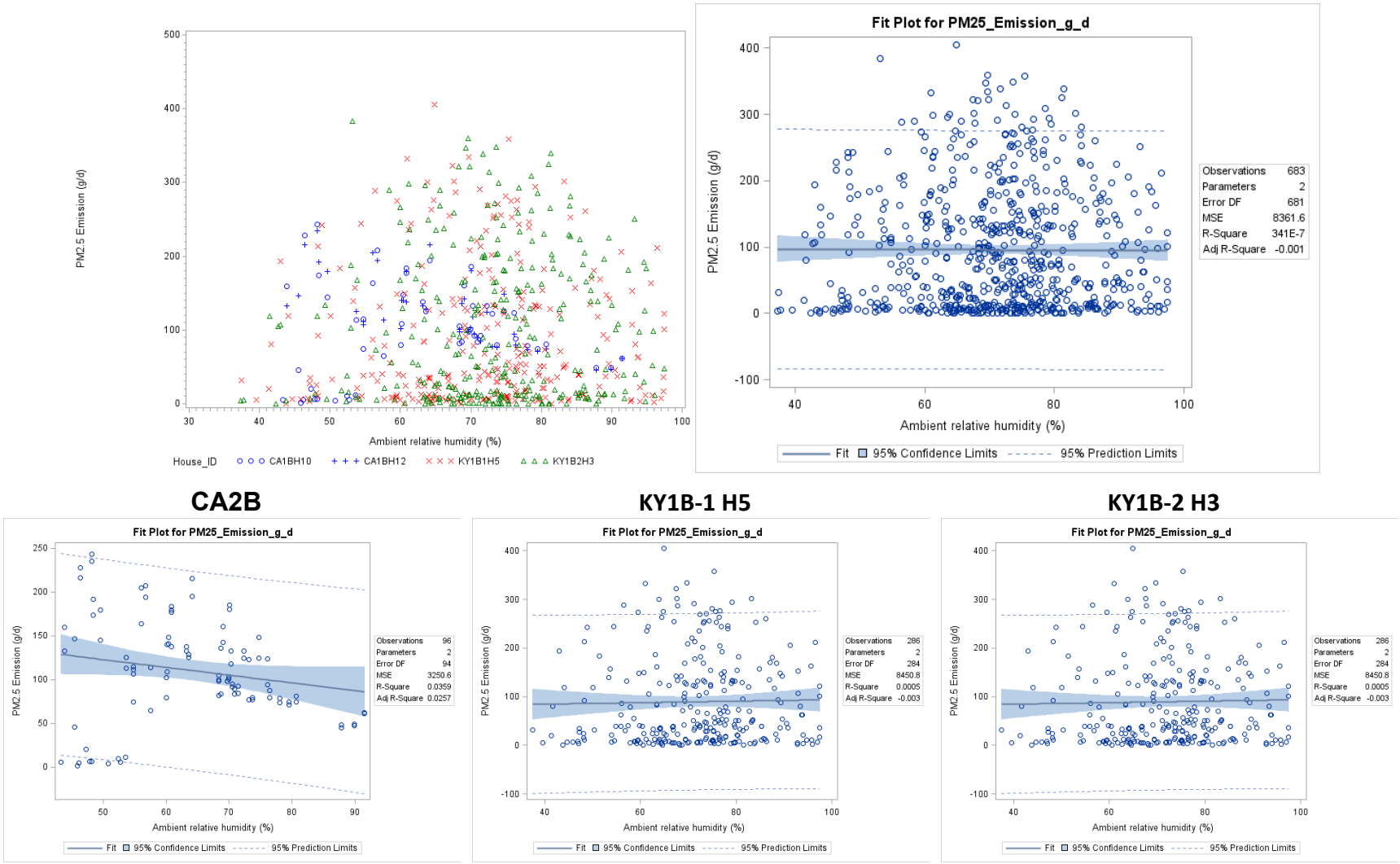


Figure F-54. Scatter plot of broiler $PM_{2.5}$ emissions versus ambient relative humidity and scatter plot with regression.

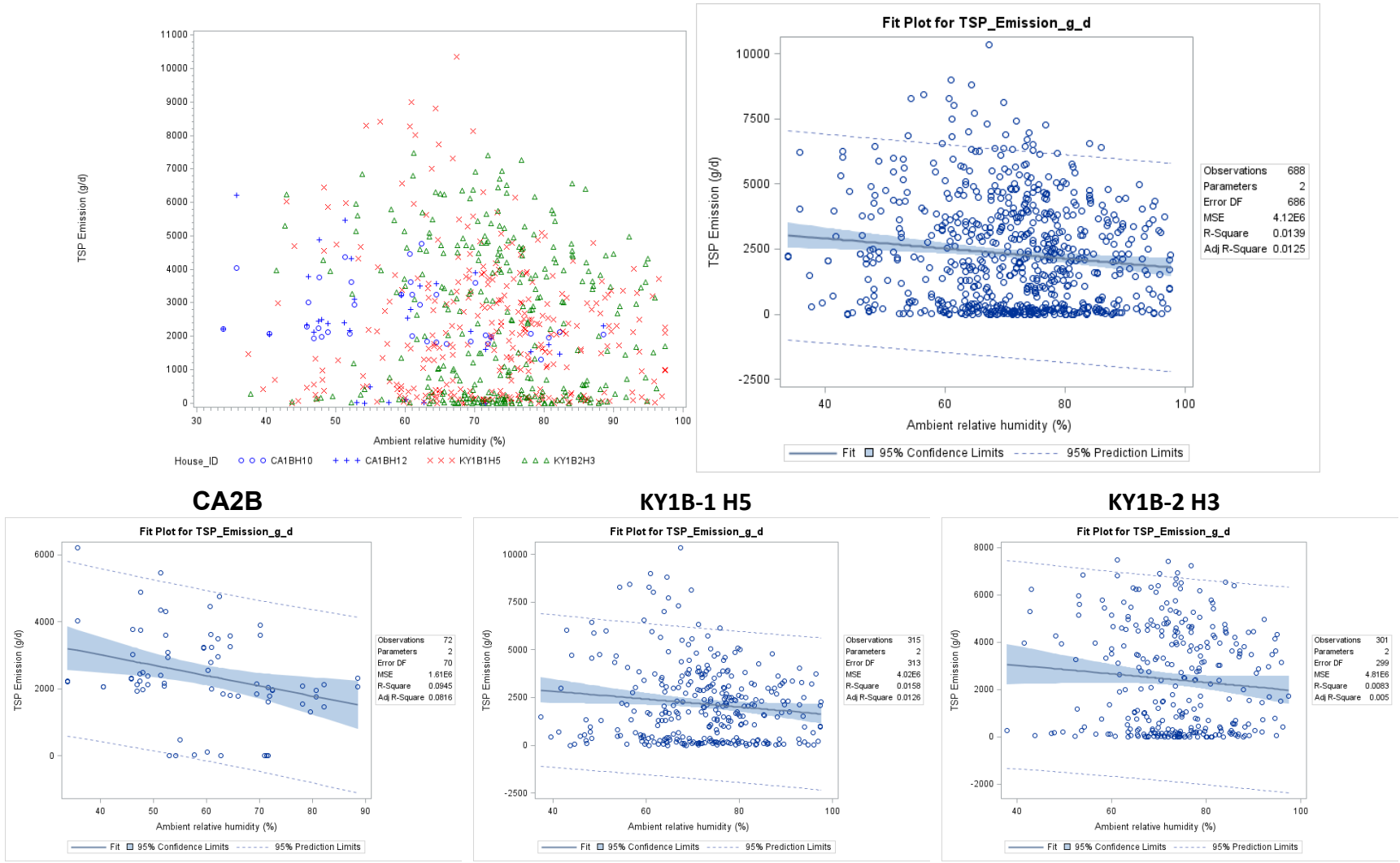


Figure F-55. Scatter plot of broiler TSP emissions versus ambient relative humidity and scatter plot with regression.

Litter age

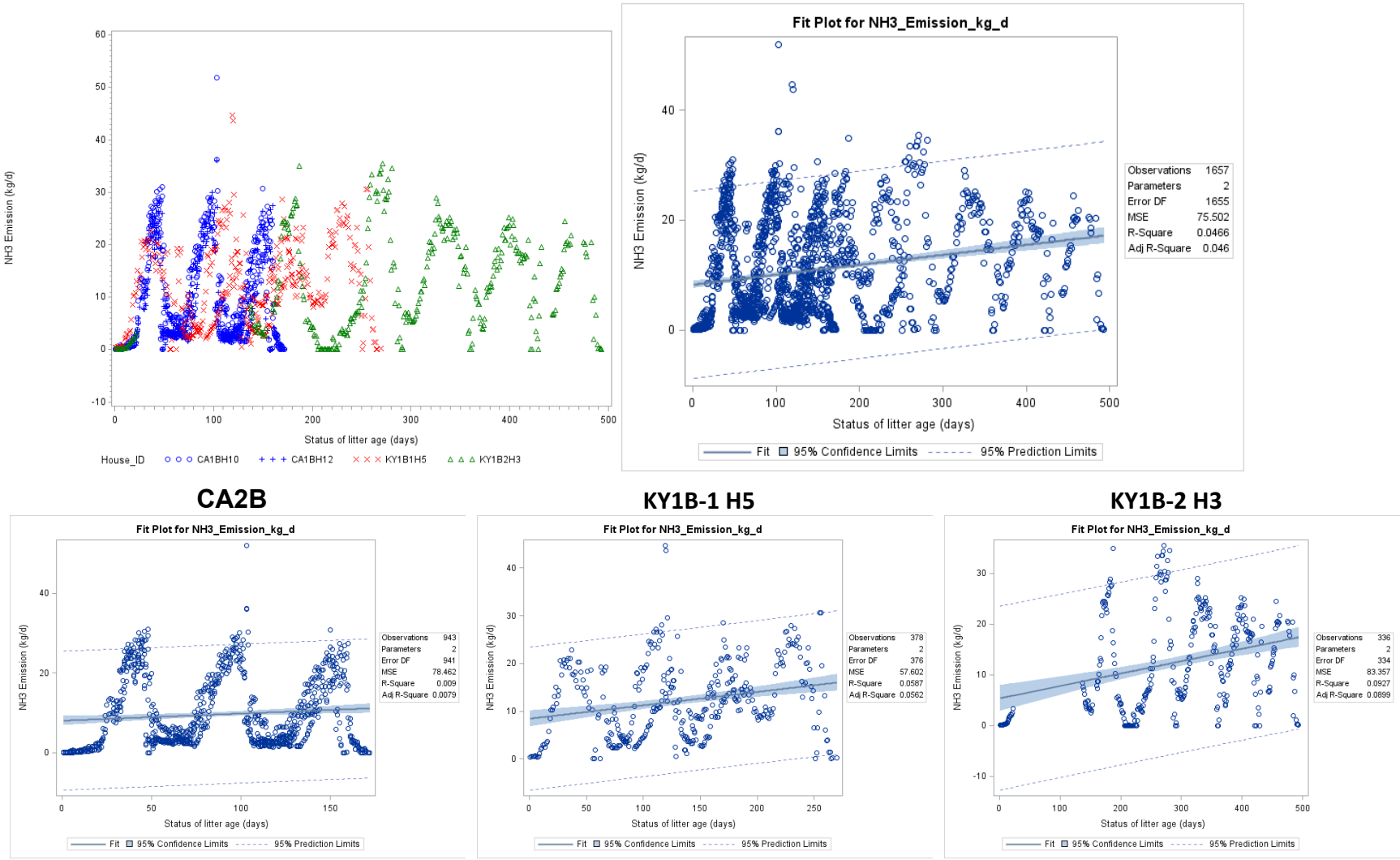


Figure F-56. Scatter plot of broiler NH_3 emissions versus litter age and scatter plot with regression.

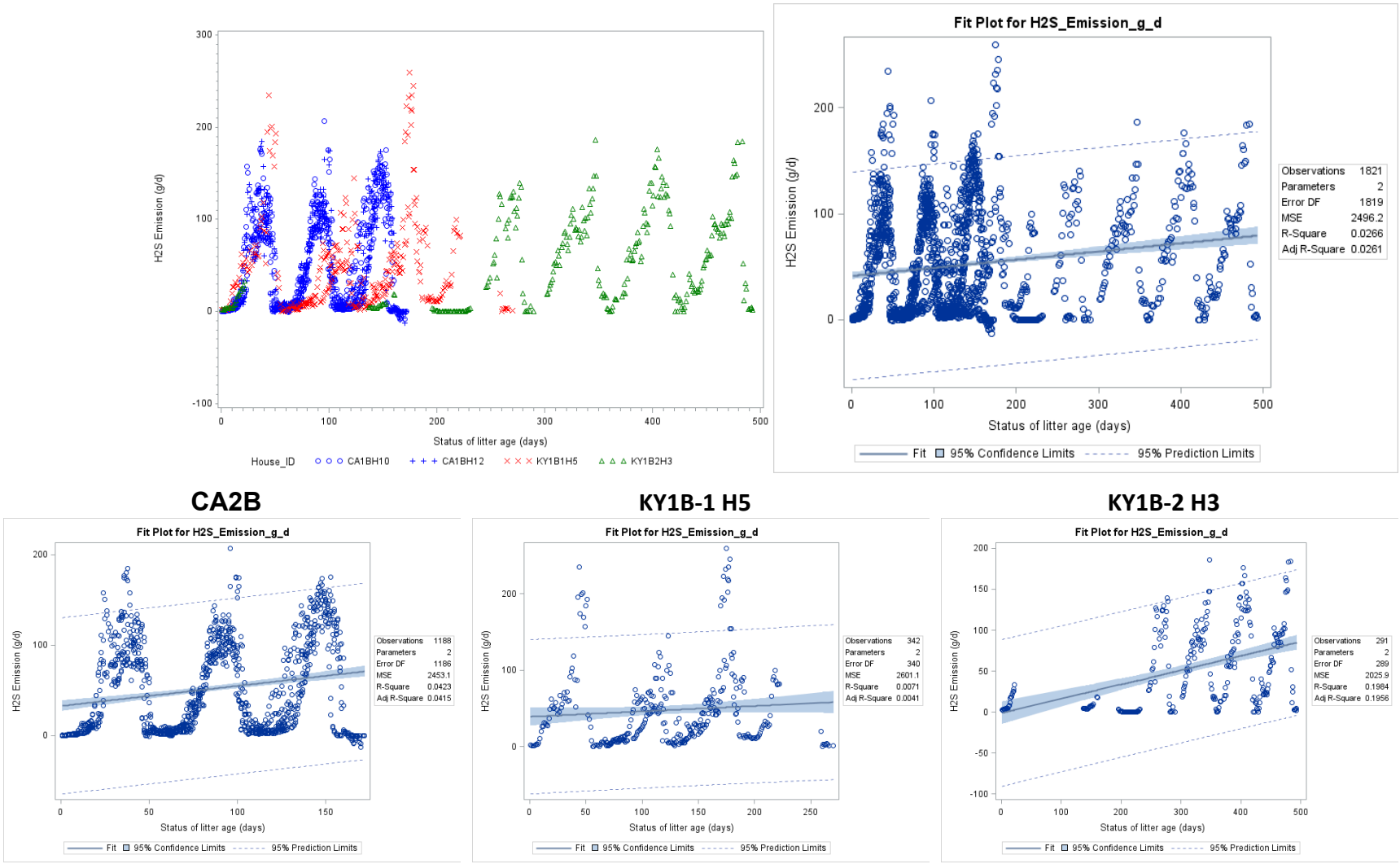


Figure F-57. Scatter plot of broiler H_2S emissions versus litter age and scatter plot with regression.

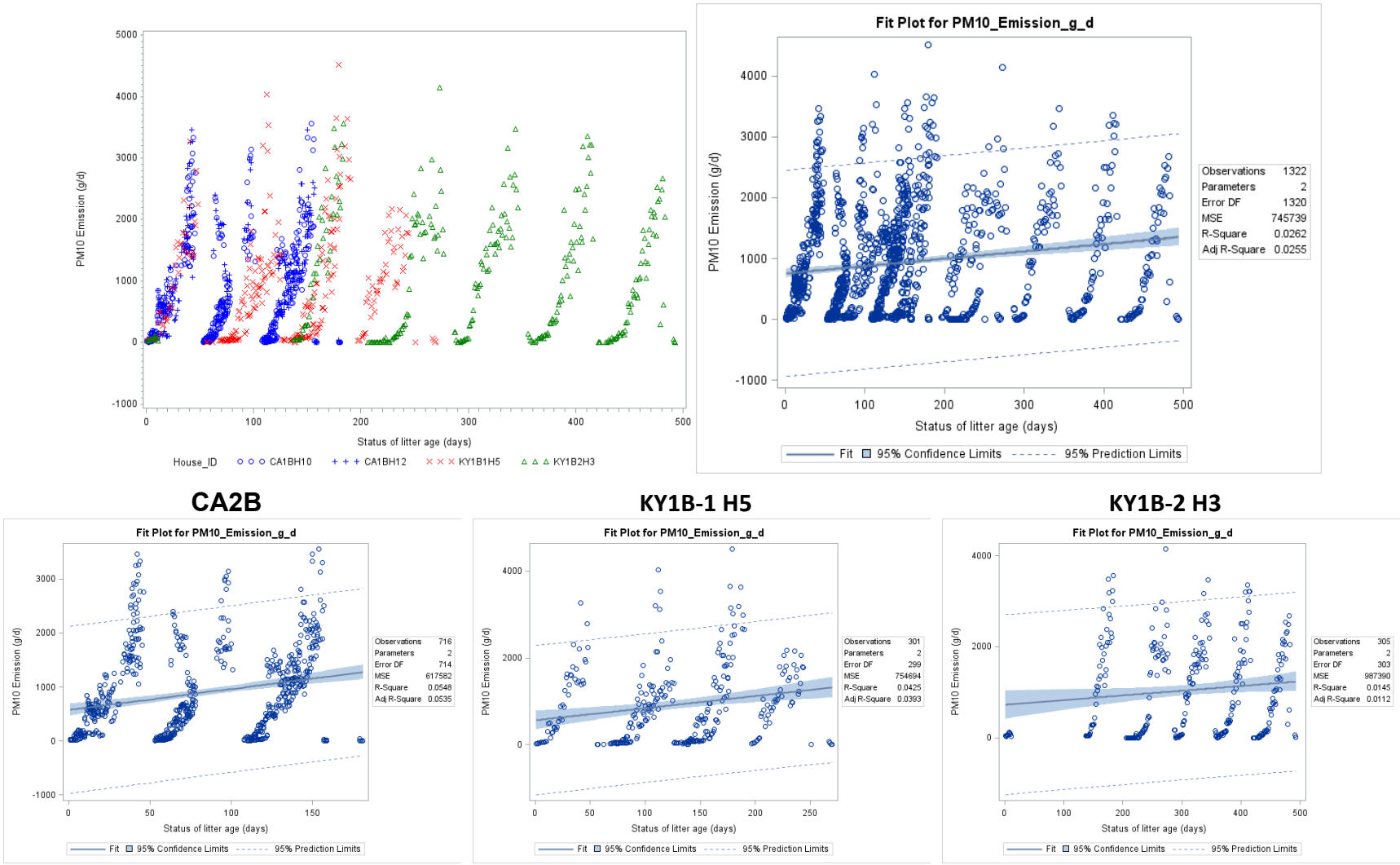


Figure F-58. Scatter plot of broiler PM_{10} emissions versus litter age and scatter plot with regression.

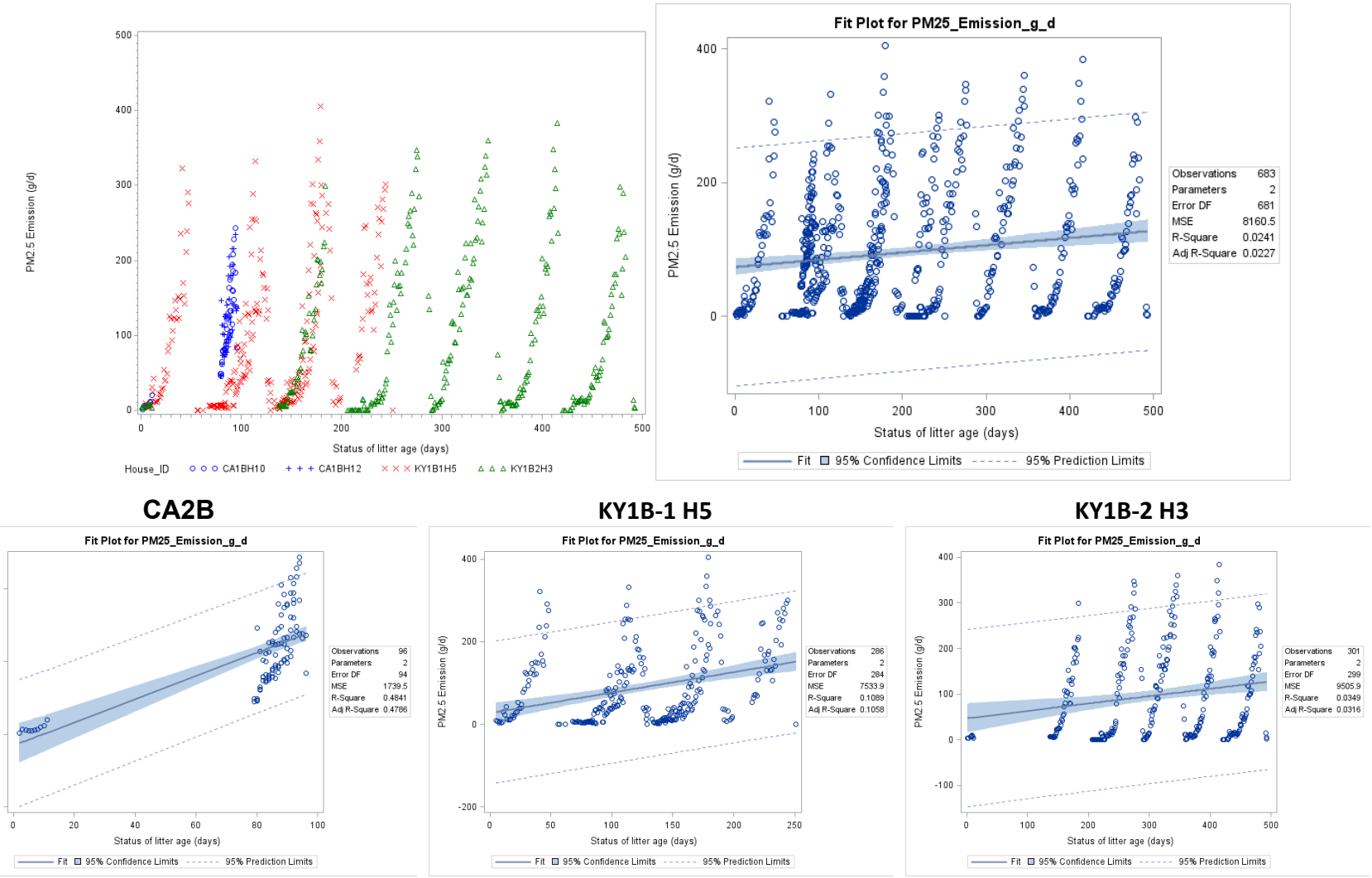


Figure F-59. Scatter plot of broiler $PM_{2.5}$ emissions versus litter age and scatter plot with regression.

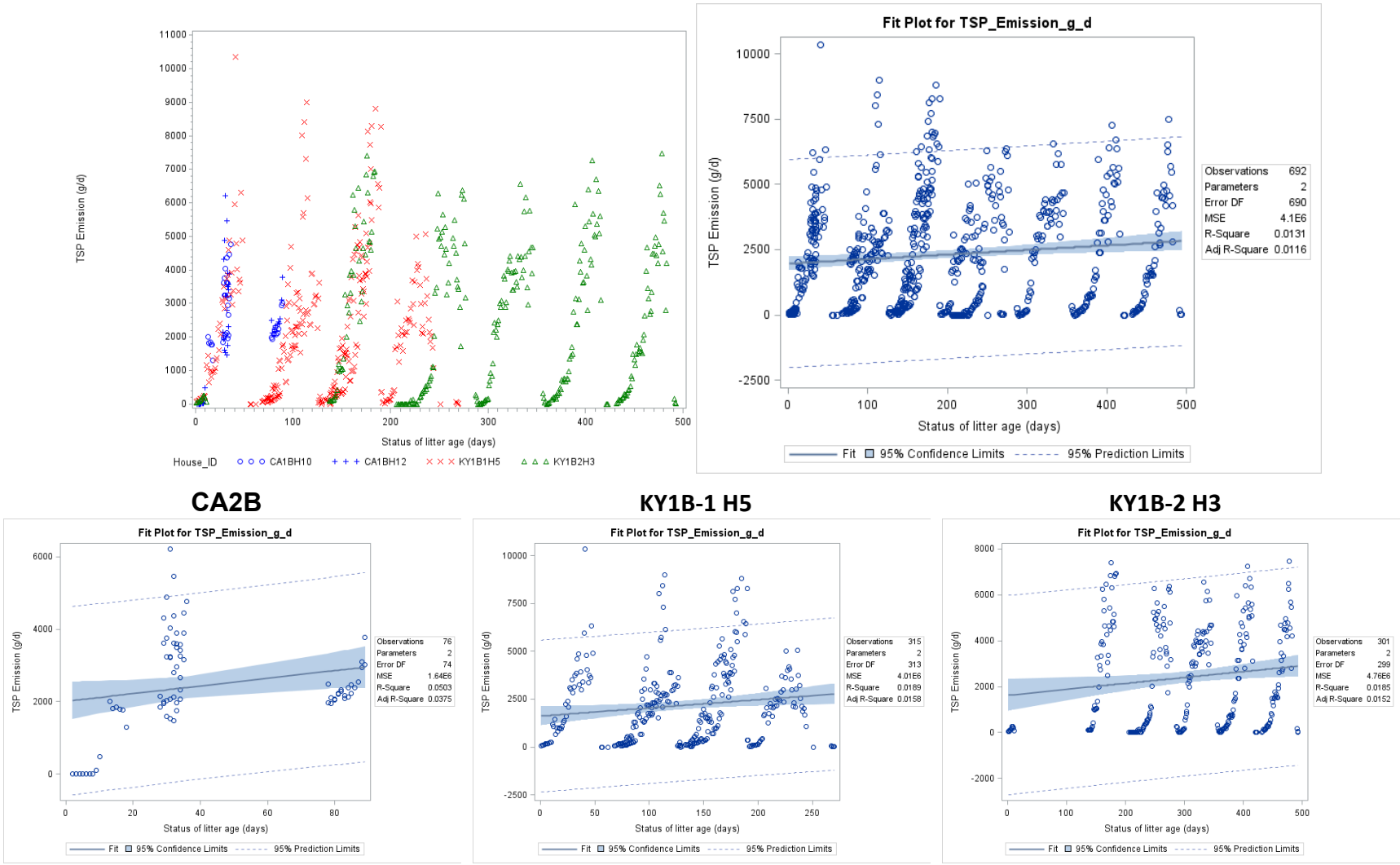
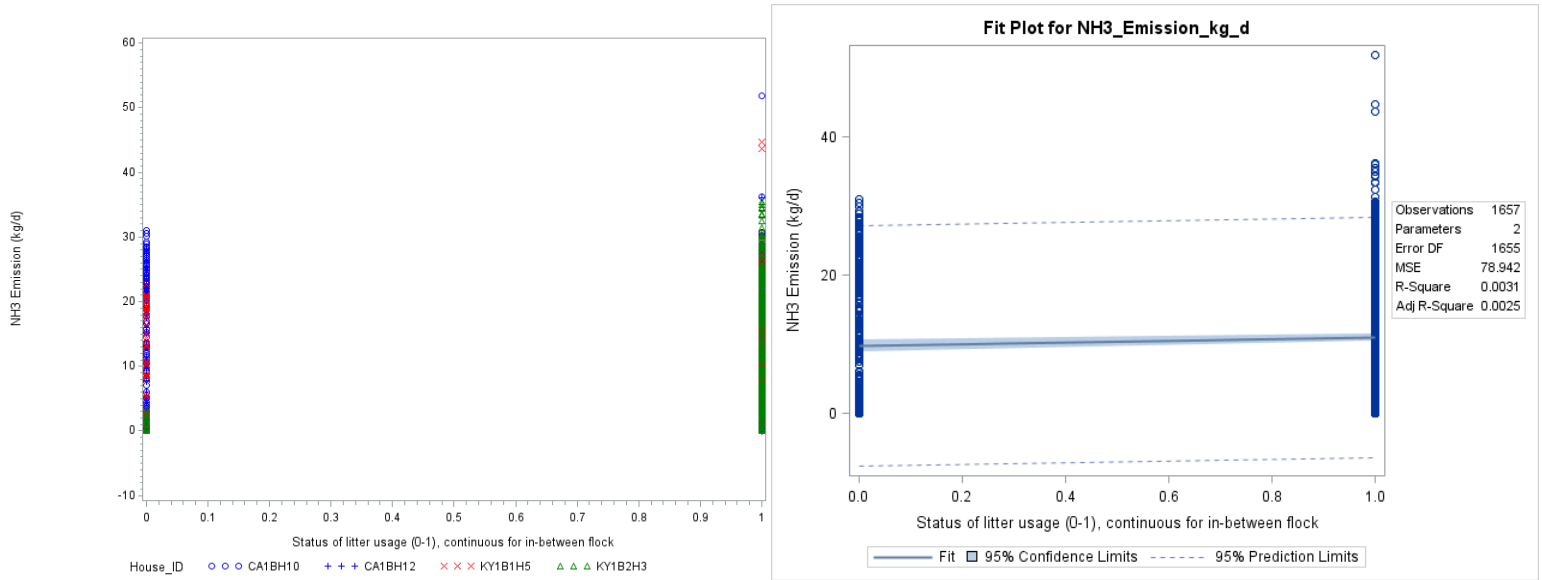
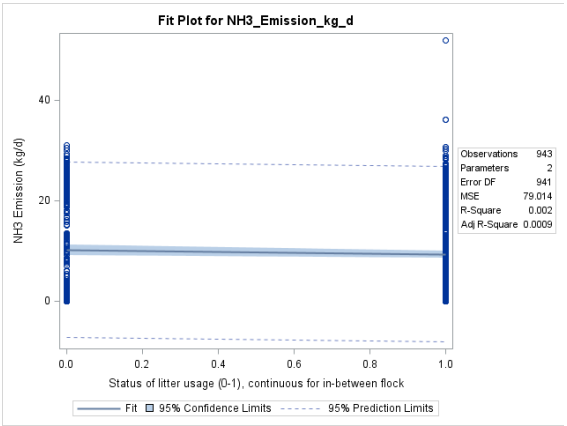


Figure F-60. Scatter plot of broiler TSP emissions versus litter age and scatter plot with regression.

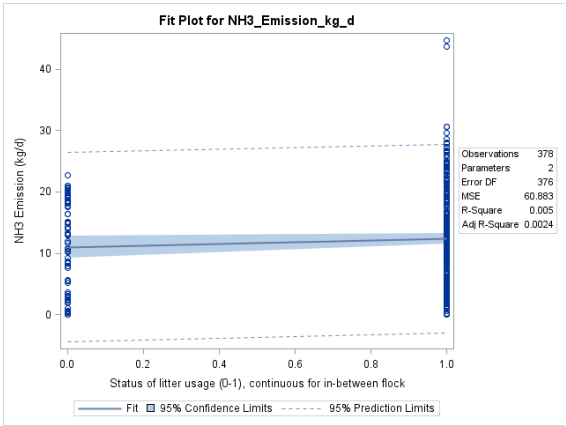
Litter Status (0-1, continuous)



CA2B



KY1B-1 H5



KY1B-2 H3

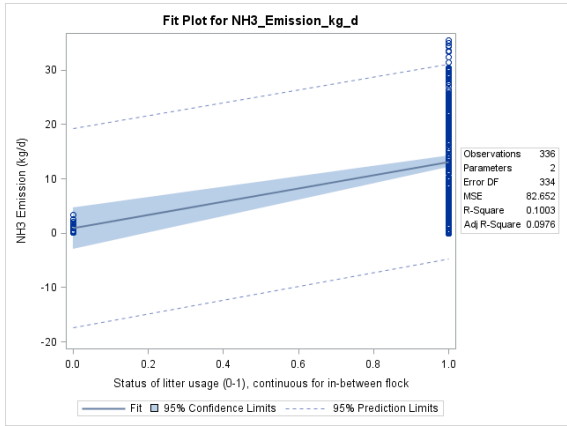


Figure F-61. Scatter plot of broiler NH_3 emissions versus litter status (0-1, continuous) and scatter plot with regression.

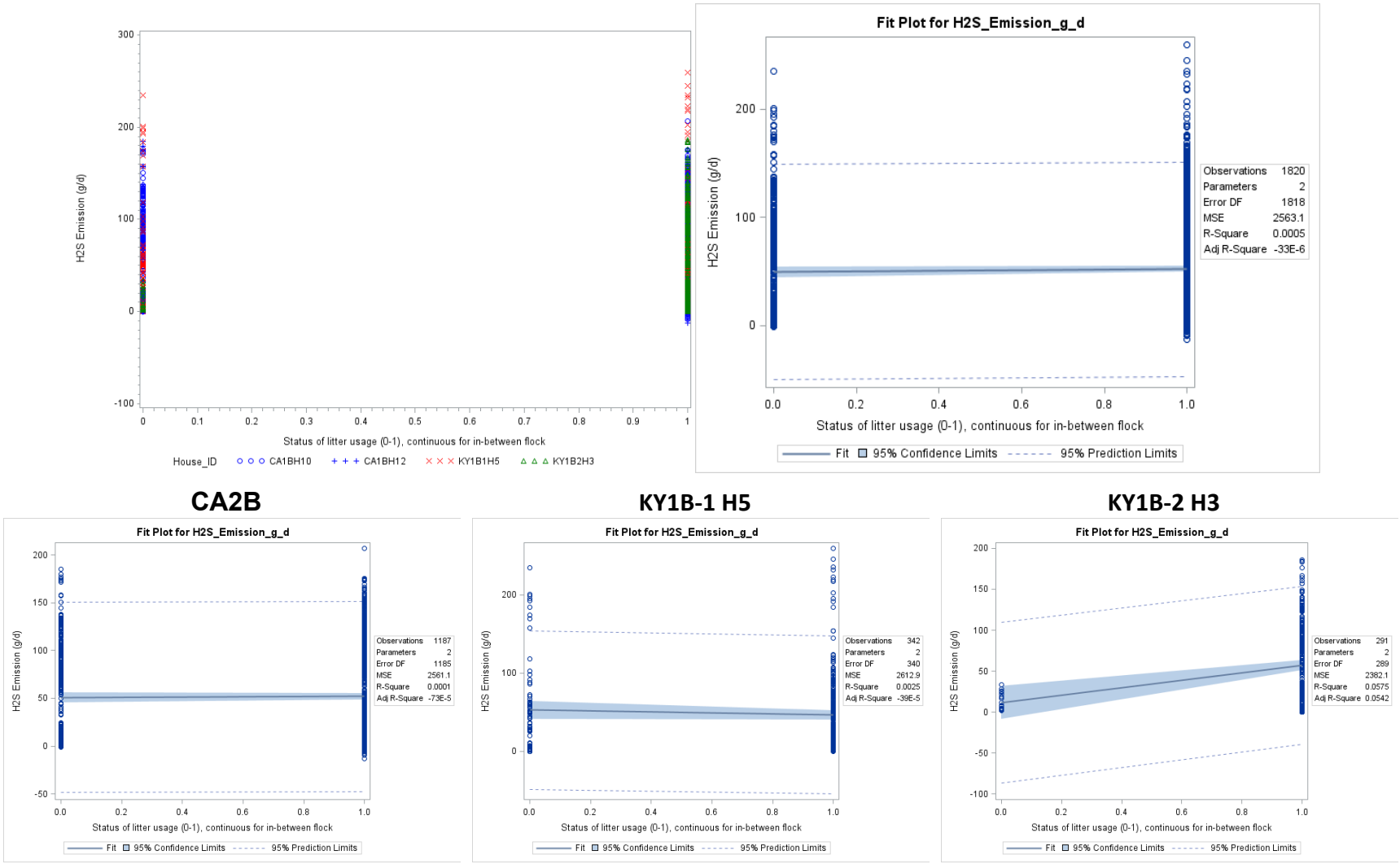


Figure F-62. Scatter plot of broiler H_2S emissions versus litter status (0-1, continuous) and scatter plot with regression.

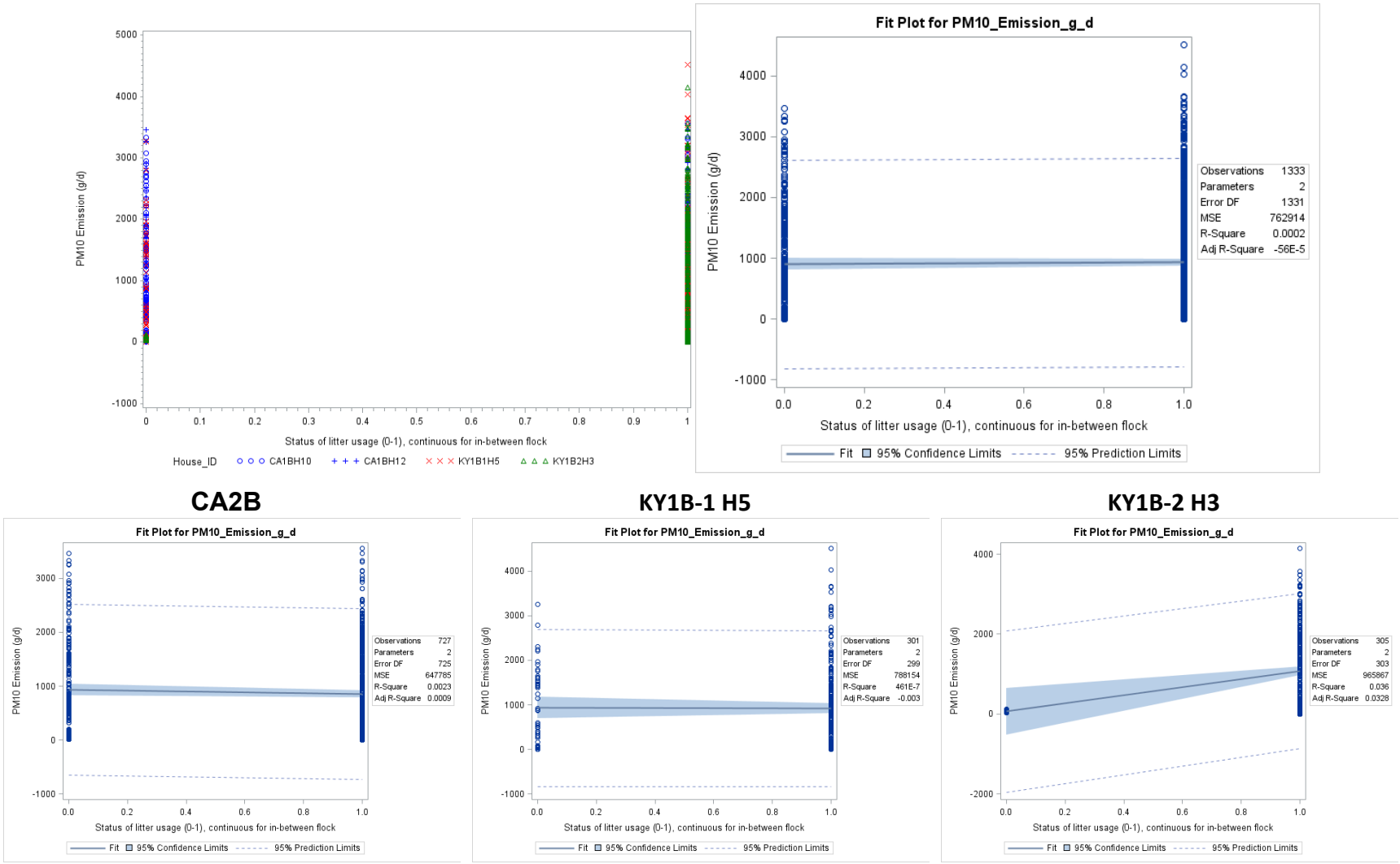


Figure F-63. Scatter plot of broiler PM_{10} emissions versus litter status (0-1, continuous) and scatter plot with regression.

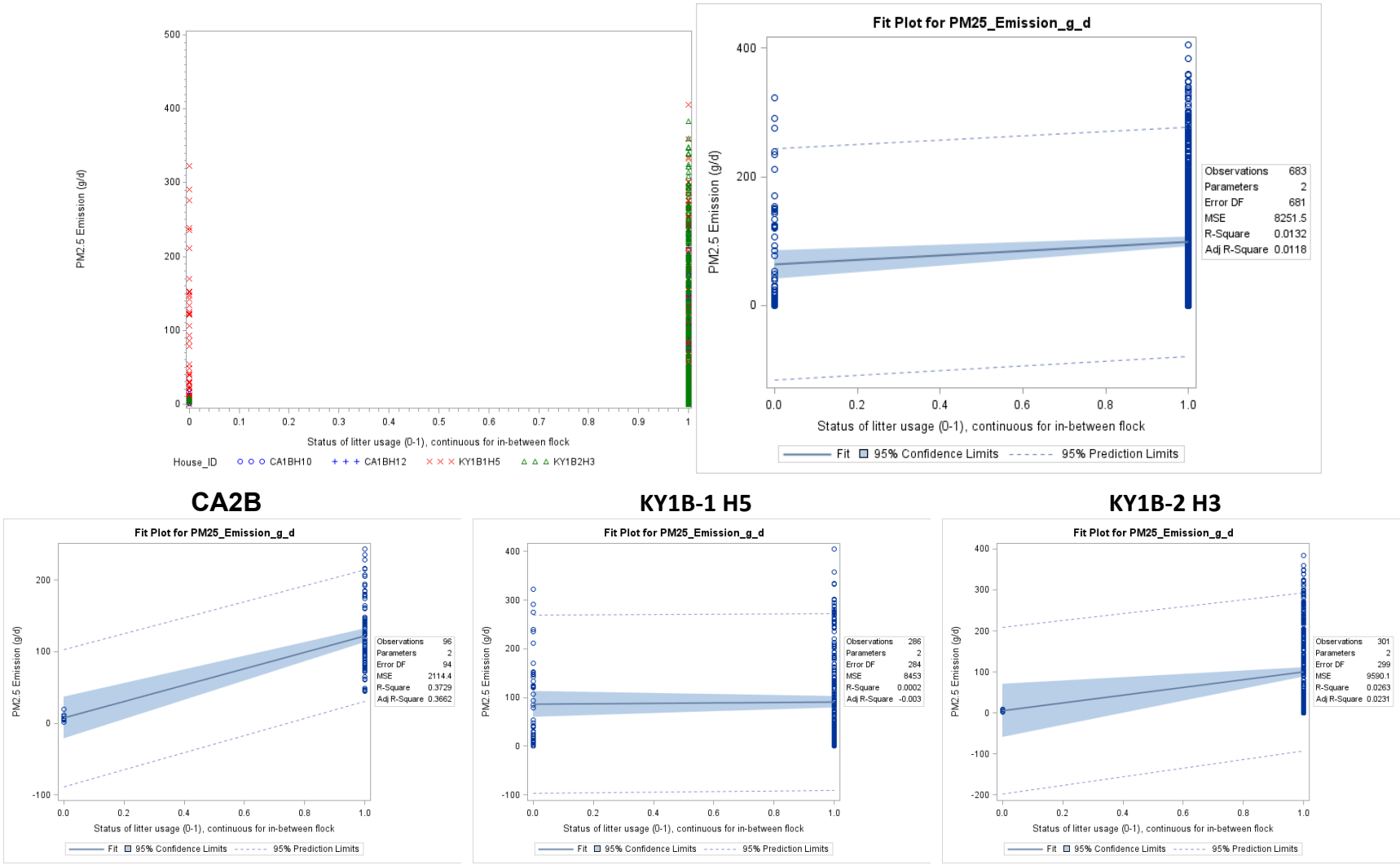


Figure F-64. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-1, continuous) and scatter plot with regression.

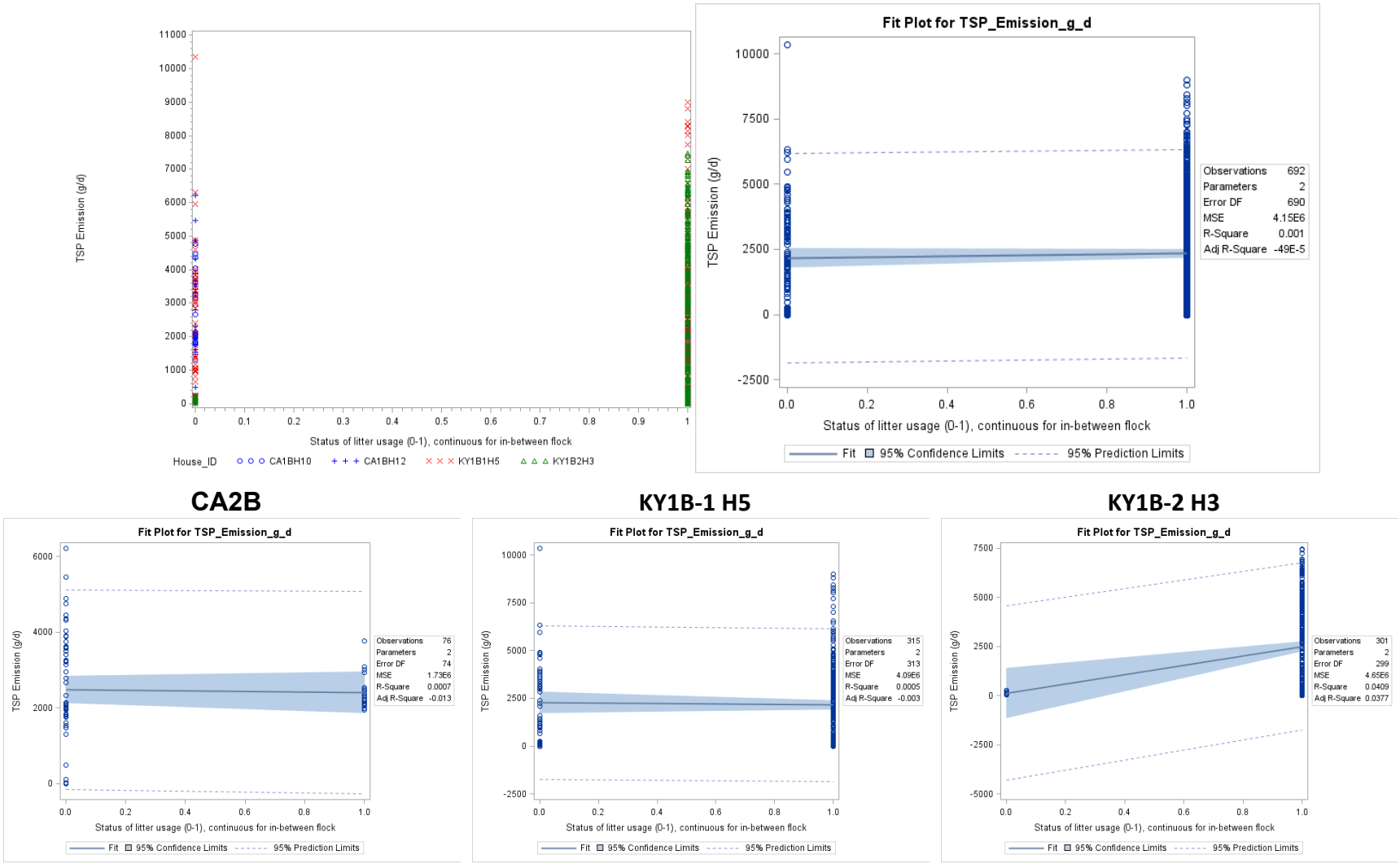
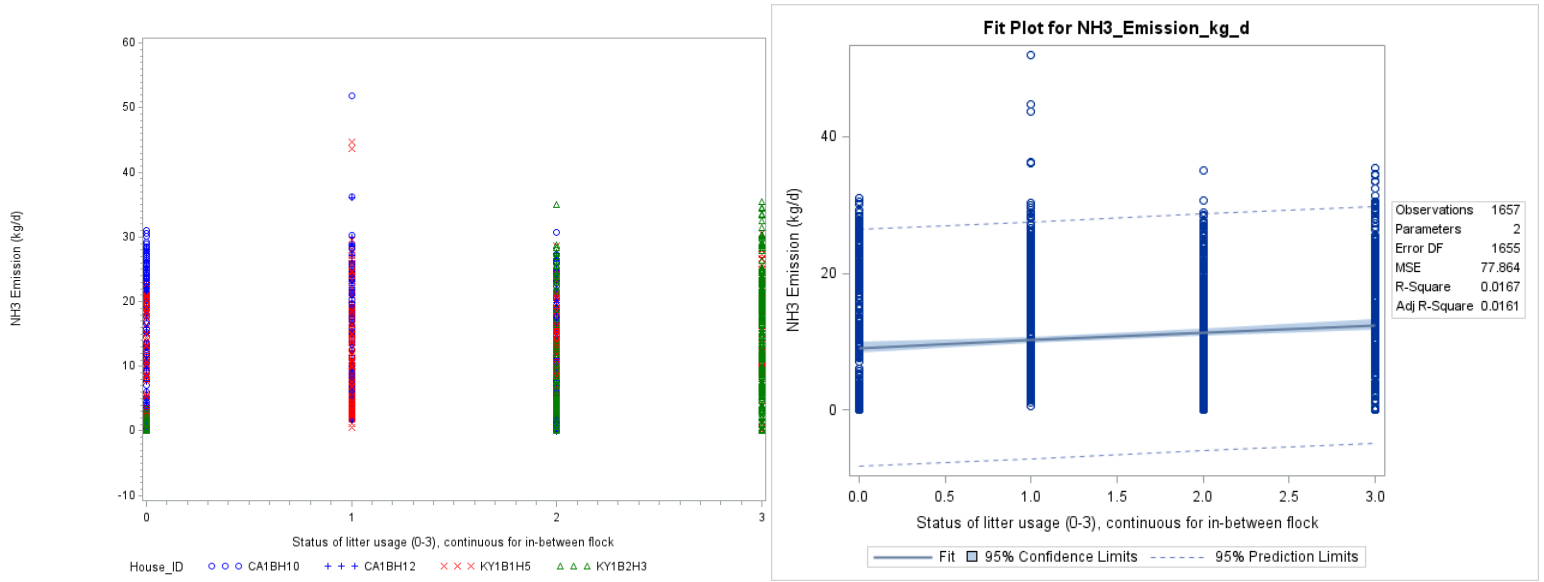
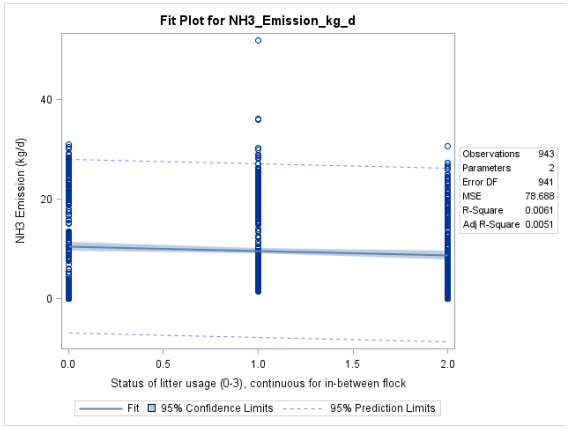


Figure F-65. Scatter plot of broiler TSP emissions versus litter status (0-1, continuous) and scatter plot with regression.

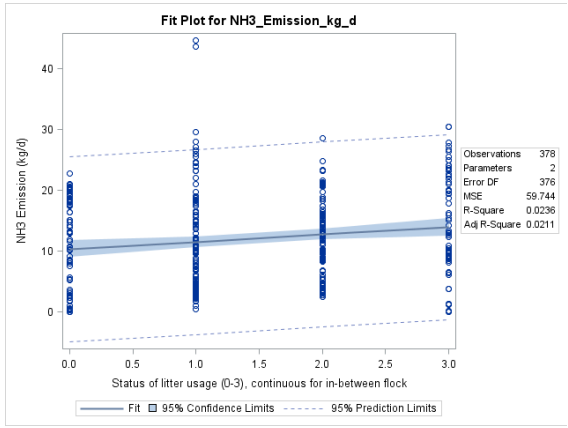
Litter Status (0-3, continuous)



CA2B



KY1B-1 H5



KY1B-2 H3

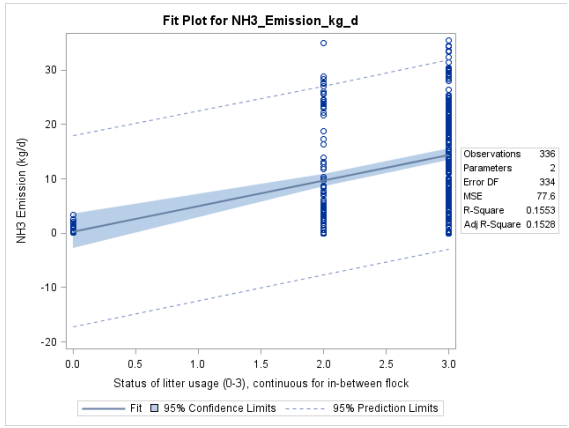


Figure F-66. Scatter plot of broiler NH_3 emissions versus litter status (0-3, continuous) and scatter plot with regression.

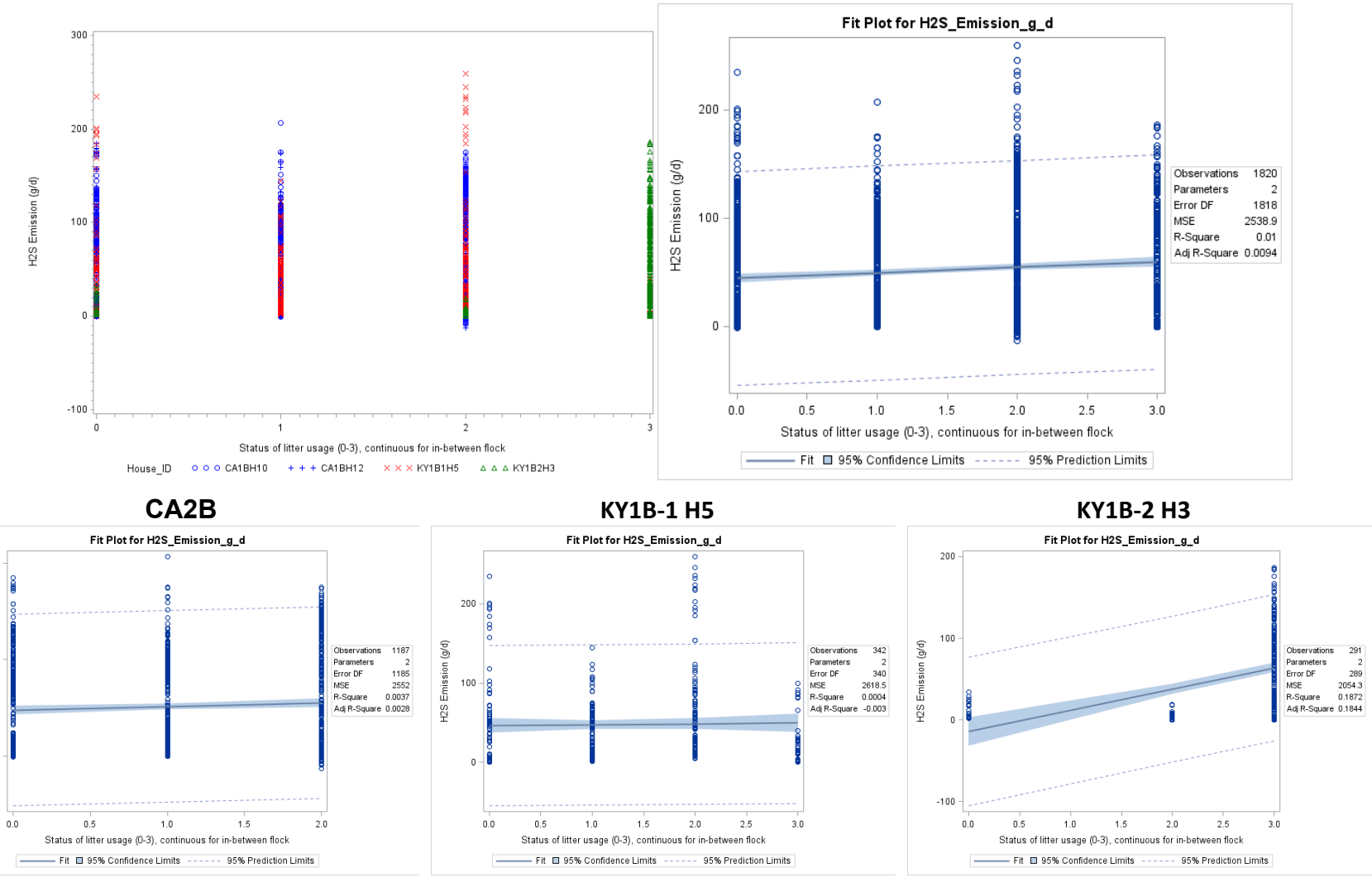


Figure F-67. Scatter plot of broiler H_2S emissions versus litter status (0-3, continuous) and scatter plot with regression.

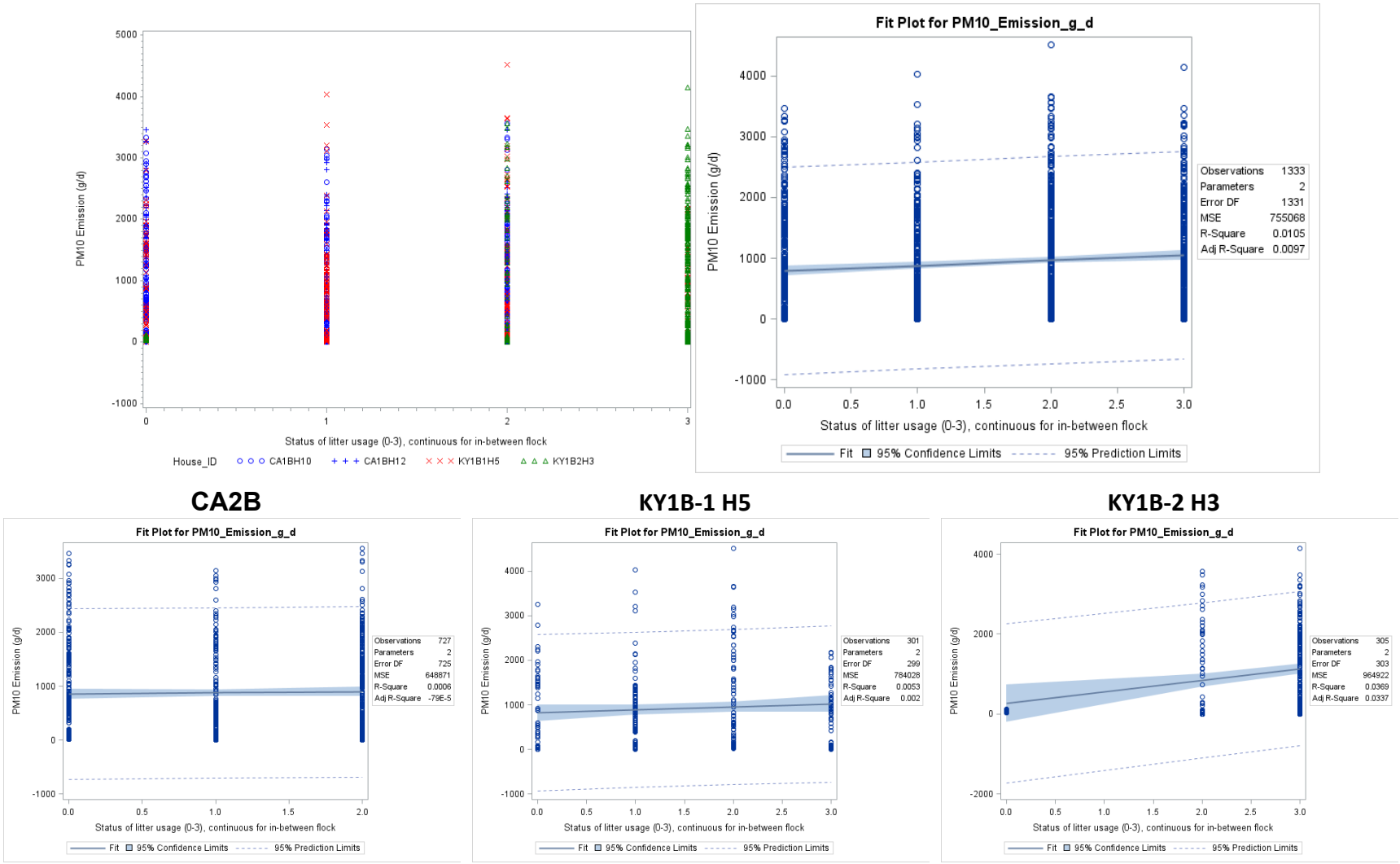


Figure F-68. Scatter plot of broiler PM_{10} emissions versus litter status (0-3, continuous) and scatter plot with regression.

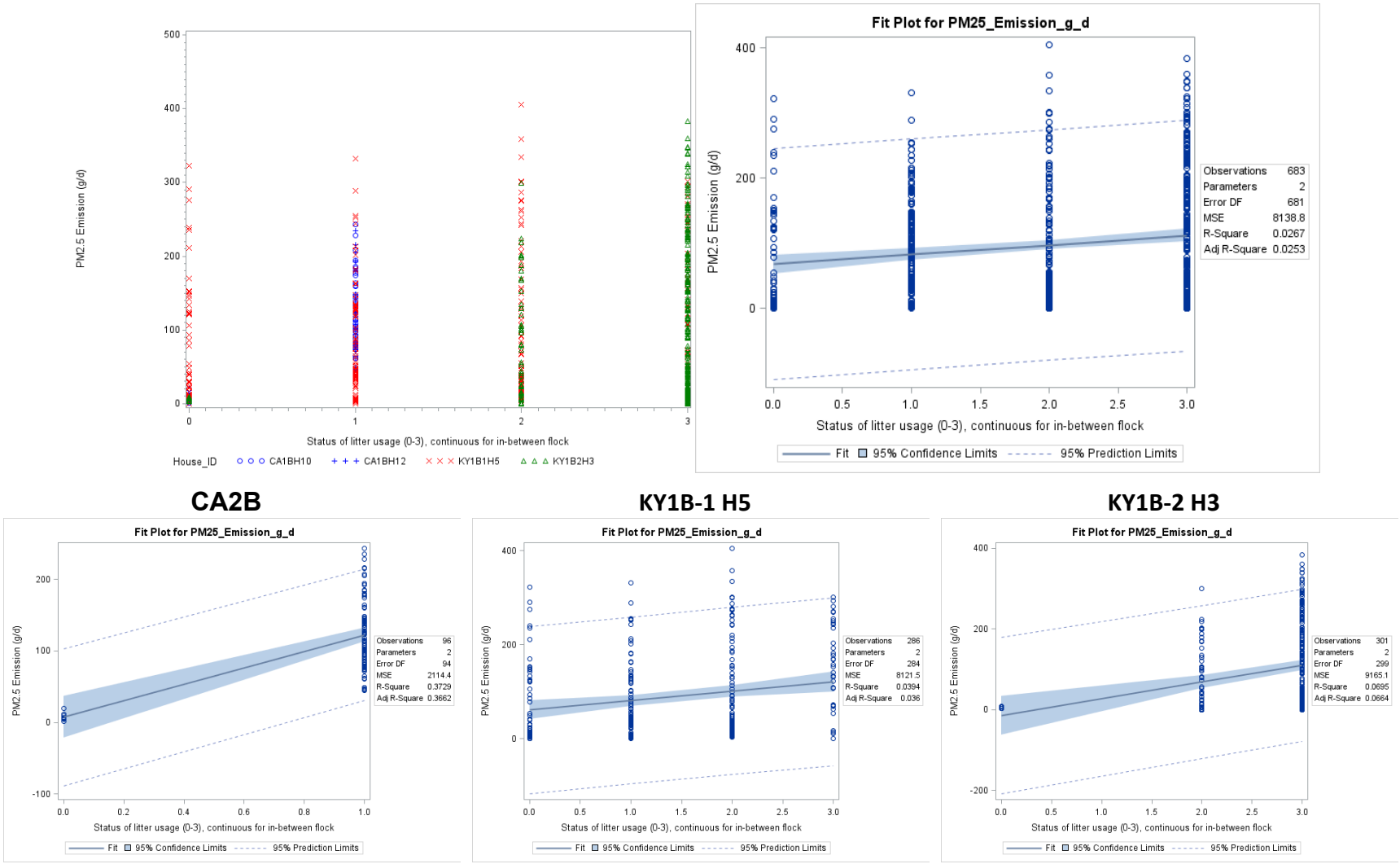


Figure F-69. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-3, continuous) and scatter plot with regression.

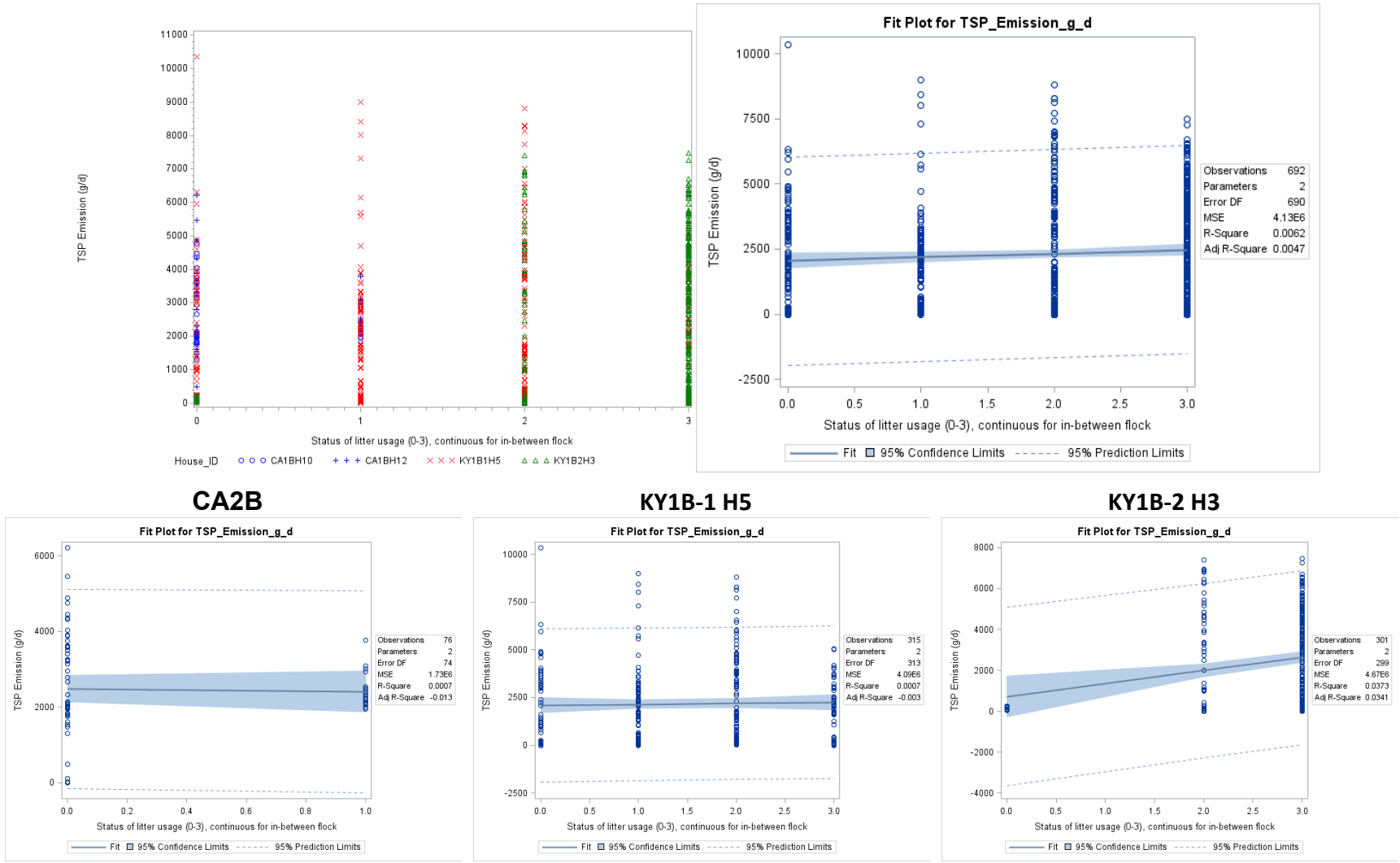
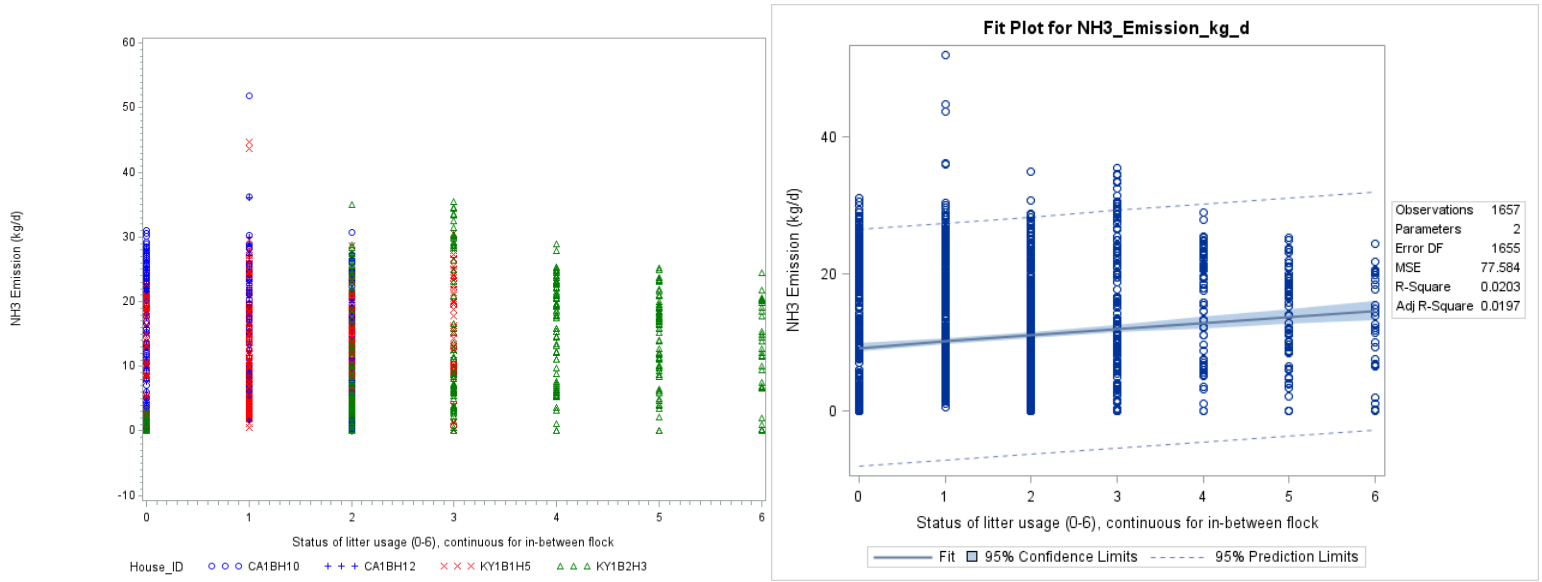
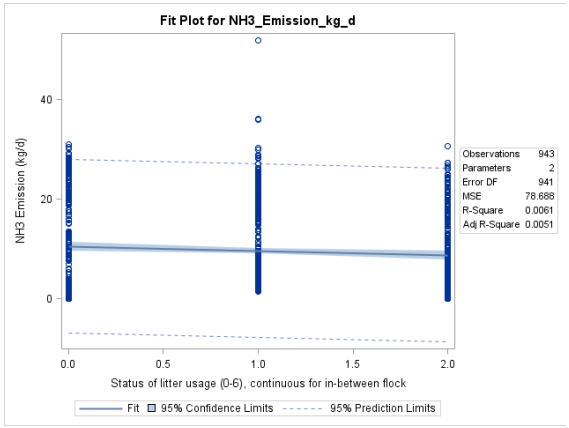


Figure F-70. Scatter plot of broiler TSP emissions versus litter status (0-3, continuous) and scatter plot with regression.

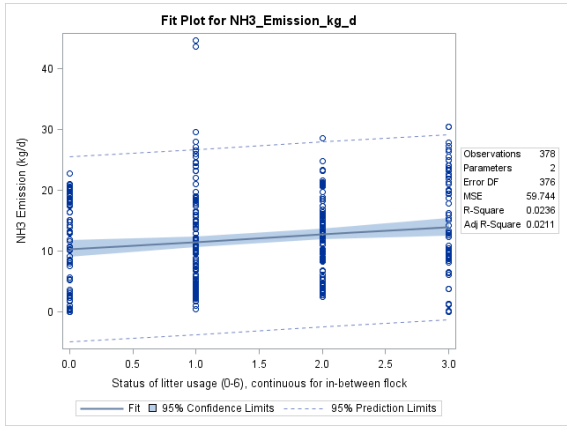
Litter status (0-6, continuous between flocks)



CA2B



KY1B-1 H5



KY1B-2 H3

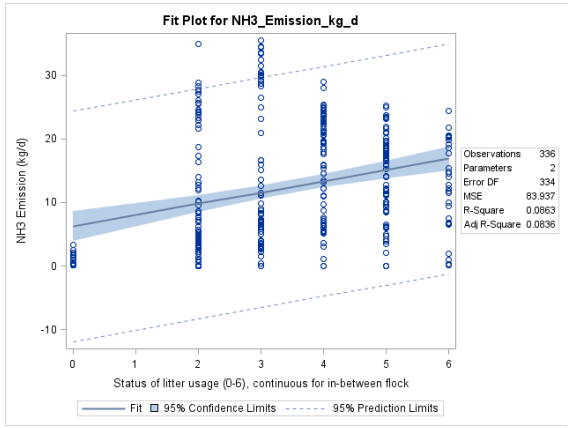


Figure F-71. Scatter plot of broiler NH_3 emissions versus litter status (0-6, continuous) and scatter plot with regression.

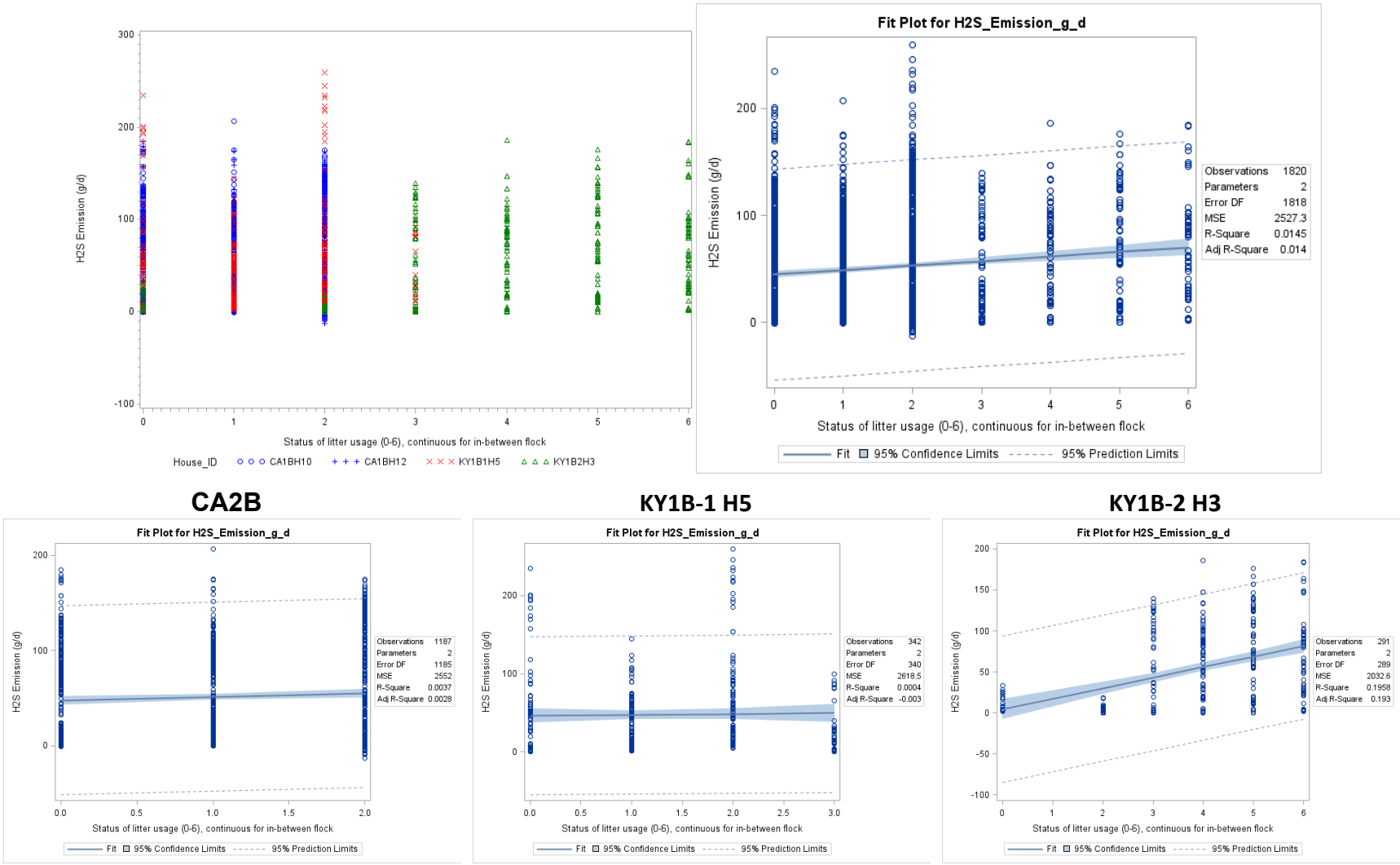


Figure F-72. Scatter plot of broiler H_2S emissions versus litter status (0-6, continuous) and scatter plot with regression.

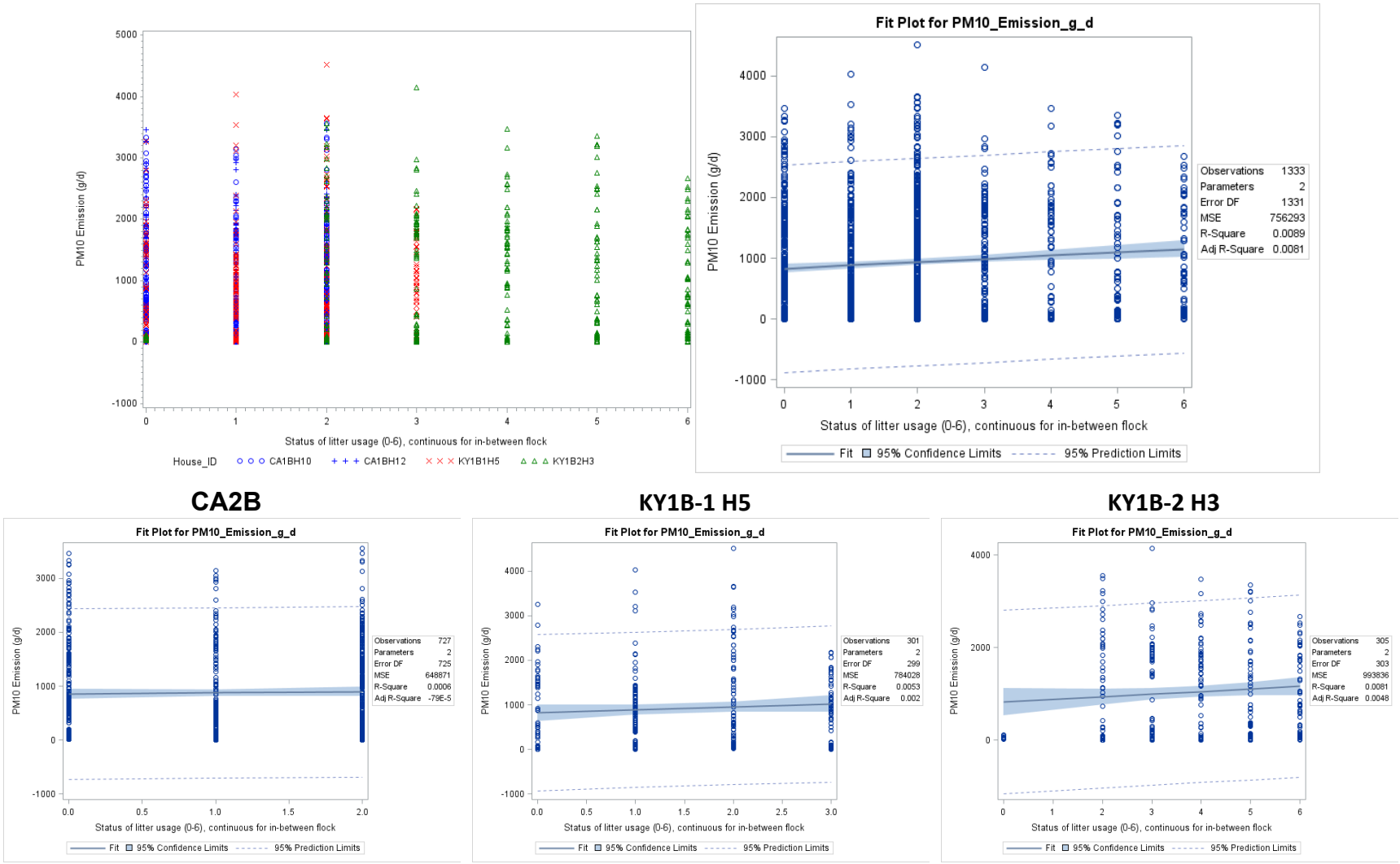


Figure F-73. Scatter plot of broiler PM_{10} emissions versus litter status (0-6, continuous) and scatter plot with regression.

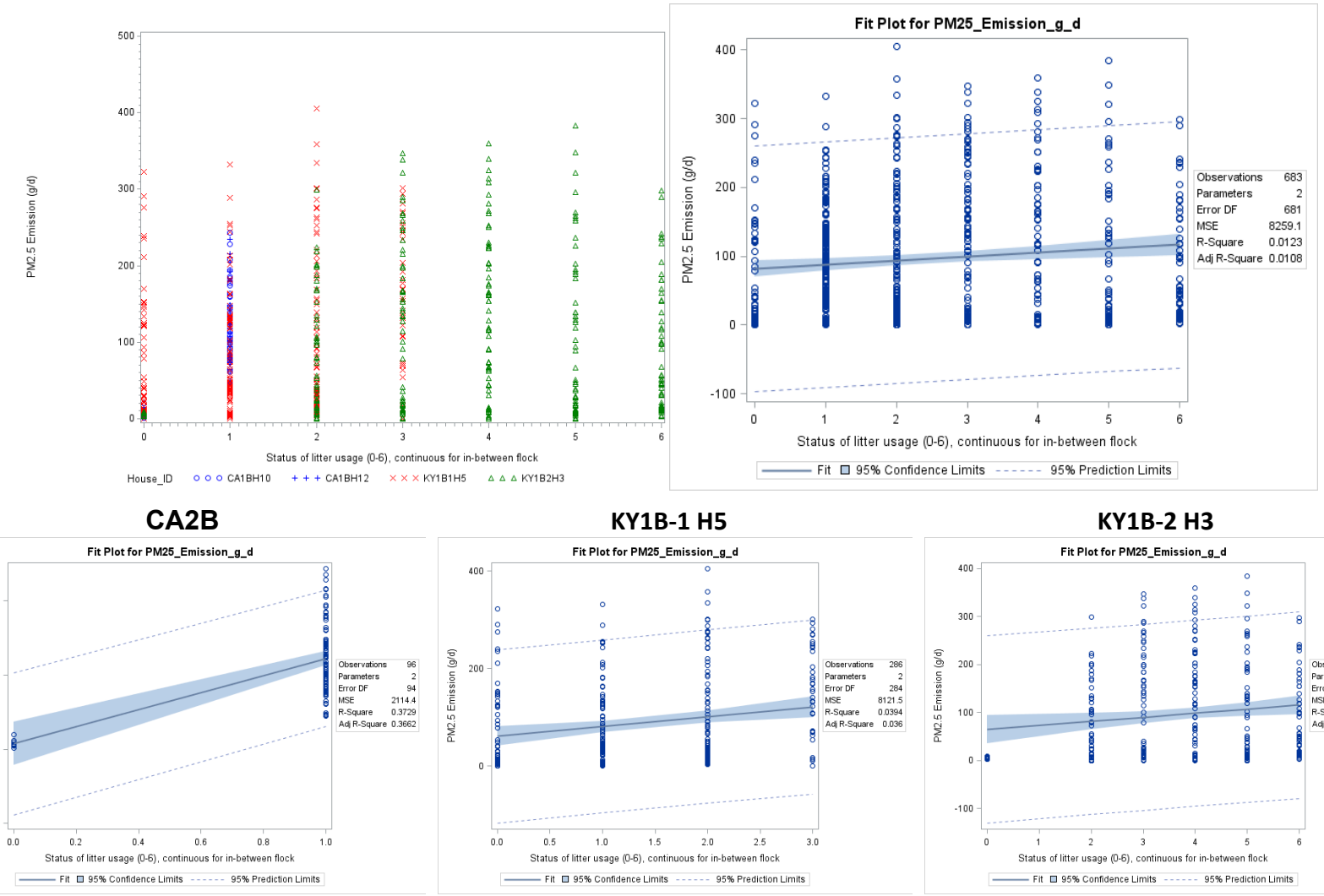


Figure F-74. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-6, continuous) and scatter plot with regression.

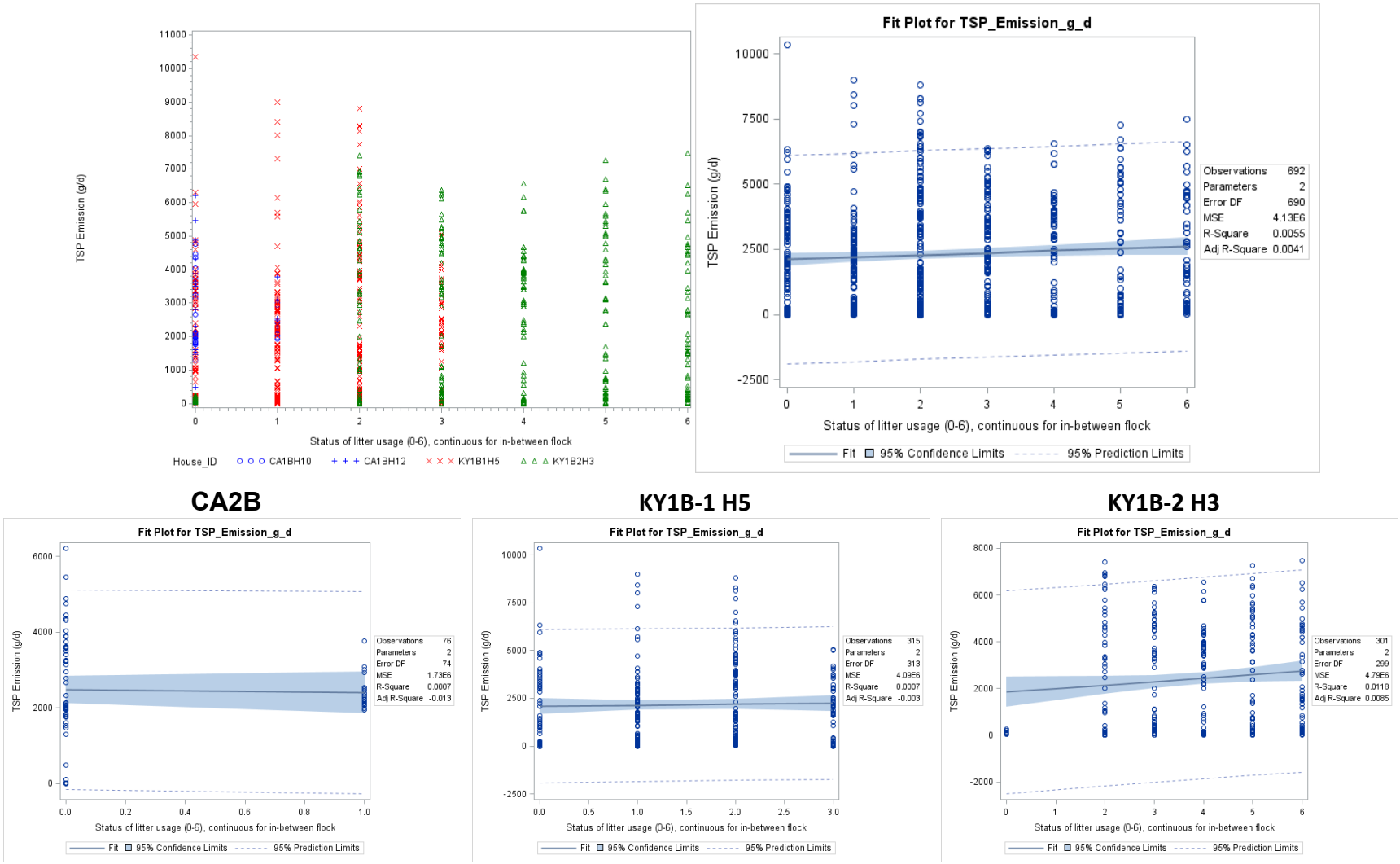


Figure F-75. Scatter plot of broiler TSP emissions versus litter status (0-6, continuous) and scatter plot with regression.

Litter Status (0-6; empty between flocks)

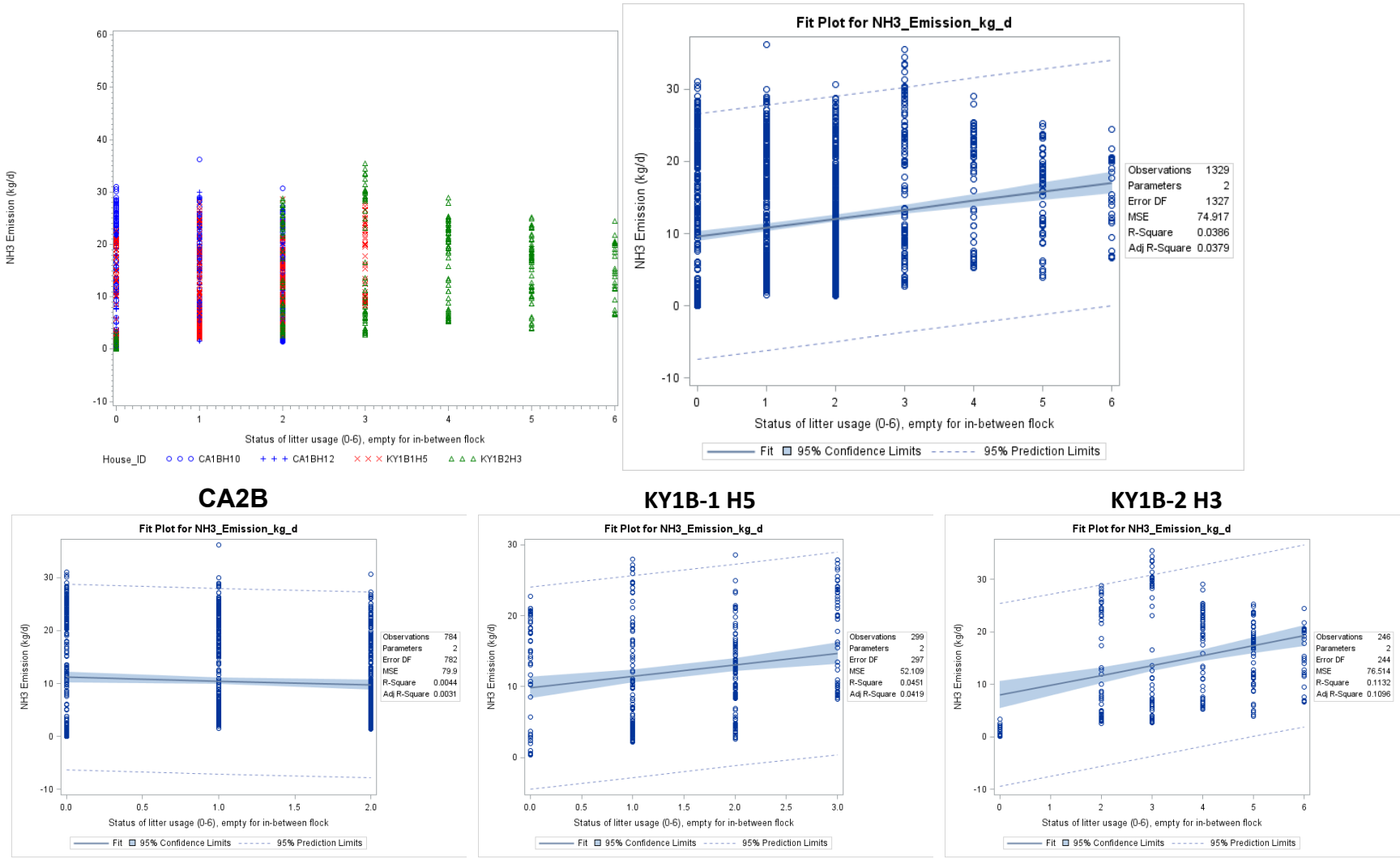


Figure F-76. Scatter plot of broiler NH_3 emissions versus litter status (0-6, empty between) and scatter plot with regression.

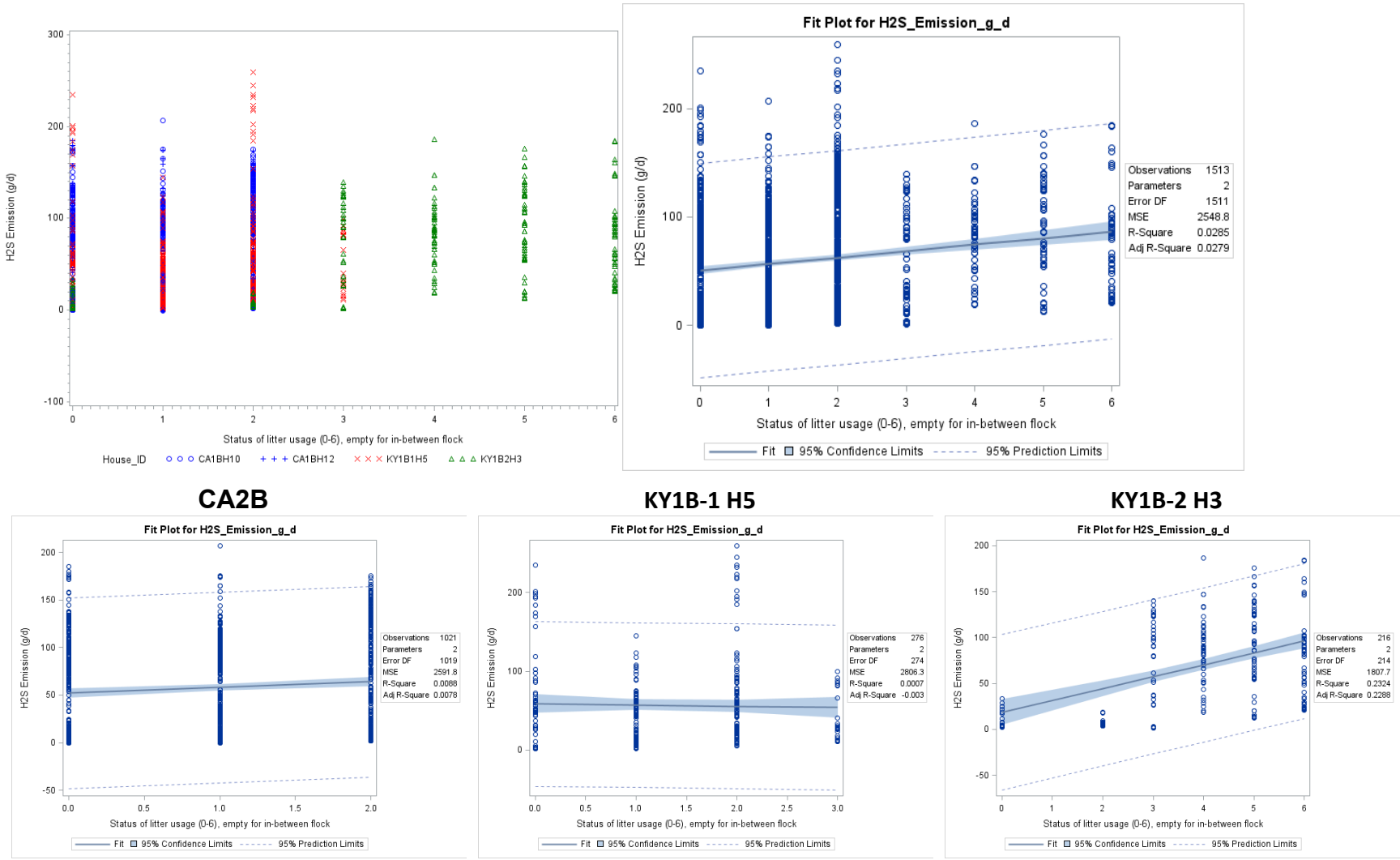


Figure F-77. Scatter plot of broiler H_2S emissions versus litter status (0-6, empty between) and scatter plot with regression.

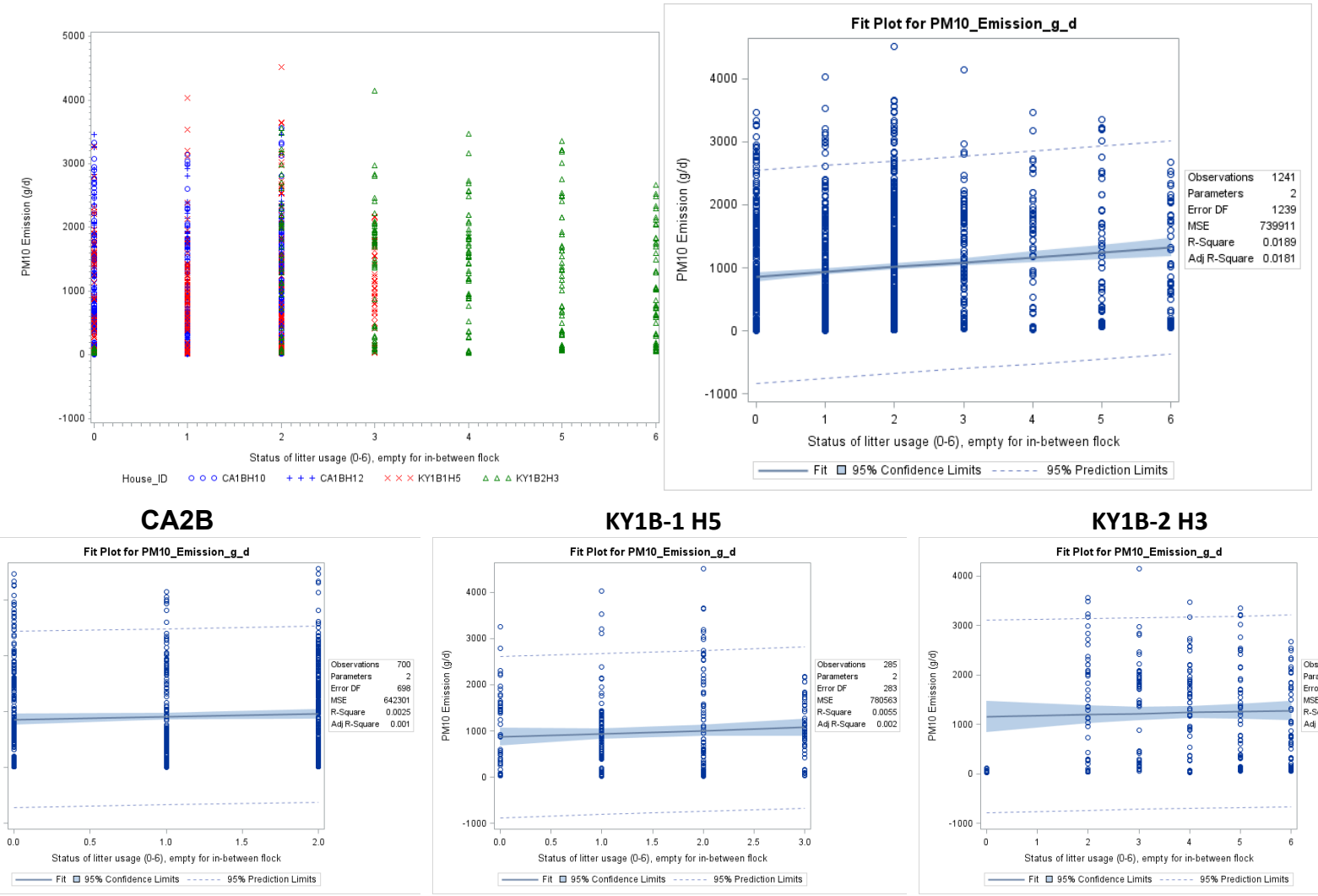


Figure F-78. Scatter plot of broiler PM_{10} emissions versus litter status (0-6, empty between) and scatter plot with regression.

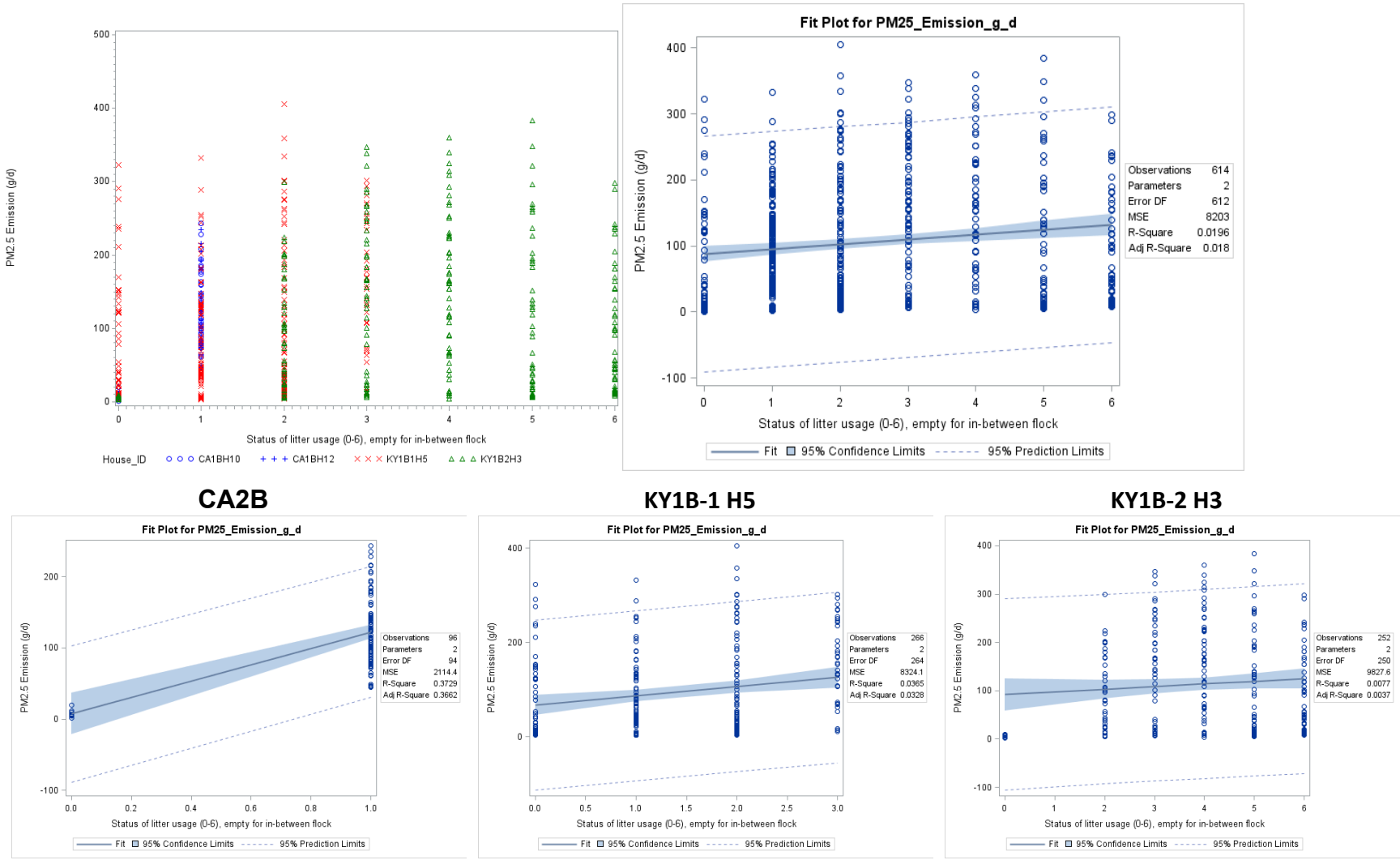


Figure F-79. Scatter plot of broiler $PM_{2.5}$ emissions versus litter status (0-6, empty between) and scatter plot with regression.

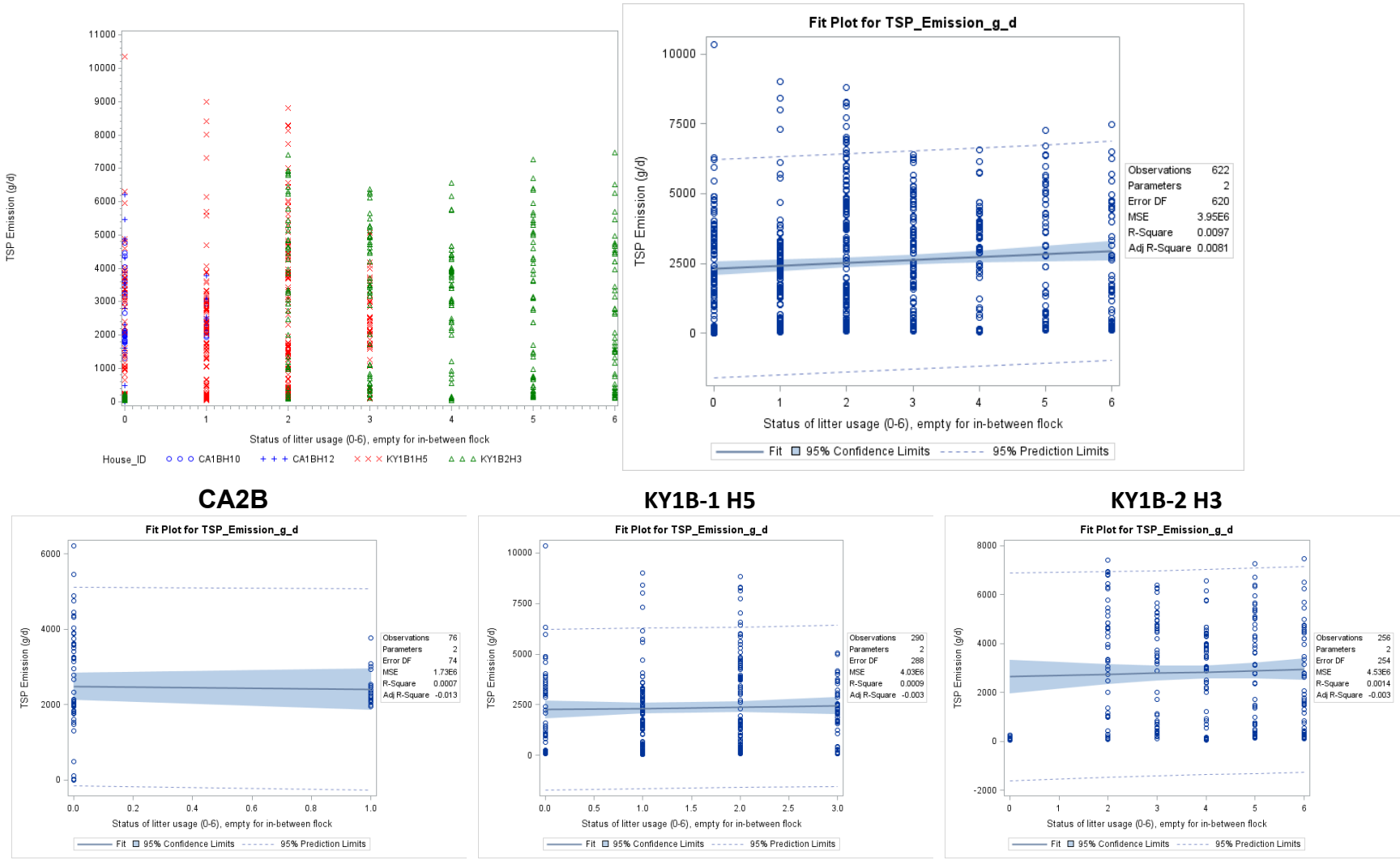
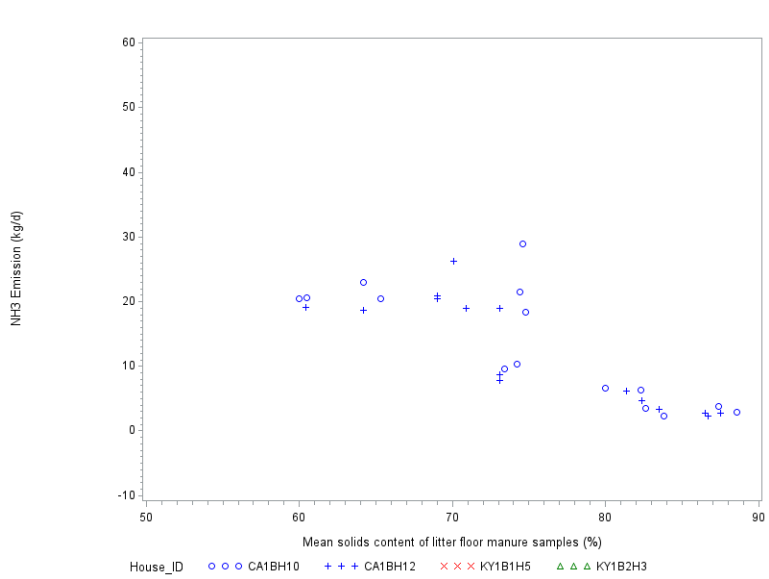
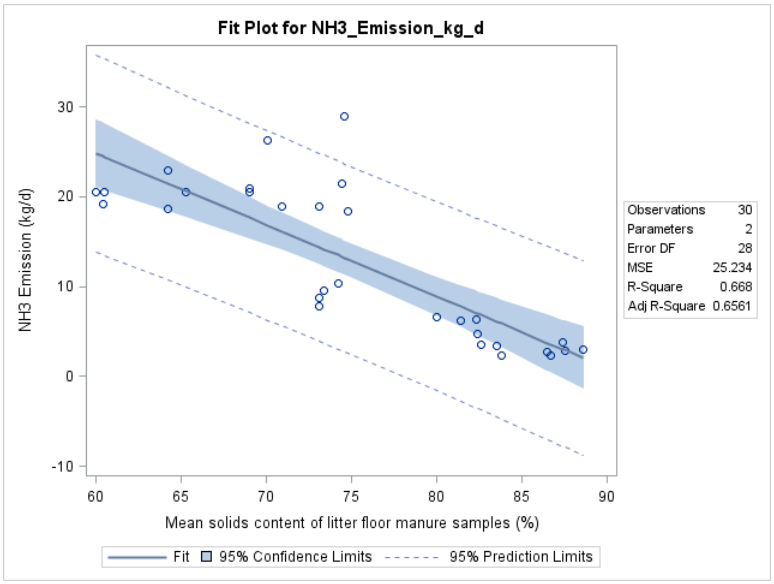
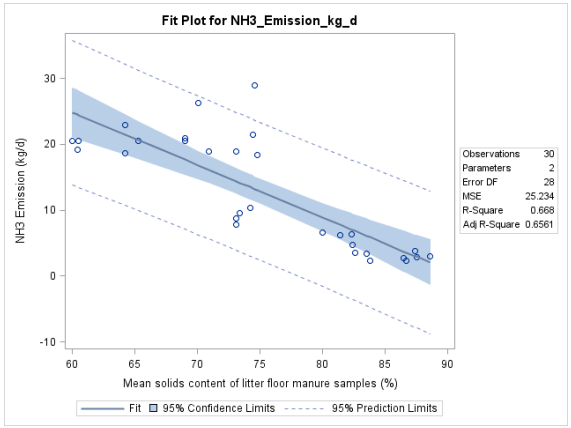


Figure F-80. Scatter plot of broiler TSP emissions versus litter status (0-6, empty between) and scatter plot with regression.





CA2B



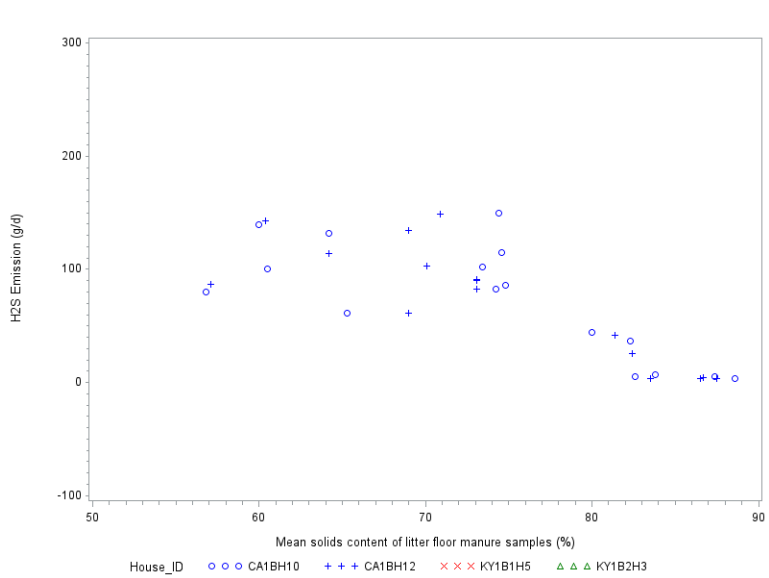
KY1B-1 H5

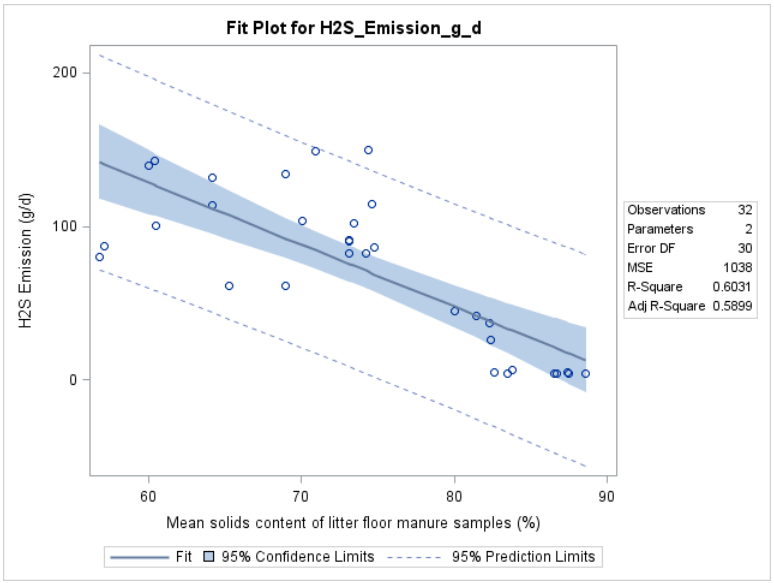
No observations were collected.

KY1B-2 H3

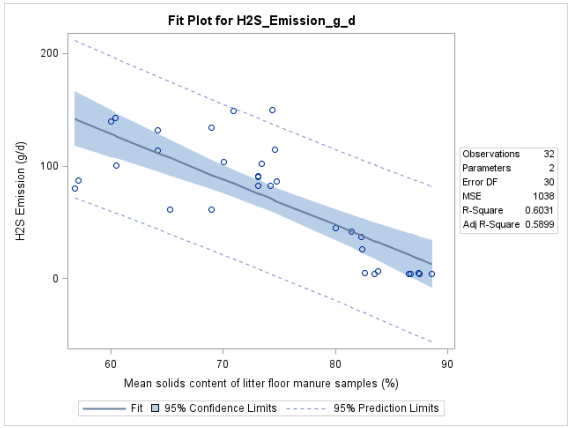
No observations were collected.

Figure F-81. Scatter plot of broiler NH_3 emissions versus solid contents of litter floor and scatter plot with regression.





CA2B



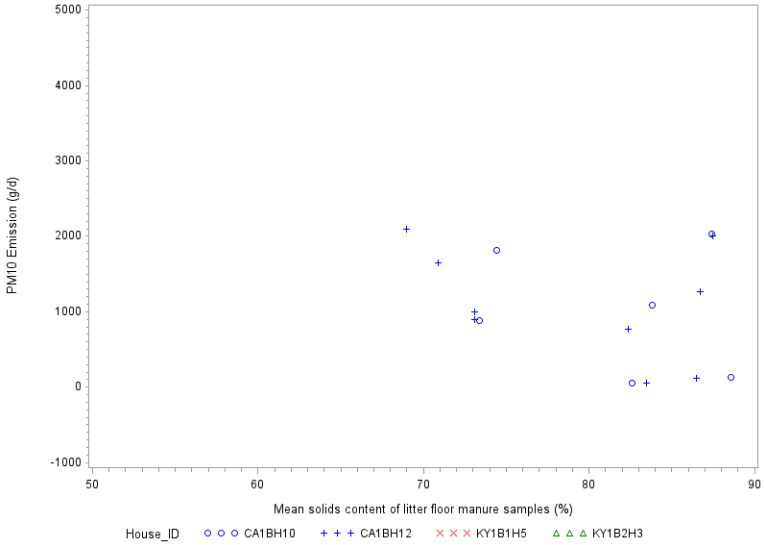
KY1B-1 H5

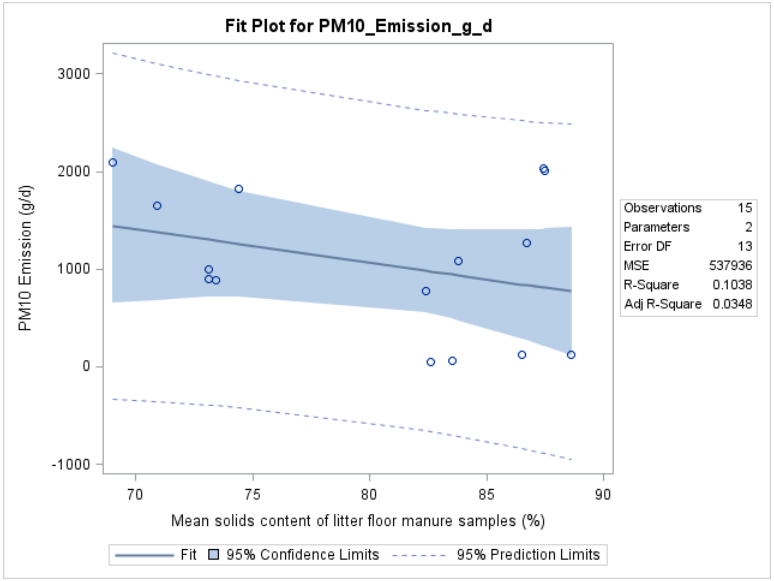
No observations were collected.

KY1B-2 H3

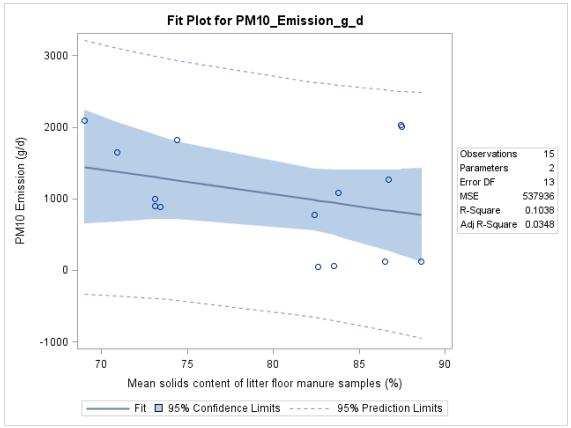
No observations were collected.

Figure F-82. Scatter plot of broiler H_2S emissions versus solid contents of litter floor and scatter plot with regression.





CA2B



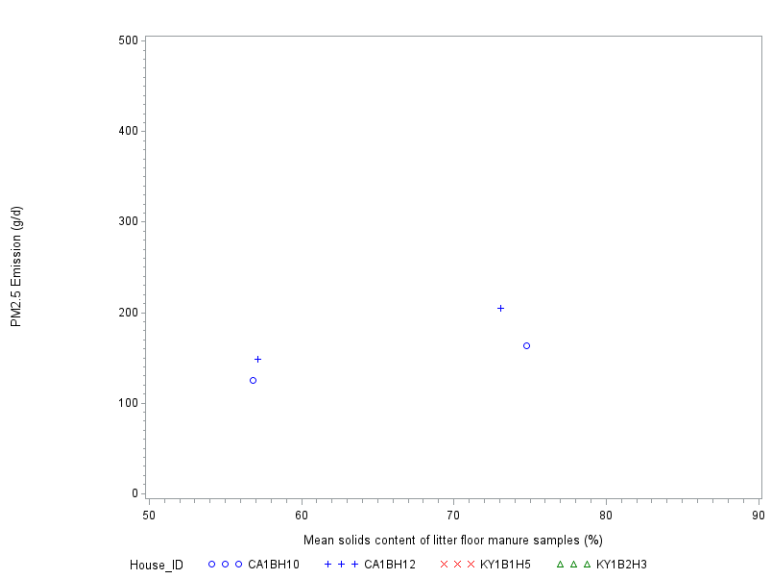
KY1B-1 H5

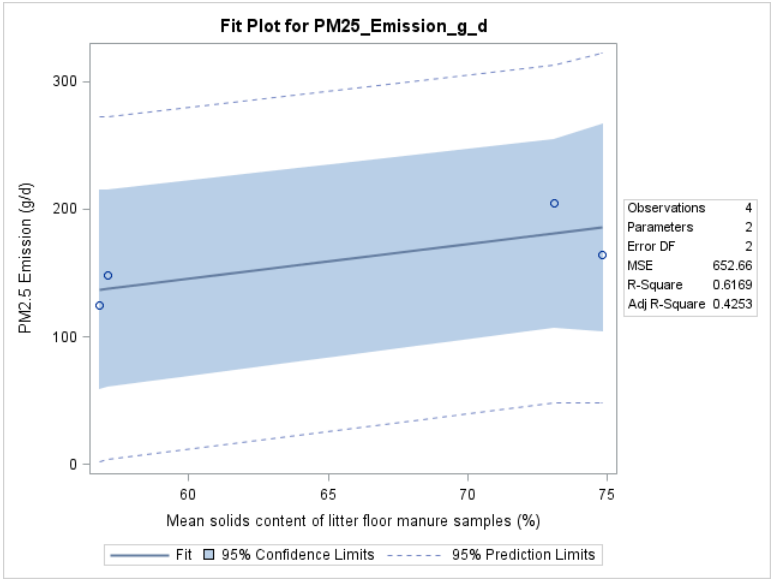
No observations were collected.

KY1B-2 H3

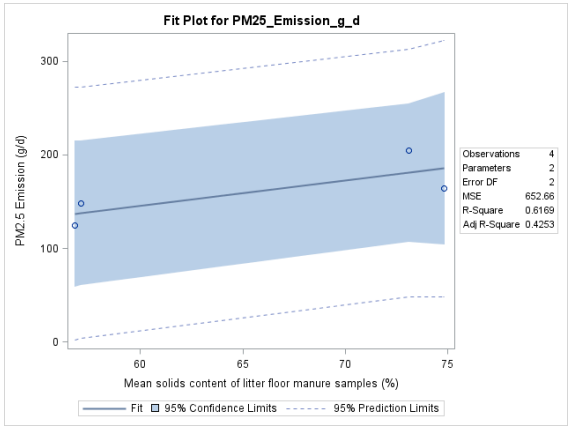
No observations were collected.

Figure F-83. Scatter plot of broiler PM_{10} emissions versus solid contents of litter floor and scatter plot with regression.





CA2B



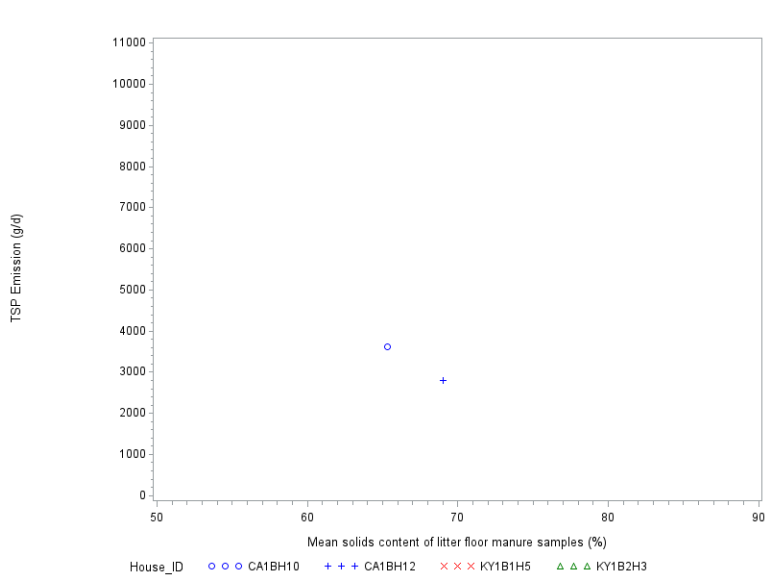
KY1B-1 H5

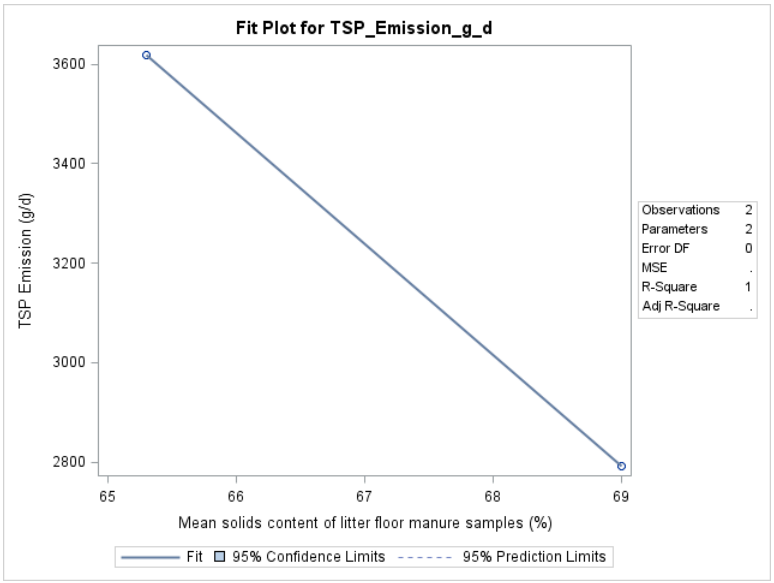
No observations were collected.

KY1B-2 H3

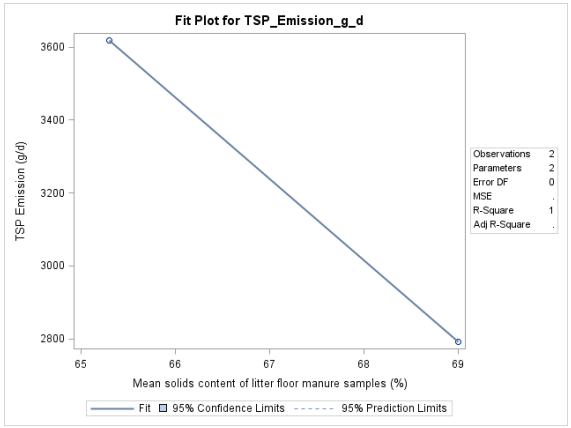
No observations were collected.

Figure F-84. Scatter plot of broiler $PM_{2.5}$ emissions versus solid contents of litter floor and scatter plot with regression.





CA2B



KY1B-1 H5

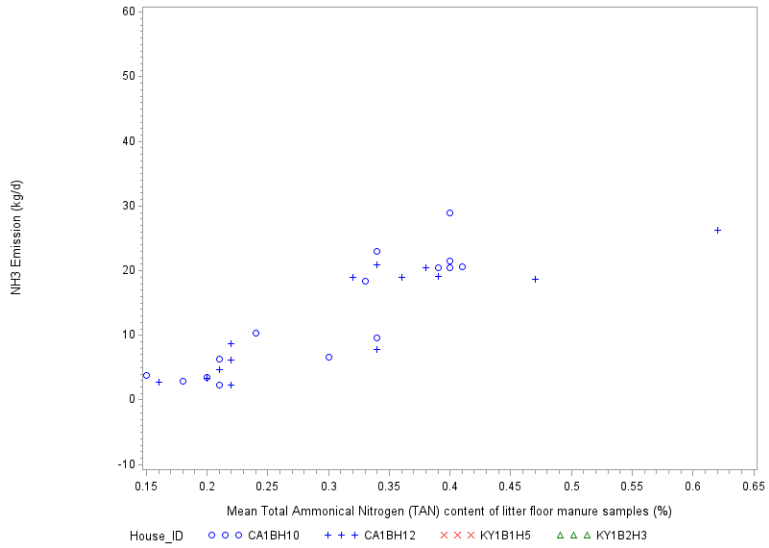
No observations were collected.

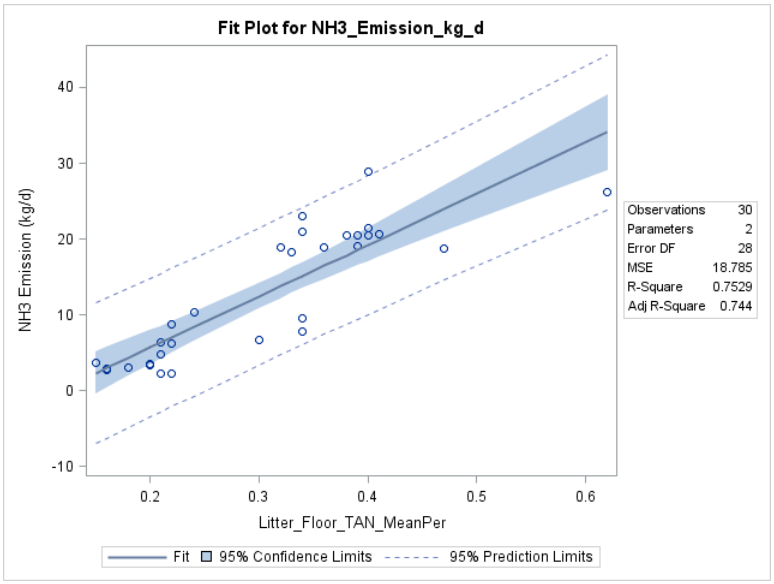
KY1B-2 H3

No observations were collected.

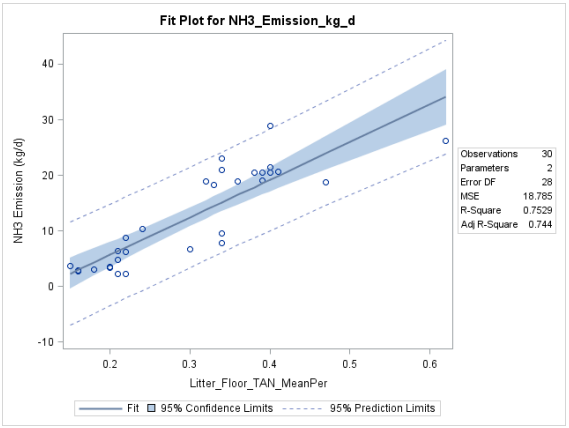
Figure F-85. Scatter plot of broiler TSP emissions versus solid contents of litter floor and scatter plot with regression.

TAN Litter floor





CA2B



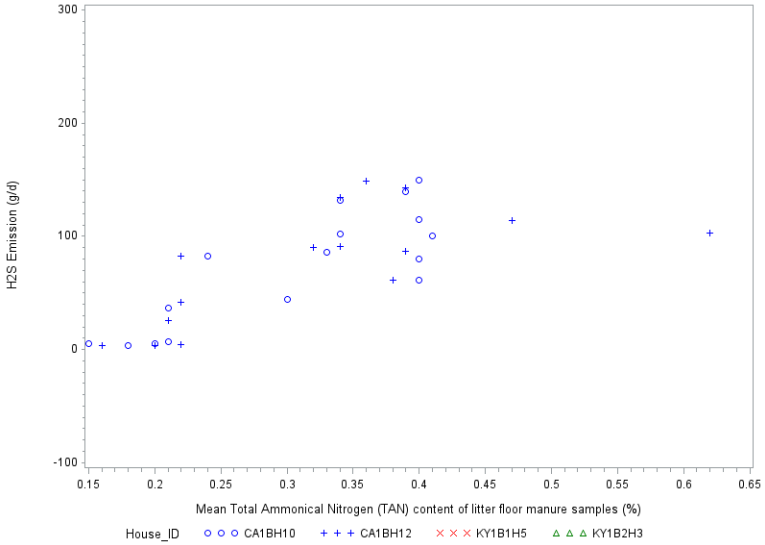
KY1B-1 H5

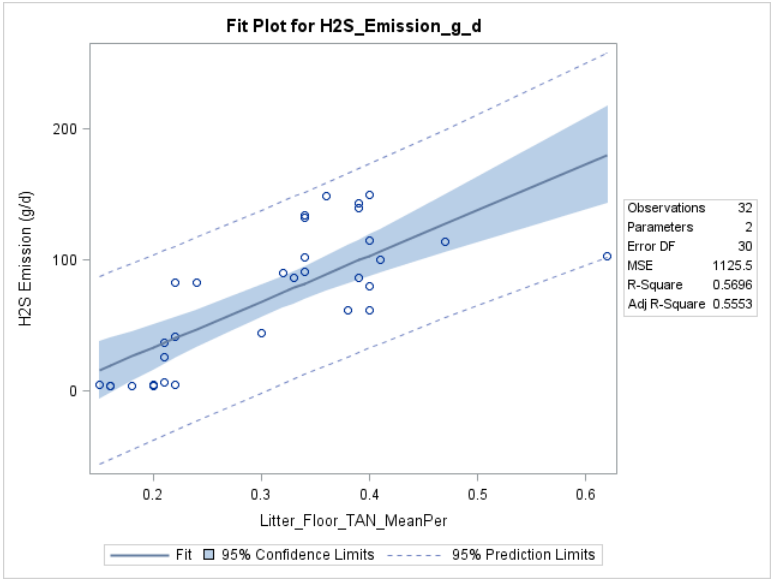
No observations were collected.

KY1B-2 H3

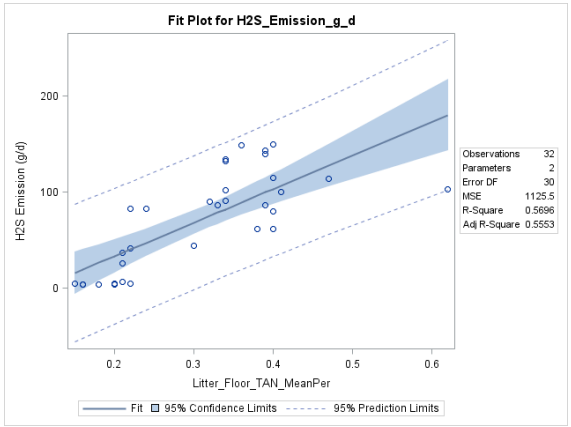
No observations were collected.

Figure F-86. Scatter plot of broiler NH_3 emissions versus TAN content of litter floor and scatter plot with regression.





CA2B



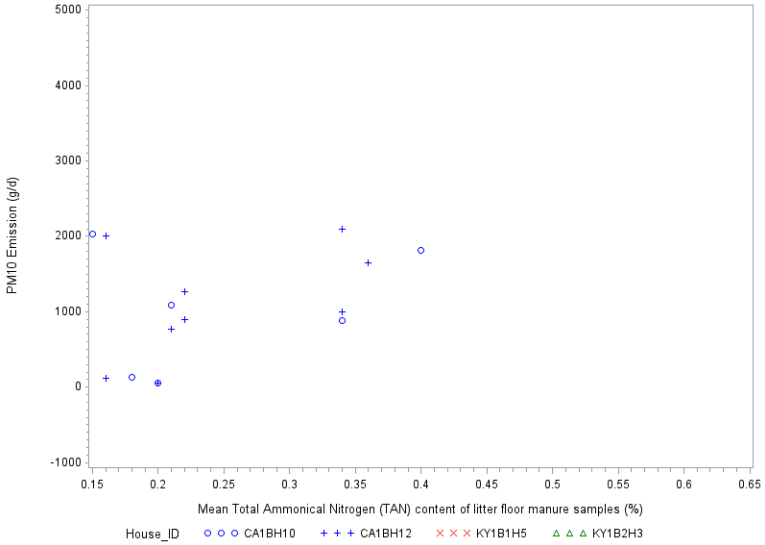
KY1B-1 H5

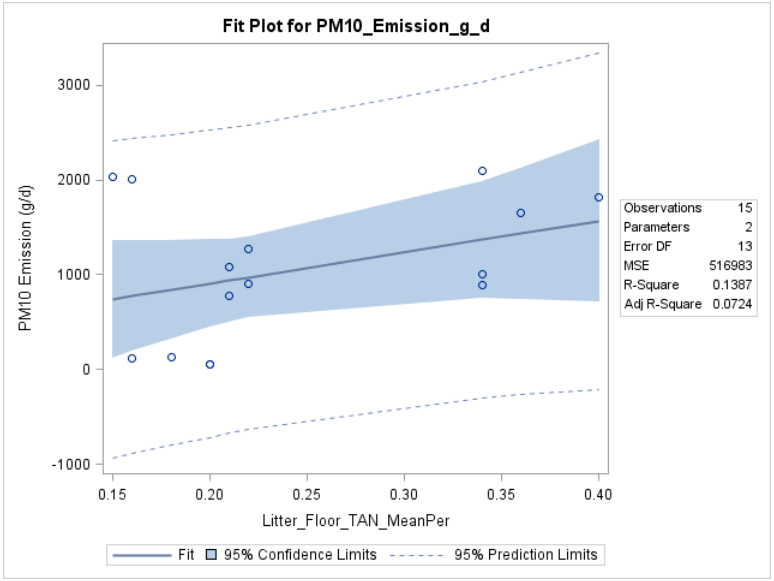
No observations were collected.

KY1B-2 H3

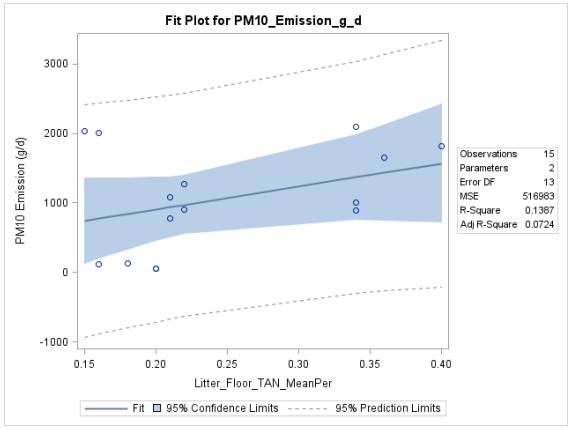
No observations were collected.

Figure F-87. Scatter plot of broiler H_2S emissions versus TAN content of litter floor and scatter plot with regression.





CA2B



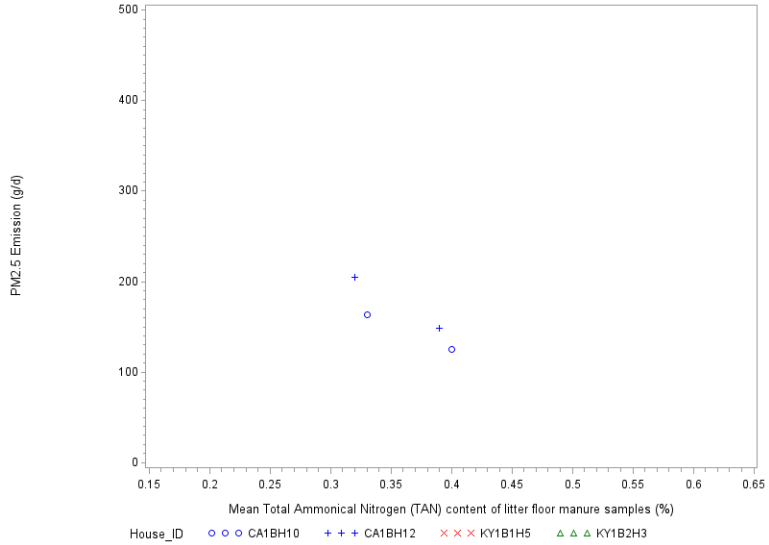
KY1B-1 H5

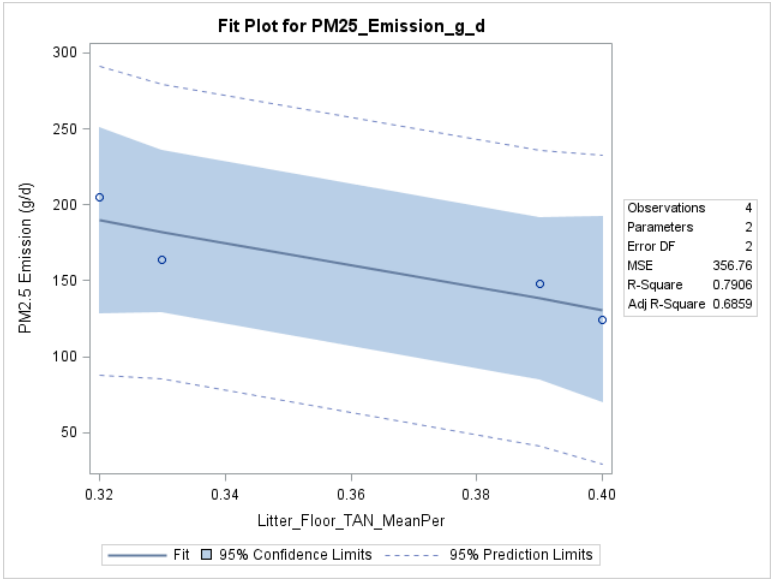
No observations were collected.

KY1B-2 H3

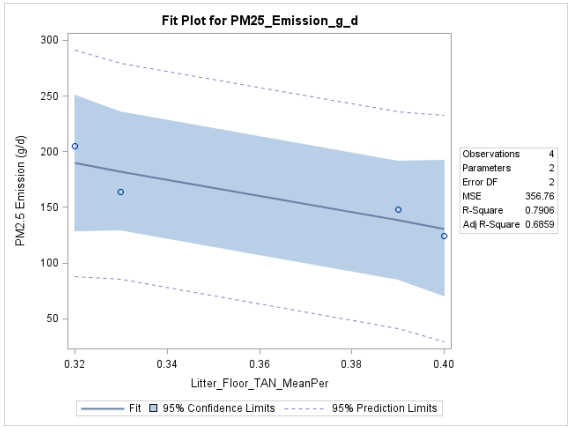
No observations were collected.

Figure F-88. Scatter plot of broiler PM_{10} emissions versus TAN content of litter floor and scatter plot with regression.





CA2B



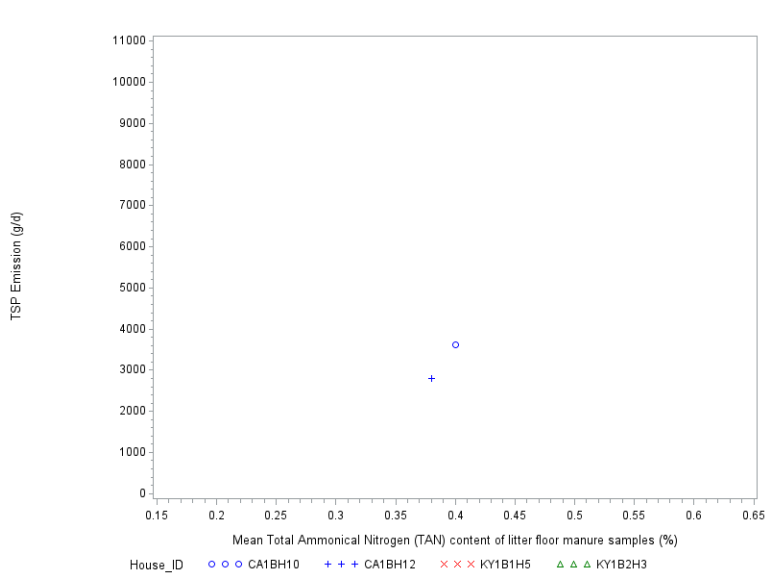
KY1B-1 H5

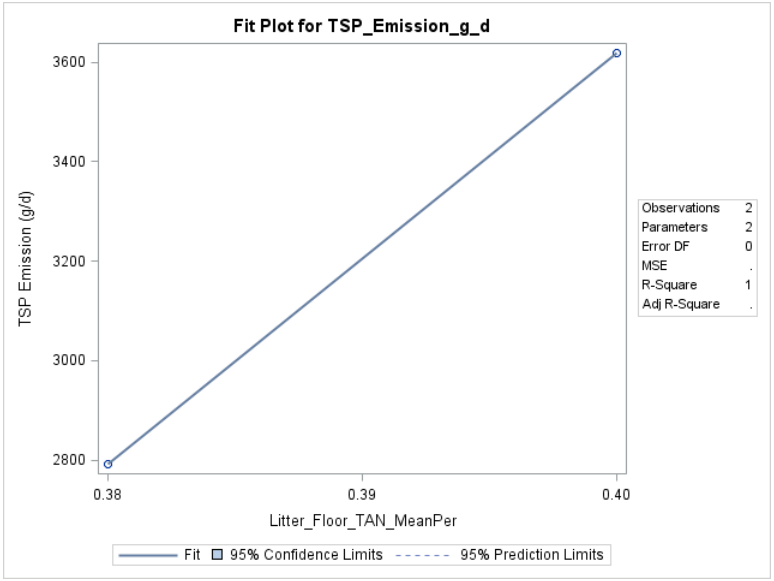
No observations were collected.

KY1B-2 H3

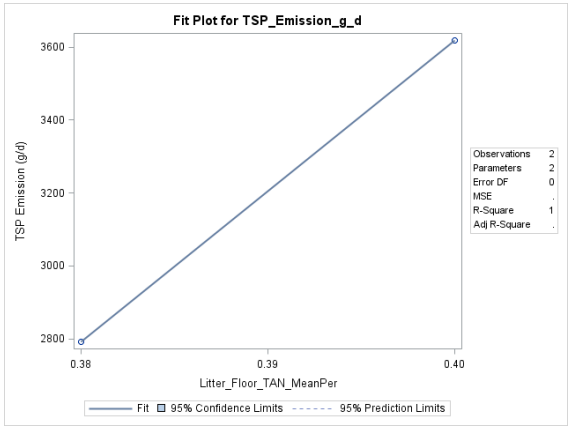
No observations were collected.

Figure F-89. Scatter plot of broiler $PM_{2.5}$ emissions versus TAN content of litter floor and scatter plot with regression.





CA2B



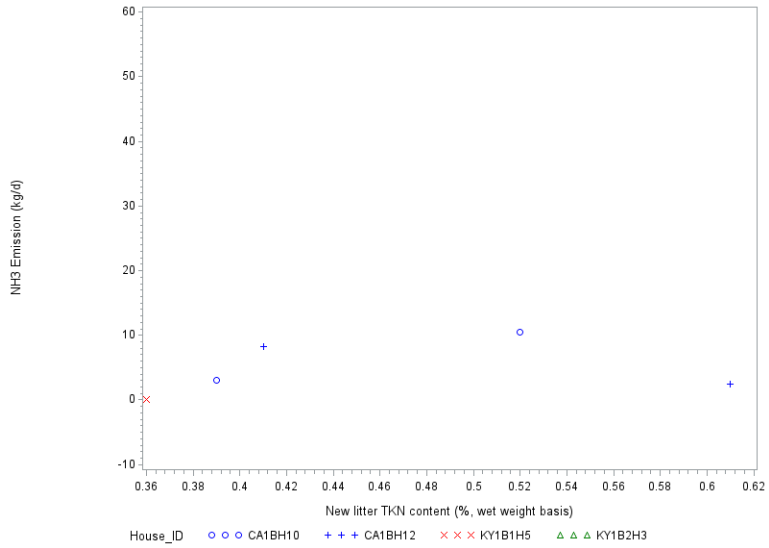
KY1B-1 H5

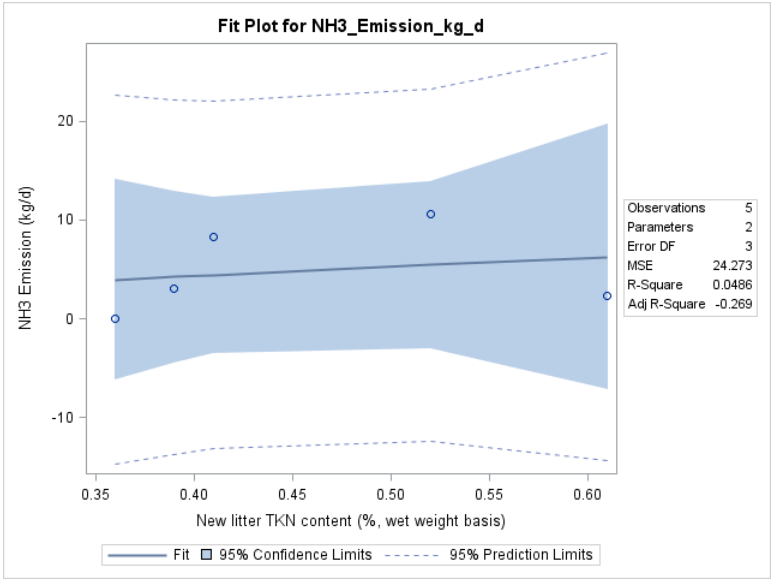
No observations were collected.

KY1B-2 H3

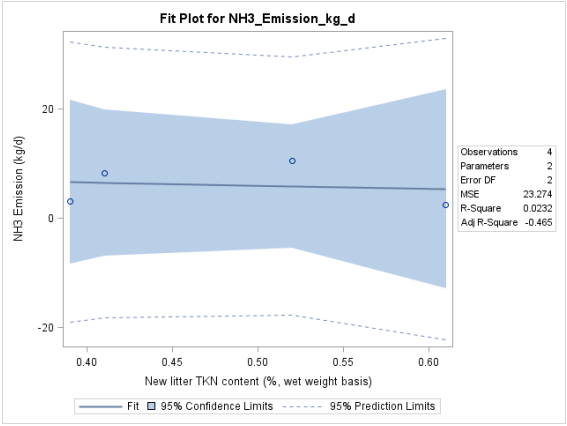
No observations were collected.

Figure F-90. Scatter plot of broiler TSP emissions versus TAN content of litter floor and scatter plot with regression.





CA2B



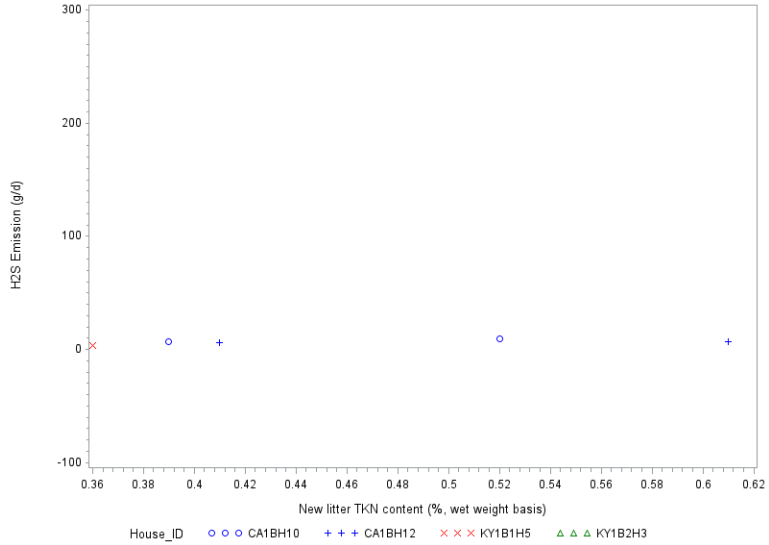
KY1B-1 H5

EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

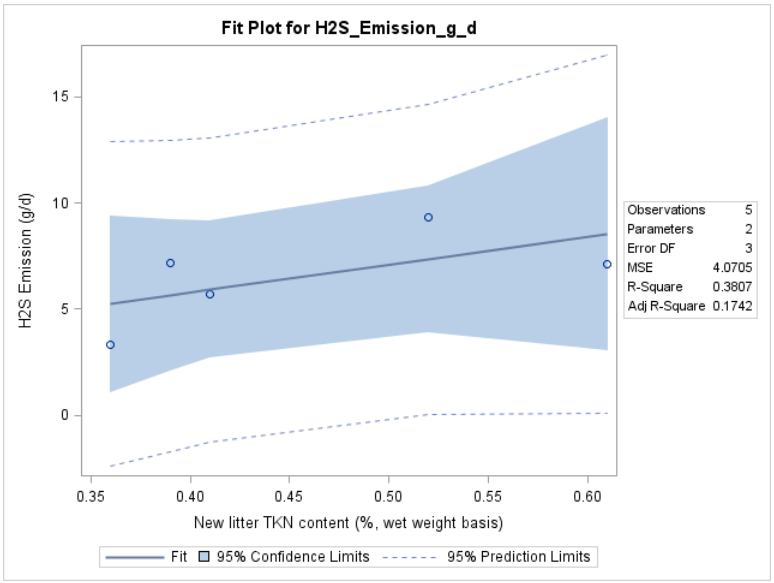
KY1B-2 H3

No observations were collected.

Figure F-91. Scatter plot of broiler NH_3 emissions versus TKN content of new litter (wet basis) and scatter plot with regression.

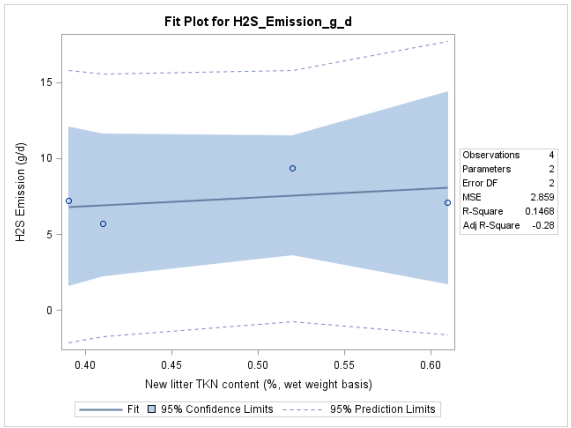


CA2B



KY1B-1 H5

KY1B-2 H3

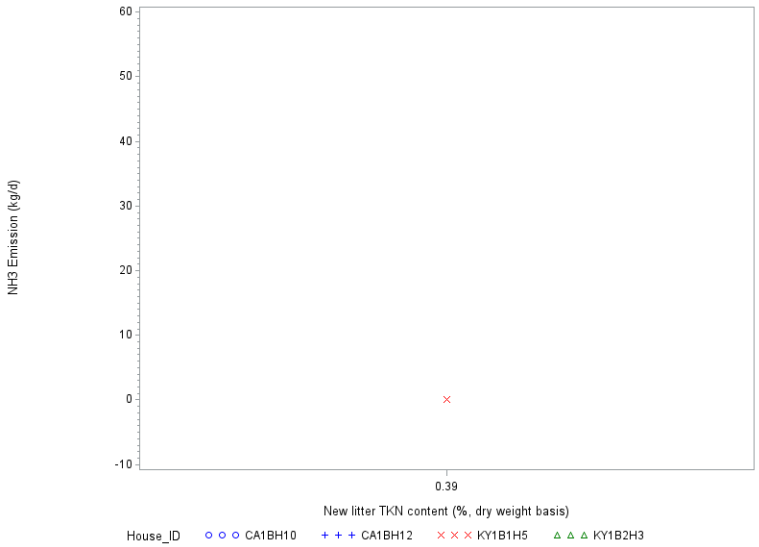


a

No observations were collected.

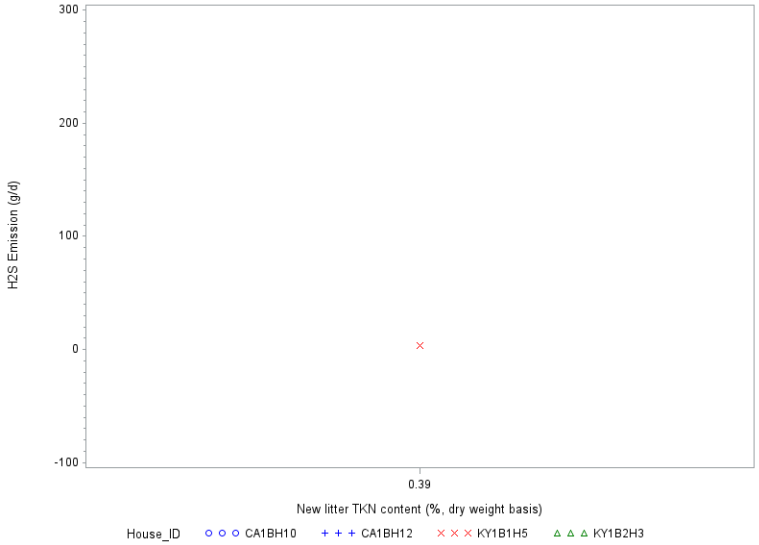
Figure F-92. Scatter plot of broiler H_2S emissions versus TKN content of new litter (wet basis) and scatter plot with regression.

TKN Content, new litter, (dry basis)



CA2B	KY1B-1 H5	KY1B-2 H3
No observations were collected.	EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).	No observations were collected.

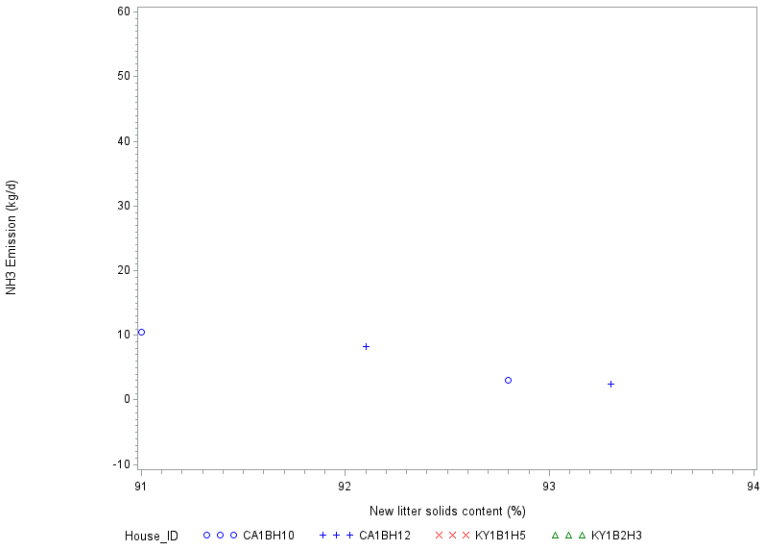
Figure F-93. Scatter plot of broiler NH_3 emissions versus TKN content of new litter (dry basis) and scatter plot with regression.

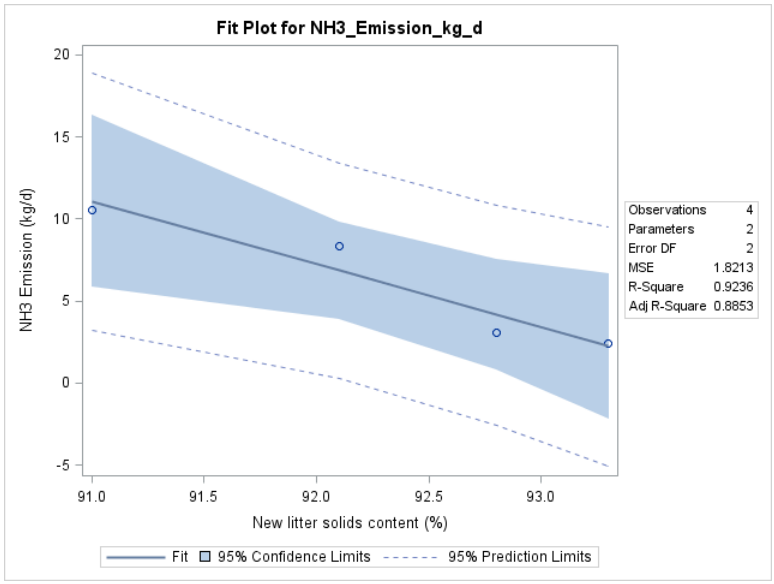


CA2B	KY1B-1 H5	KY1B-2 H3
No observations were collected.	EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).	No observations were collected.

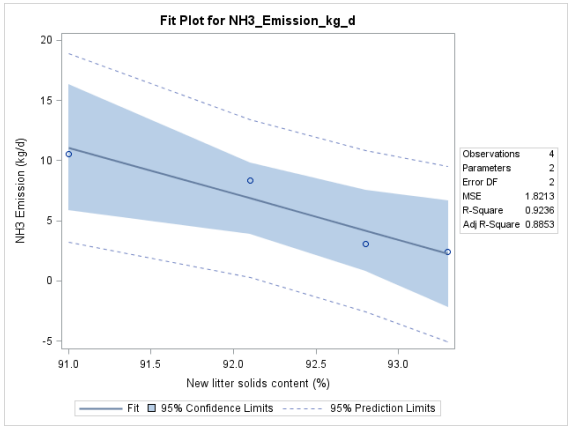
Figure F-94. Scatter plot of broiler H_2S emissions versus TKN content of new litter (dry basis) and scatter plot with regression.

Solids content , new litter





CA2B



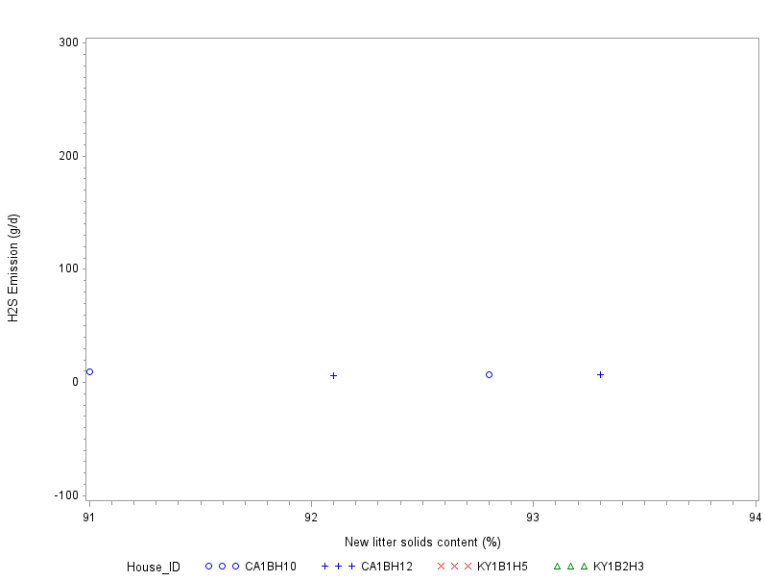
KY1B-1 H5

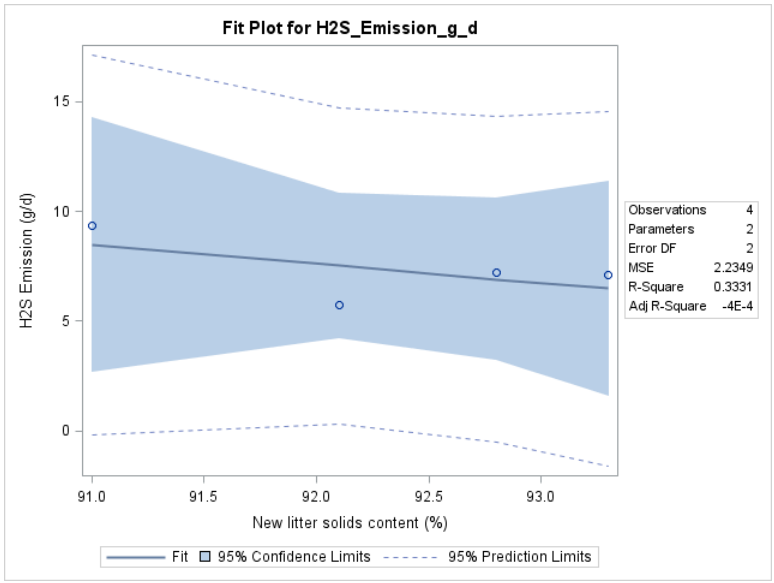
No observations were collected.

KY1B-2 H3

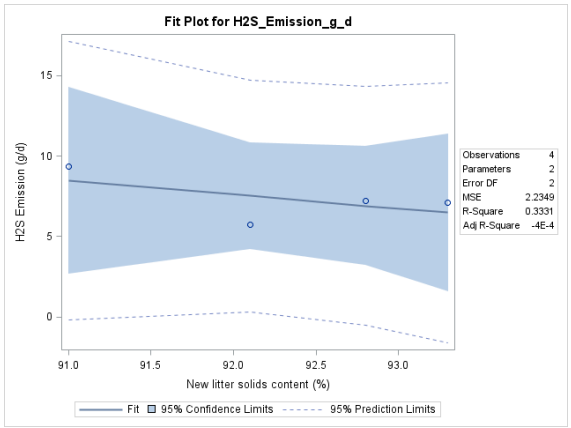
No observations were collected.

Figure F-95. Scatter plot of broiler NH_3 emissions versus solids content of new litter and scatter plot with regression.





CA2B



KY1B-1 H5

No observations were collected.

KY1B-2 H3

No observations were collected.

Figure F-96. Scatter plot of broiler H_2S emissions versus solids content of new litter and scatter plot with regression.

TKN, decaked litter (wet weight basis)

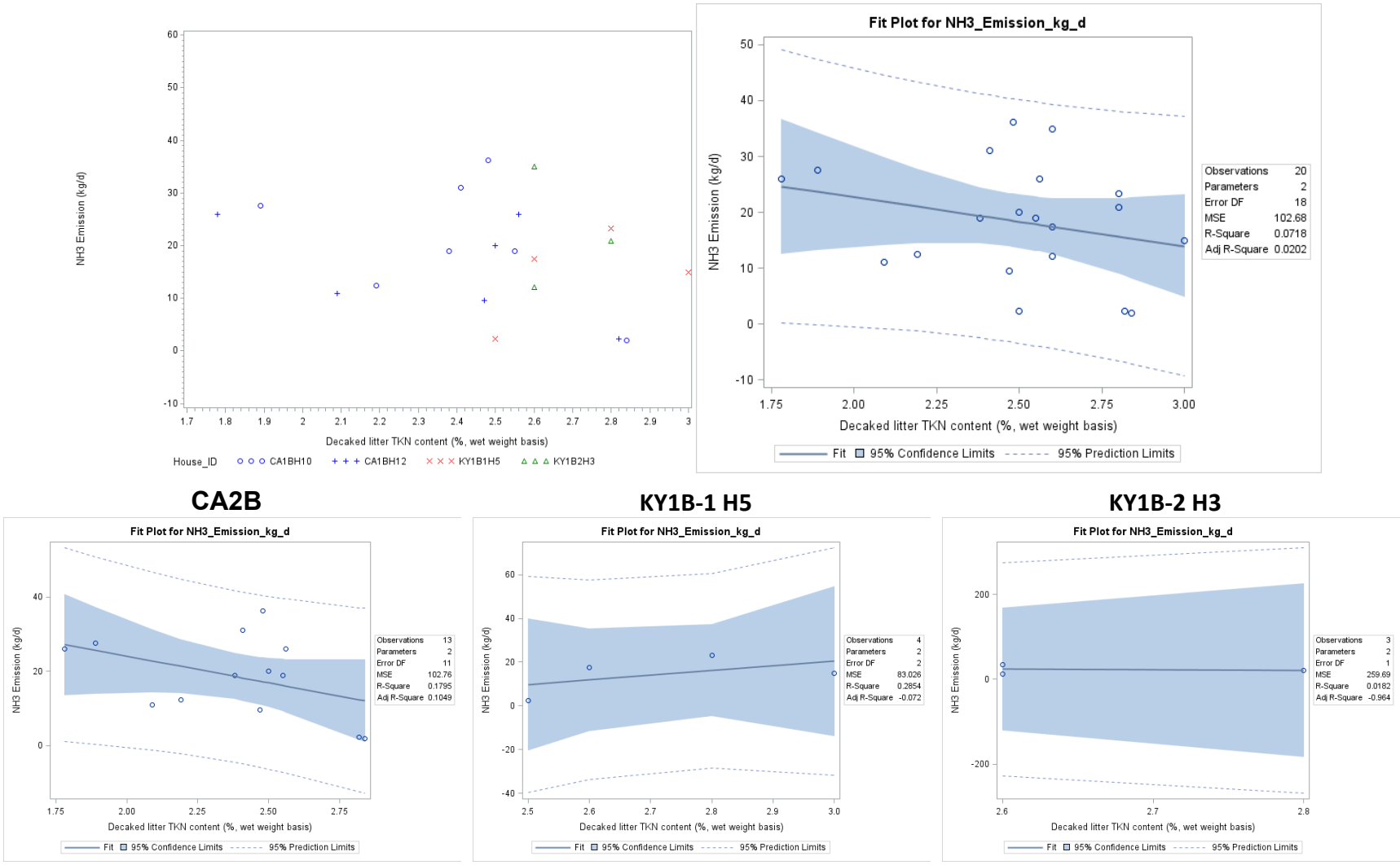


Figure F-97. Scatter plot of broiler NH_3 emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression.

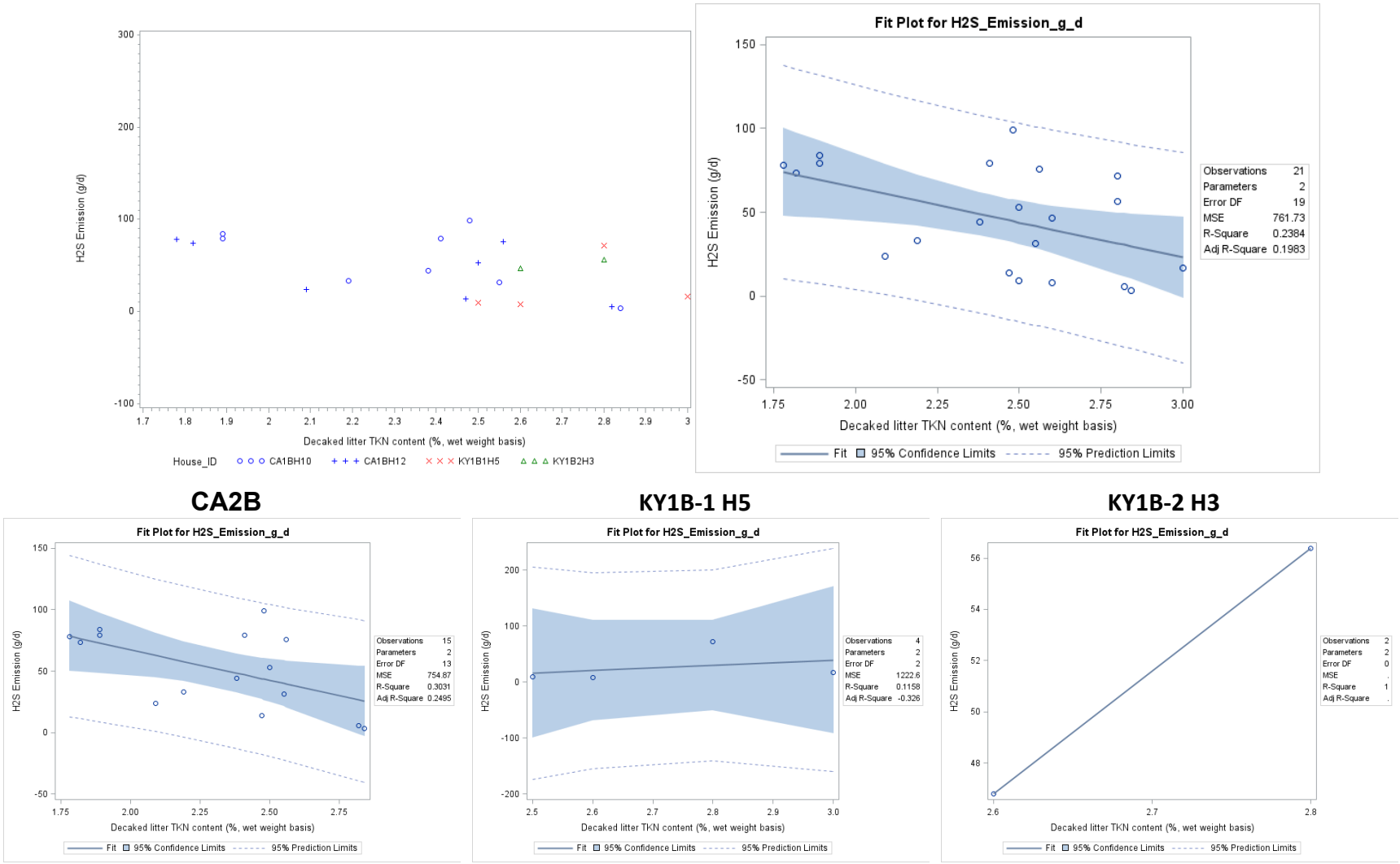
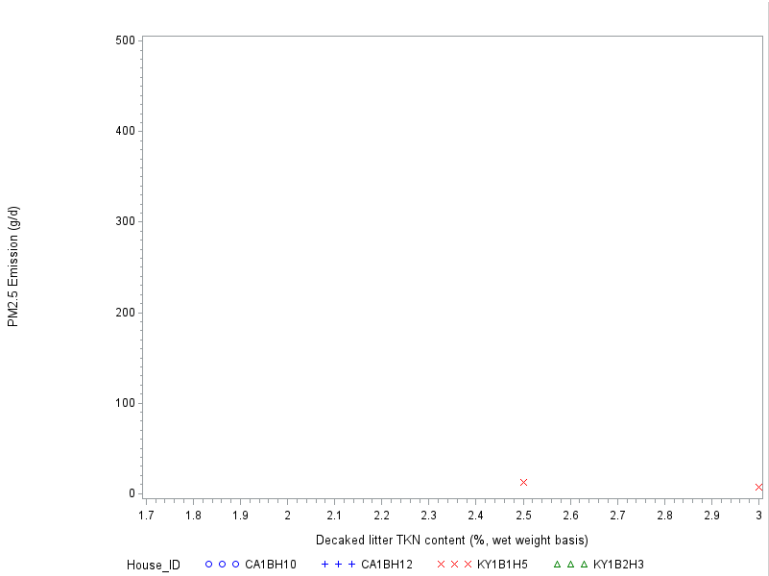
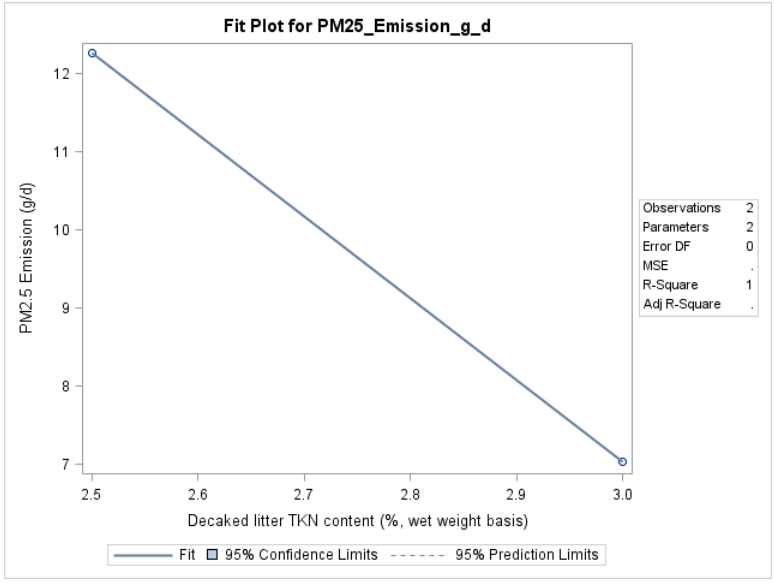


Figure F-98. Scatter plot of broiler H_2S emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression.

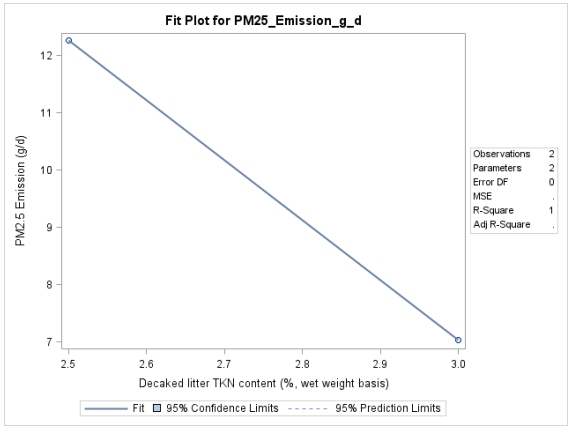


CA2B

No observations were collected.



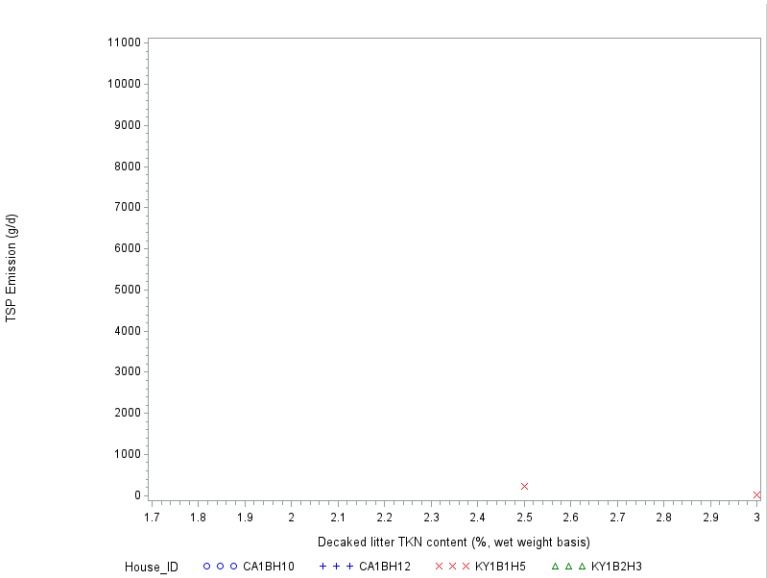
KY1B-1 H5



KY1B-2 H3

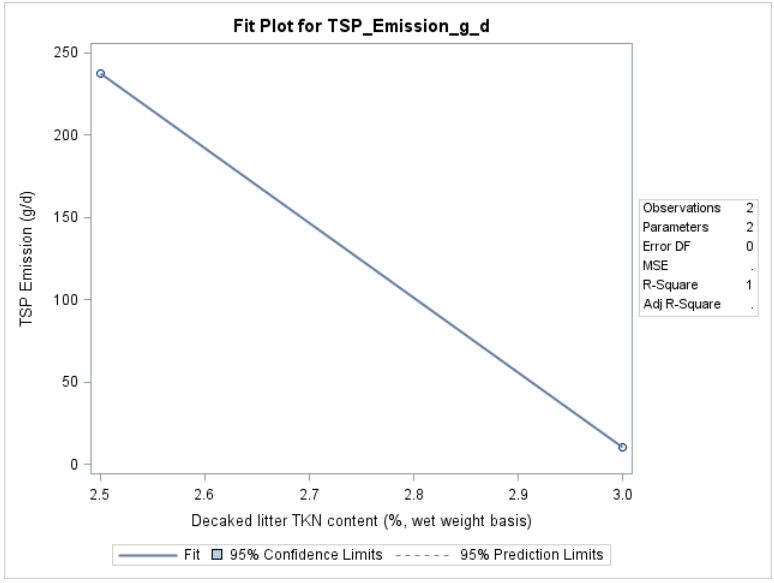
No observations were collected.

Figure F-99. Scatter plot of broiler $PM_{2.5}$ emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression.

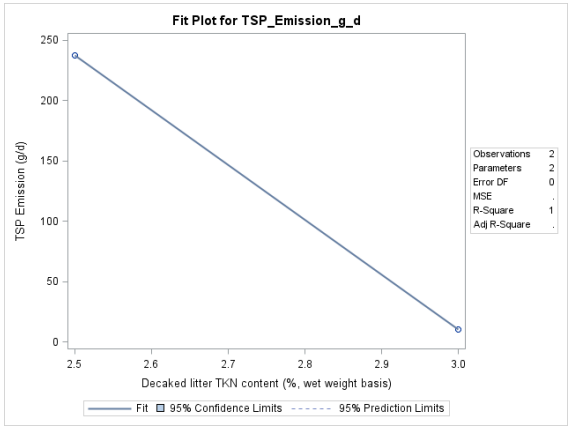


CA2B

No observations were collected.



KY1B-1 H5

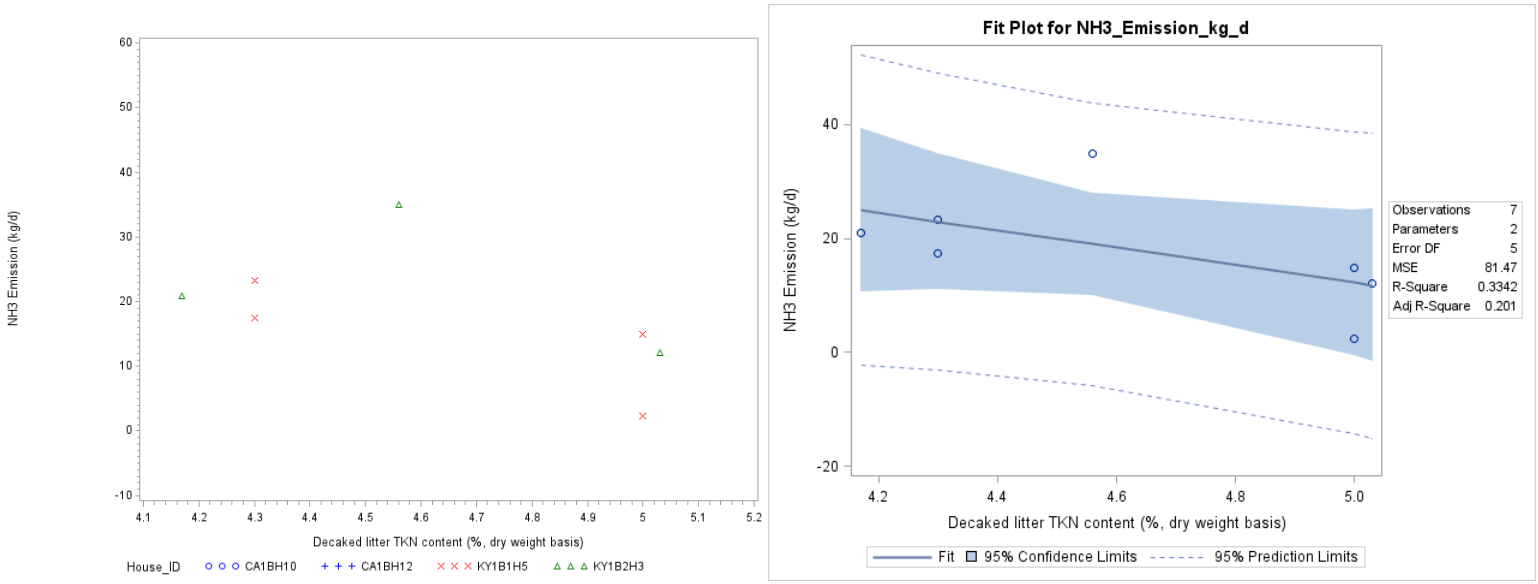


KY1B-2 H3

No observations were collected.

Figure F-100. Scatter plot of broiler TSP emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression.

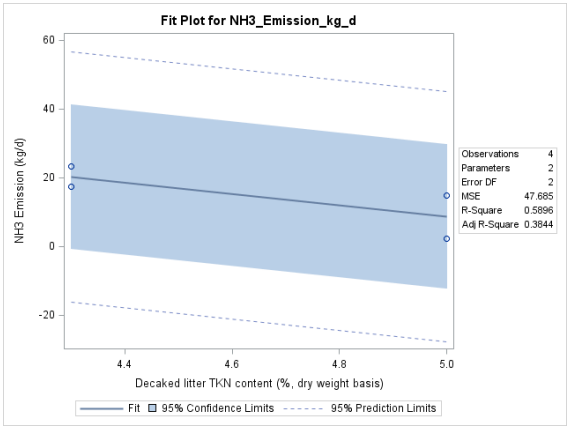
TKN content, decaked litter (dry weight basis)



CA2B

No observations were collected.

KY1B-1 H5



KY1B-2 H3

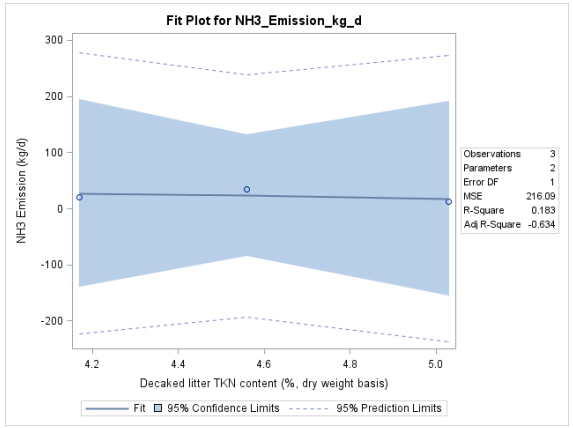
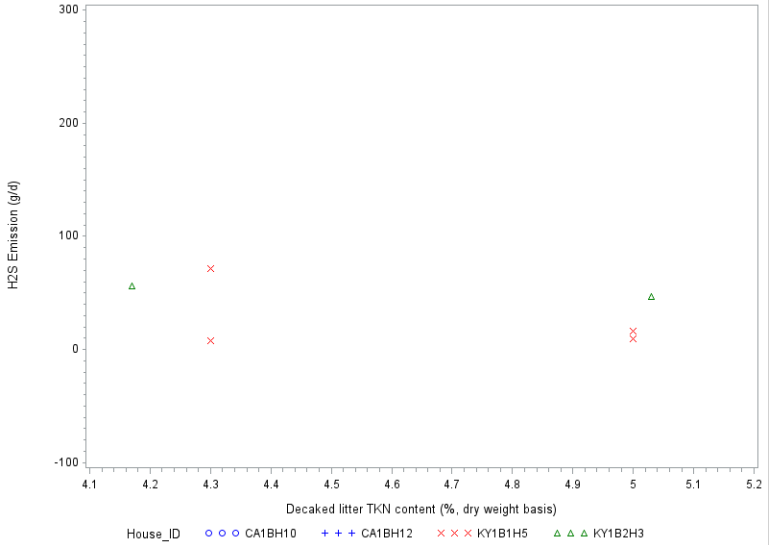
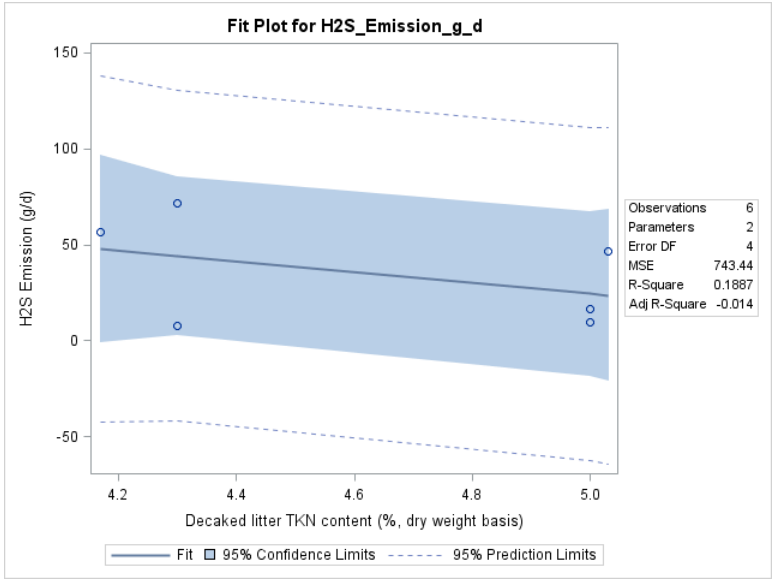


Figure F-101. Scatter plot of broiler NH_3 emissions versus decaked litter TKN content (dry weight basis)and scatter plot with regression.

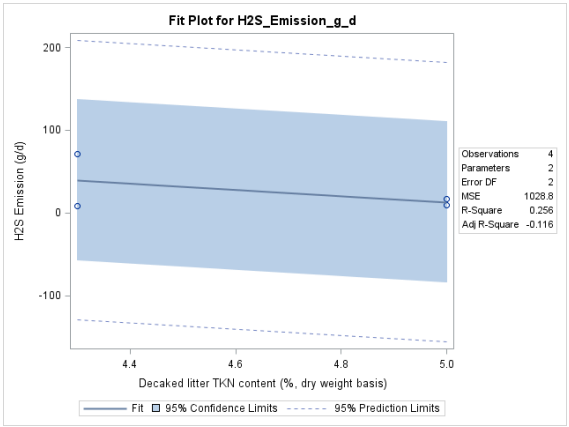




CA2B

No observations were collected.

KY1B-1 H5



KY1B-2 H3

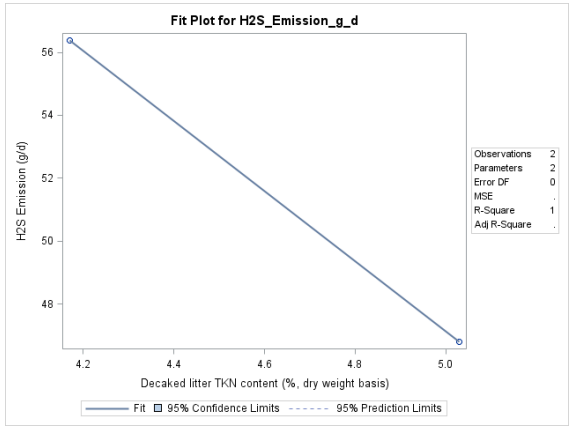
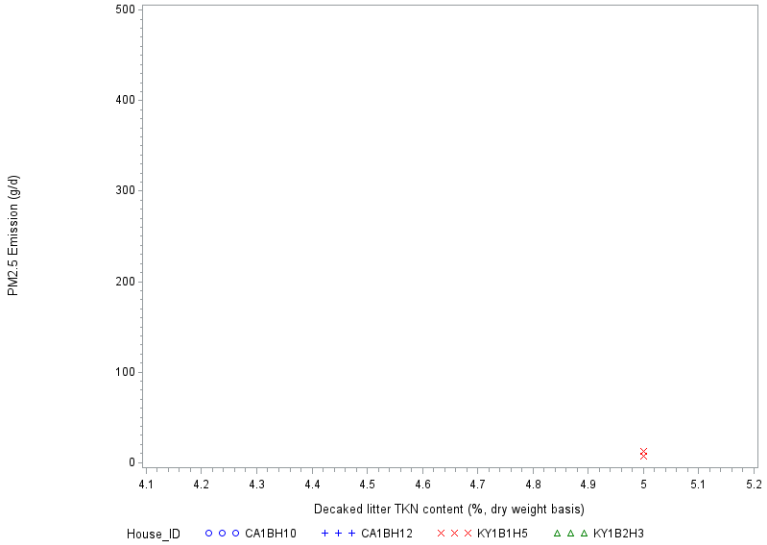
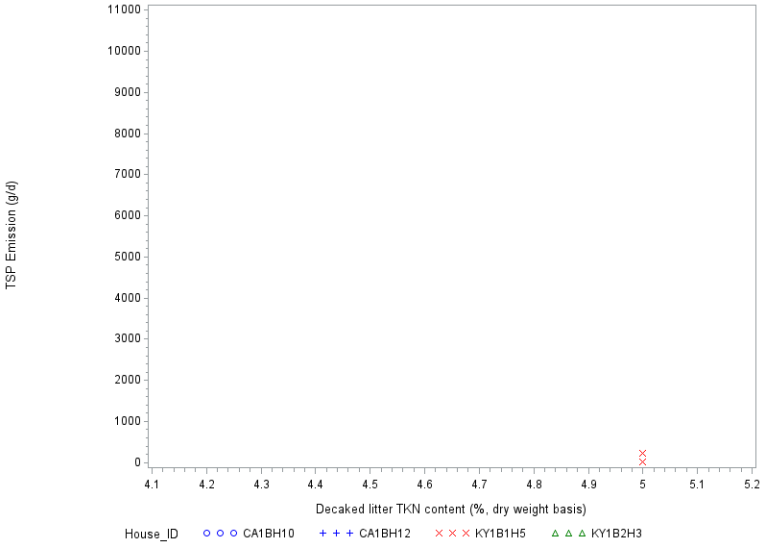


Figure F-102. Scatter plot of broiler H_2S emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression.



CA2B	KY1B-1 H5	KY1B-2 H3
No observations were collected.	EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).	No observations were collected.

Figure F-103. Scatter plot of broiler $PM_{2.5}$ emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression.



CA2B

No observations were collected.

KY1B-1 H5

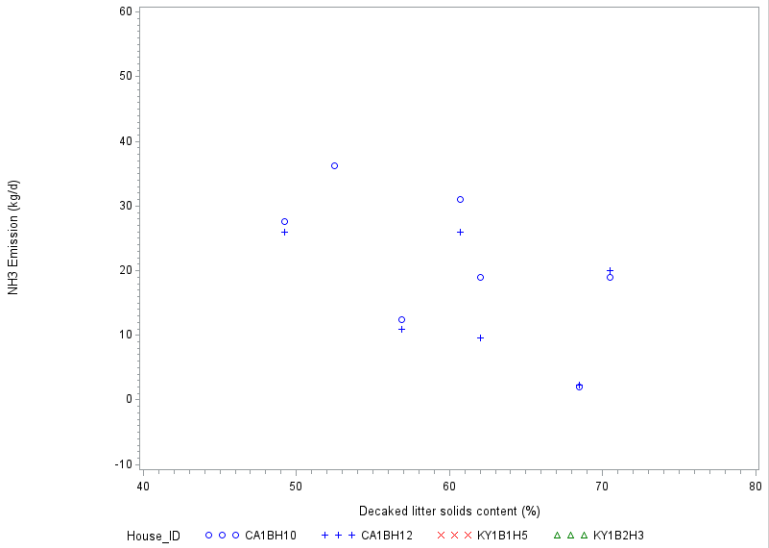
EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

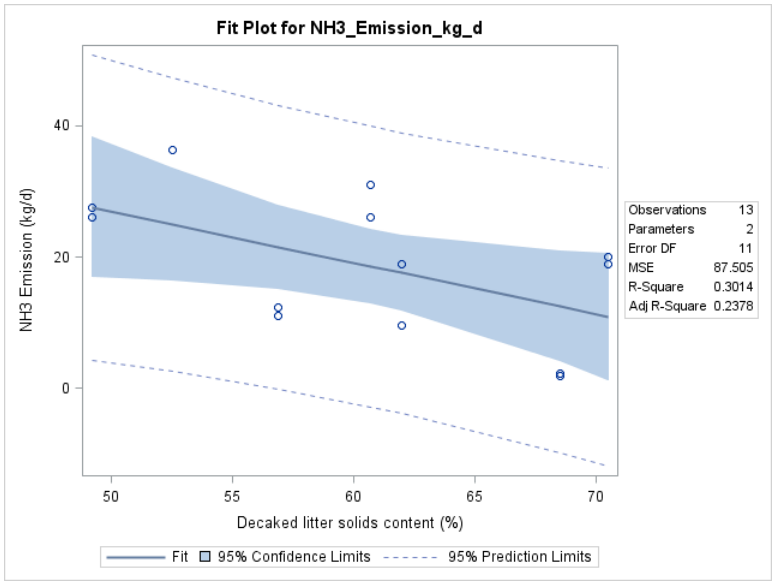
KY1B-2 H3

No observations were collected.

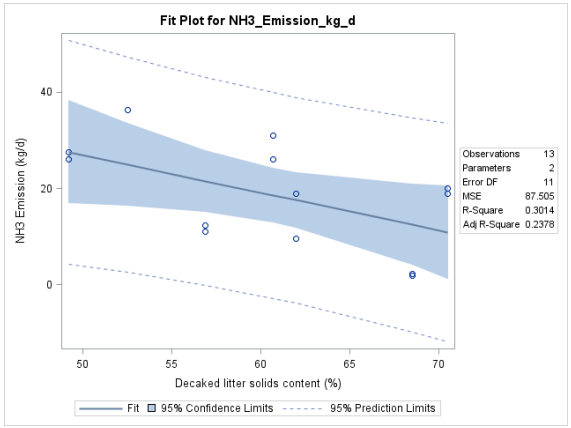
Figure F-104. Scatter plot of broiler TSP emissions versus decaked litter TKN content (wet weight basis) and scatter plot with regression.

Solids Content, decaked litter





CA2B



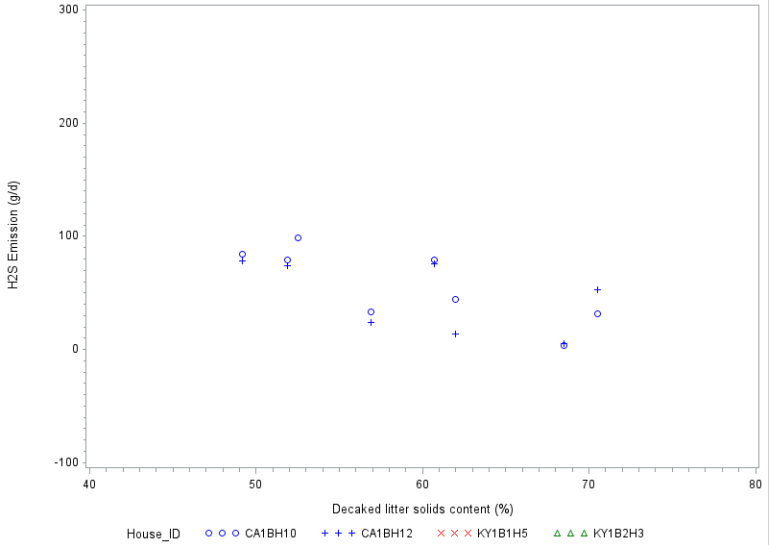
KY1B-1 H5

No observations were collected.

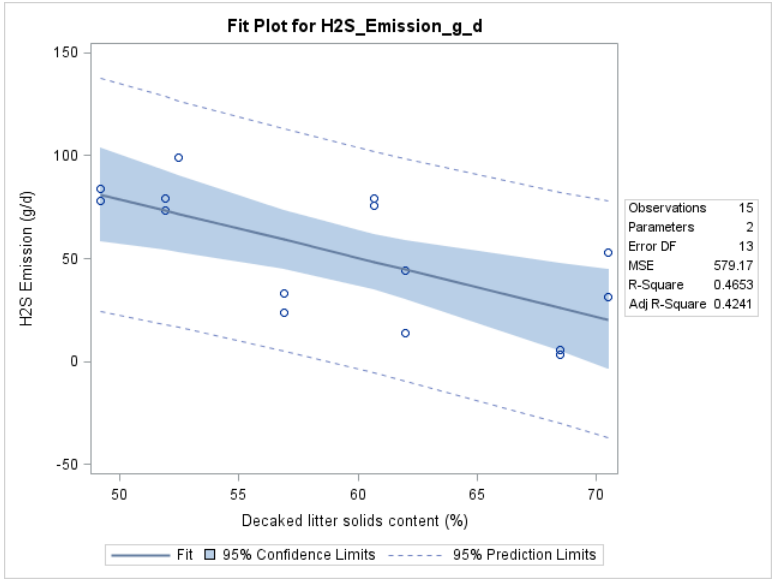
KY1B-2 H3

No observations were collected.

Figure F-105. Scatter plot of broiler NH_3 emissions versus decaked litter solids content and scatter plot with regression.



CA2B



KY1B-1 H5

No observations were collected.

KY1B-2 H3

No observations were collected.

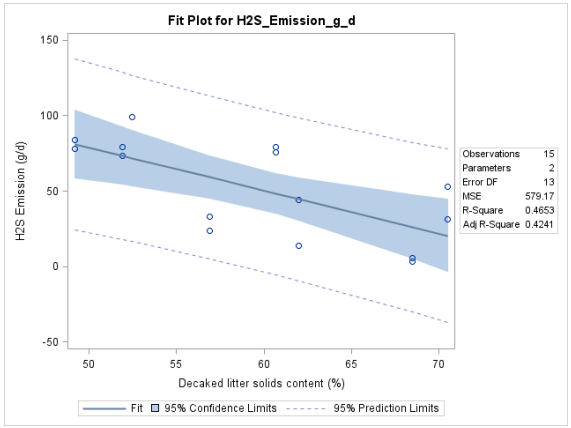
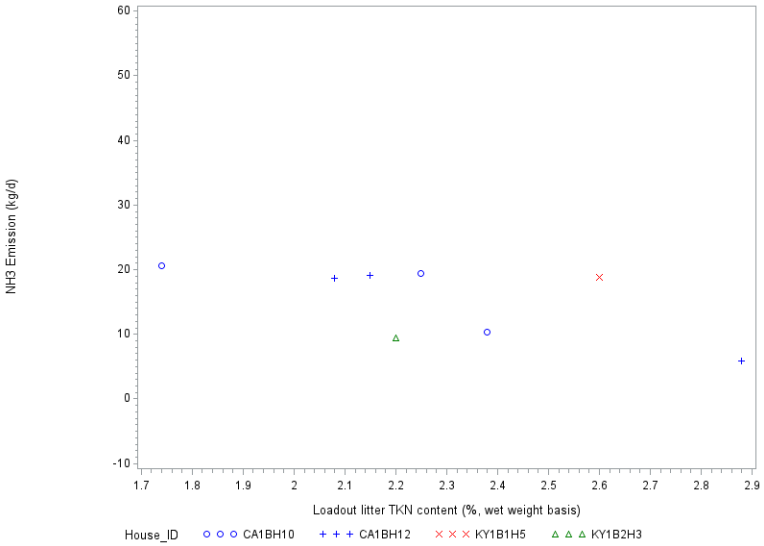
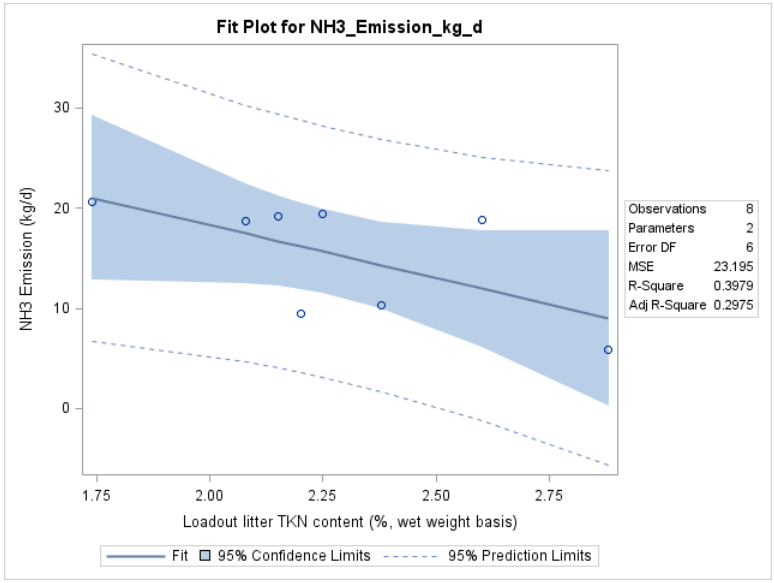


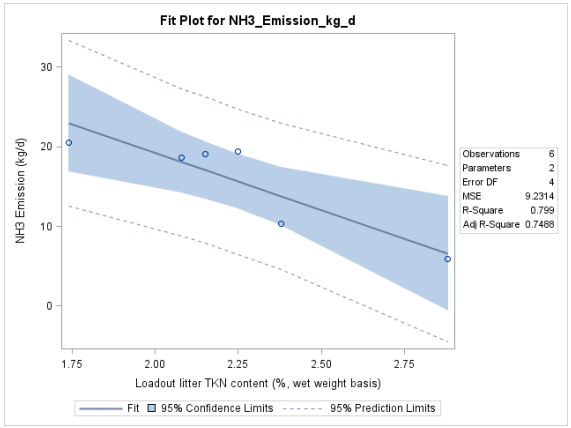
Figure F-106. Scatter plot of broiler H_2S emissions versus inventory and scatter plot with regression.

TKN, loadout litter (wet weight basis)





CA2B



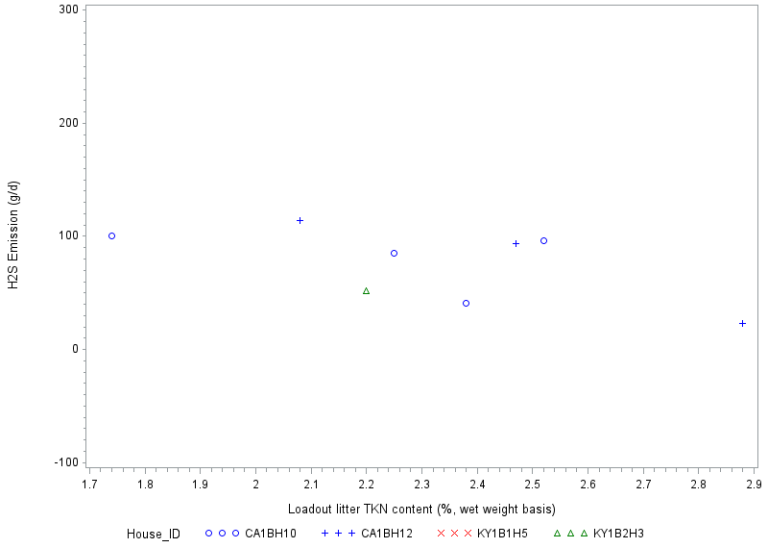
KY1B-1 H5

No observations were collected.

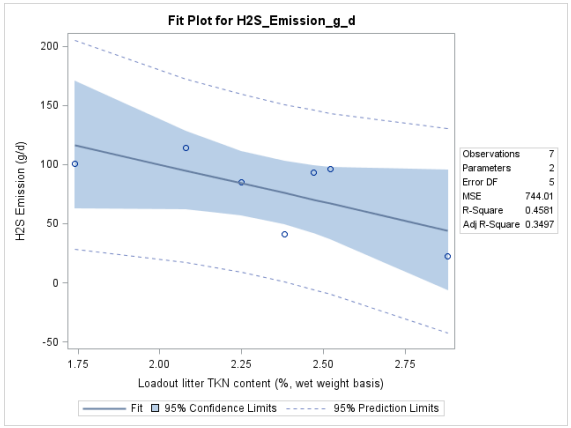
KY1B-2 H3

EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

Figure F-107. Scatter plot of broiler NH_3 emissions versus loadout litter TKN content (wet weight basis) and scatter plot with regression.

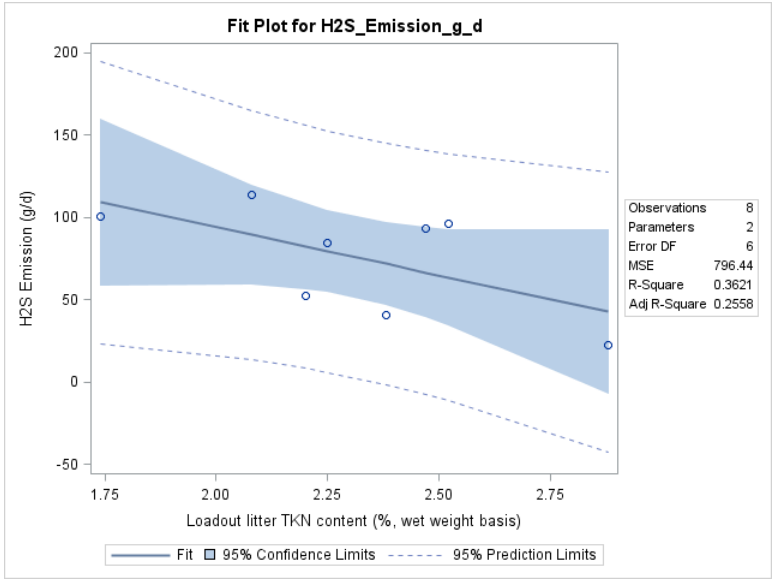


CA2B



KY1B-1 H5

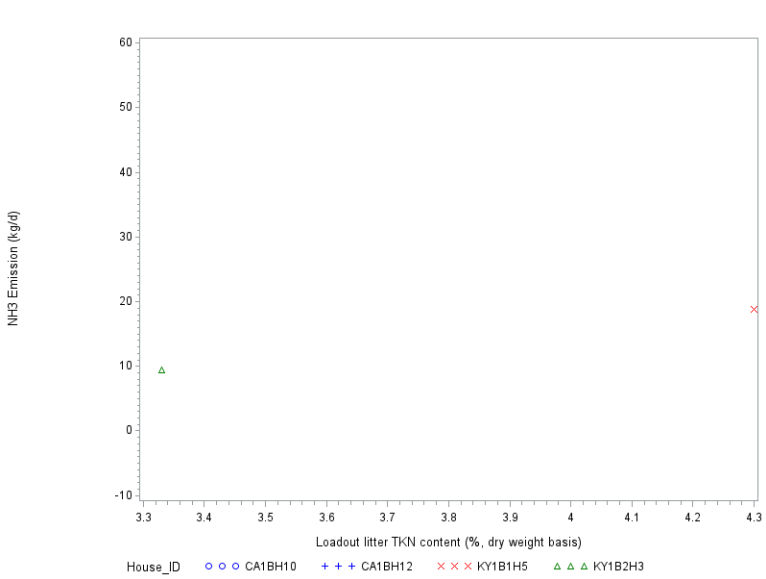
No observations were collected.

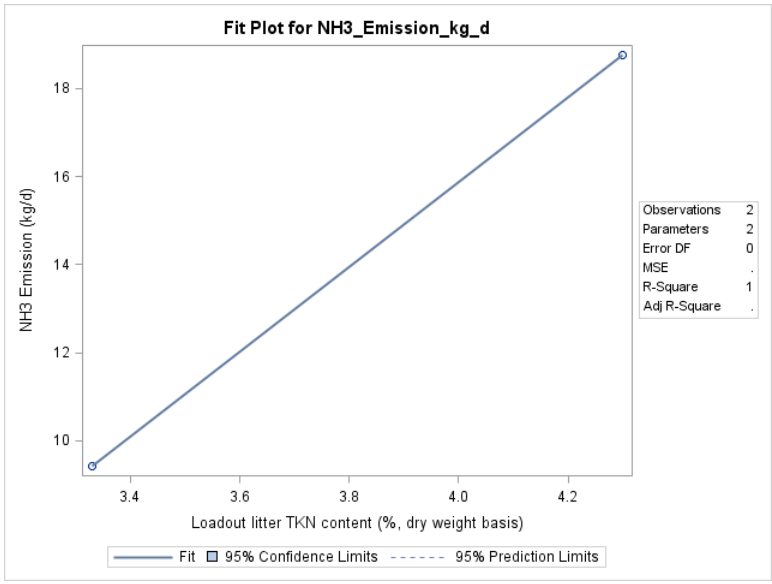


KY1B-2 H3

EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

Figure F-108. Scatter plot of broiler H_2S emissions versus loadout litter TKN content (wet weight basis) and scatter plot with regression.





CA2B

No observations were collected.

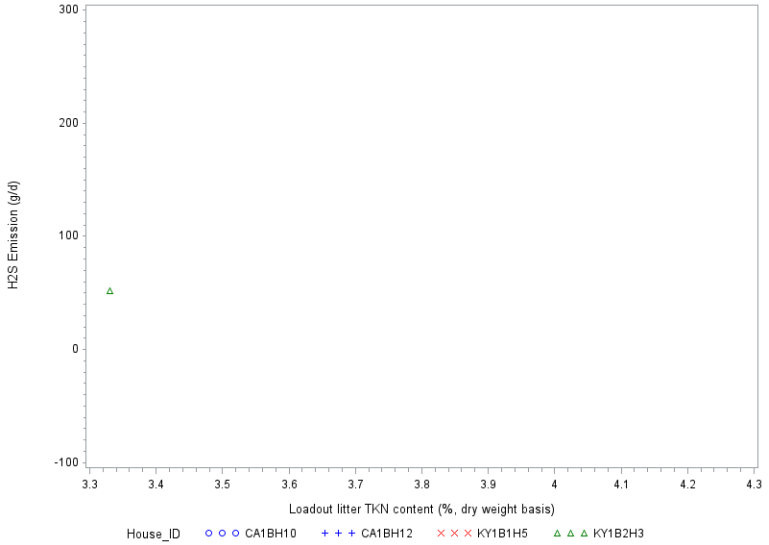
KY1B-1 H5

EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

KY1B-2 H3

EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

Figure F-109. Scatter plot of broiler NH_3 emissions versus loadout litter TKN content (dry weight basis) and scatter plot with regression.



CA2B

No observations were collected.

KY1B-1 H5

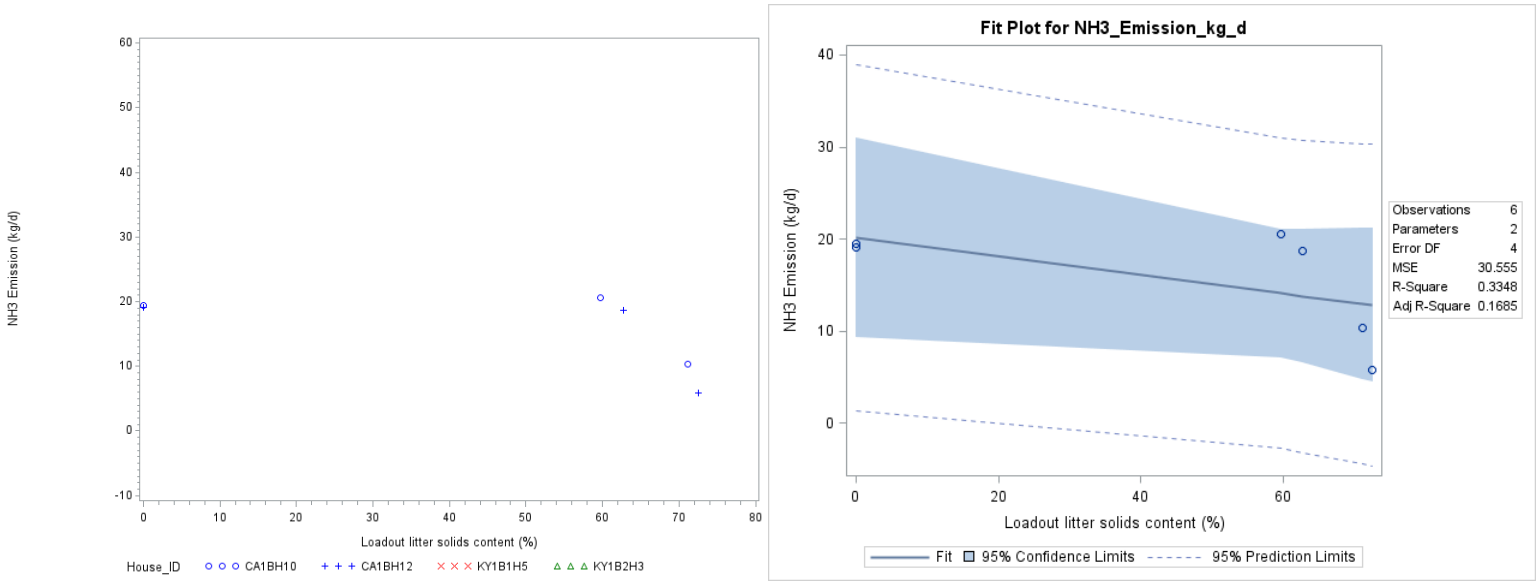
No observations were collected.

KY1B-2 H3

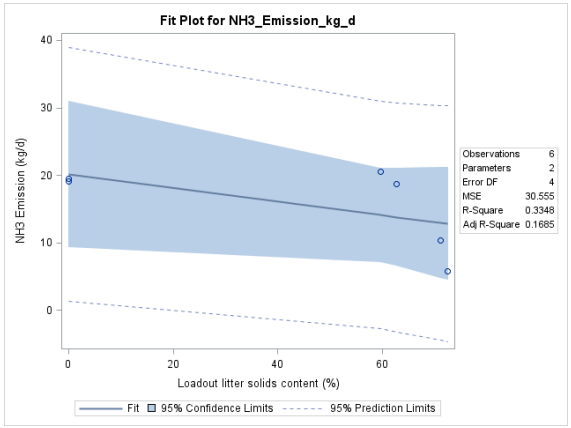
EPA did not have sufficient measurement data from NAEMS to conduct a linear regression analysis (i.e., two or fewer observations were taken).

Figure F-110. Scatter plot of broiler H_2S emissions versus loadout litter TKN content (dry weight basis) and scatter plot with regression.

Solids content, loadout litter



CA2B



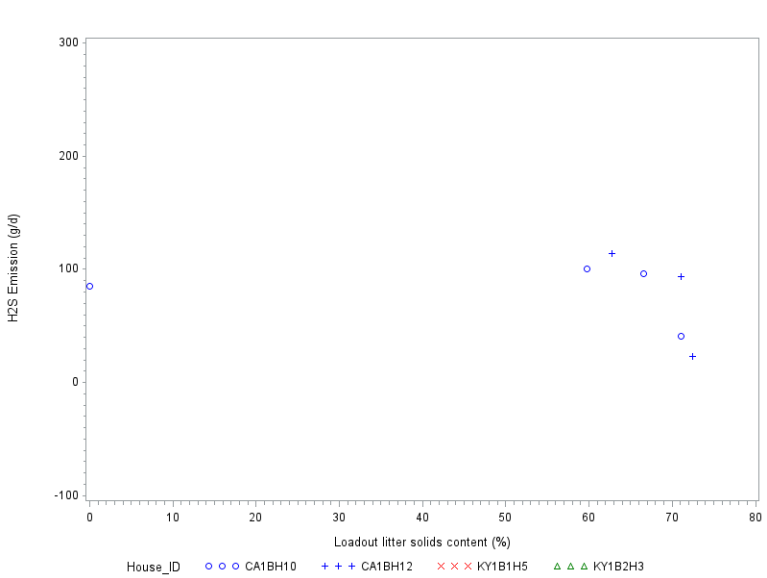
KY1B-1 H5

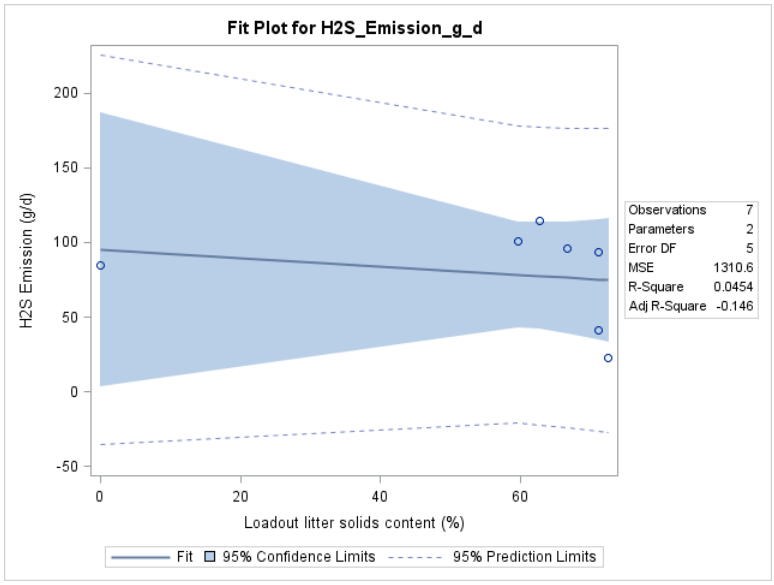
No observations were collected.

KY1B-2 H3

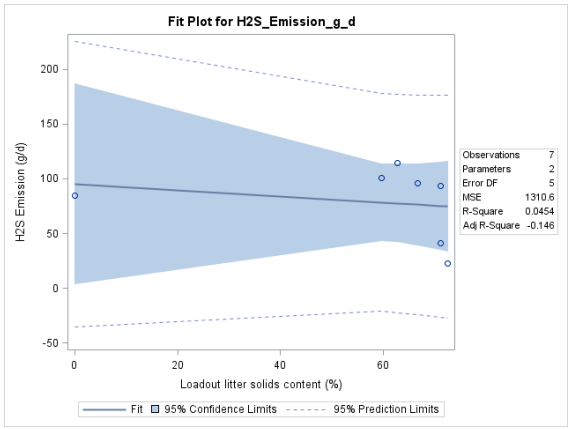
No observations were collected.

Figure F-111. Scatter plot of broiler NH_3 emissions versus loadout litter solids content and scatter plot with regression.





CA2B



KY1B-1 H5

No observations were collected.

KY1B-2 H3

No observations were collected.

Figure F-112. Scatter plot of broiler H_2S emissions versus loadout litter solids content and scatter plot with regression.

Appendix G – Modeling Plots

List of Tables

Table G-1. Parameter combinations tested as models for NH_3 and H_2S emissions. G-3
Table G-2. Parameter and estimates for broiler NH_3 emission models tested. G-4
Table G-3. Fit and evaluation statistics for the broiler house NH_3 models tested. G-7
Table G-4. Parameter and estimates for broiler H_2S emission models tested. G-11
Table G-5. Fit and evaluation statistics for the broilerH_2S models tested. G-14
Table G-6. Parameter and estimates for broiler PM_{10} emission models tested. G-18
Table G-7. Fit and evaluation statistics for the broiler PM_{10} models tested. G-21
Table G-8. Parameter and estimates for broiler $PM_{2.5}$ emission models tested. G-25
Table G-9. Fit and evaluation statistics for the broiler $PM_{2.5}$ models tested. G-28
Table G-10. Parameter and estimates for broiler TSP emission models tested. G-32
Table G-11. Fit and evaluation statistics for the broiler TSP models tested. G-35

List of Figures

Figure G-1. Broiler house NH_3 one-to-one plots models 1 through 9. ..... G-8
Figure G-2. Broiler house NH_3 one-to-one plots models 10 through 18. ..... G-9
Figure G-3. Broiler house NH_3 one-to-one plots models 19 through 26. ..... G-10
Figure G-4. Broiler house H_2S one-to-one plots models 1 through 9. ..... G-15
Figure G-5. Broiler house H_2S one-to-one plots models 10 through 18. ..... G-16
Figure G-6. Broiler house H_2S one-to-one plots models 19 through 26. ..... G-17
Figure G-7. Broiler house PM_{10} one-to-one plots models 1 through 9. ..... G-22
Figure G-8. Broiler house PM_{10} one-to-one plots models 10 through 18. ..... G-23
Figure G-9. Broiler house PM_{10} one-to-one plots models 19 through 26. ..... G-24
Figure G-10. Broiler house $PM_{2.5}$ one-to-one plots models 1 through 9. ..... G-29
Figure G-11. Broiler house $PM_{2.5}$ one-to-one plots models 10 through 18. ..... G-30
Figure G-12. Broiler house $PM_{2.5}$ one-to-one plots models 19 through 26. ..... G-31
Figure G-13. Broiler house TSP one-to-one plots models 1 through 9. ..... G-36
Figure G-14. Broiler house TSP one-to-one plots models 10 through 18 ..... G-37
Figure G-15. Broiler house TSP one-to-one plots models 19 through 26 ..... G-38

Table G-1. Parameter combinations tested as models for NH_3 and H_2S emissions.

Model	Parameter
1	Intercept, Inventory, Flock age
2	Intercept, Inventory, Flock age, Ambient temperature
3	Intercept, Inventory, Flock age, Ambient relative humidity
4	Intercept, Inventory, Flock age, Exhaust temperature
5	Intercept, Inventory, Flock age, Exhaust humidity
6	Intercept, Inventory, Flock age, Ambient temperature, Ambient relative humidity
7	Intercept, Inventory, Flock age, Exhaust temperature, Exhaust relative humidity
8	Intercept, Inventory, Flock age, Litter age
9	Intercept, Inventory, Flock age, Litter age, Ambient temperature
10	Intercept, Live animal weight
11	Intercept, Live animal weight, Ambient temperature
12	Intercept, Live animal weight, Ambient relative humidity
13	Intercept, Live animal weight, Exhaust temperature
14	Intercept, Live animal weight, Exhaust humidity
15	Intercept, Live animal weight, Ambient temperature, Ambient relative humidity
16	Intercept, Live animal weight, Exhaust temperature, Exhaust relative humidity
17	Intercept, Live animal weight, Litter age
18	Intercept, Live animal weight, Litter age, Ambient temperature
19*	Intercept, Inventory, Flock age, Ambient temperature, Ambient relative humidity, House status (Empty (E), Full (F), Transition (T))
20*	Intercept, Live animal weight, Ambient temperature, Ambient relative humidity, House status (Empty (E), Full (F), Transition (T))
21*	Intercept, Inventory, Flock age, Ambient temperature, Ambient relative humidity, Litter status (0-3, continuous between flocks)
22*	Intercept, Live animal weight, Ambient temperature, Ambient relative humidity, Litter status (0-3, continuous between flocks)
23*	Intercept, Inventory, Flock age, Ambient temperature, Ambient relative humidity, Litter status (0-6, continuous between flocks)
24*	Intercept, Live animal weight, Ambient temperature, Ambient relative humidity, Litter status (0-6, continuous between flocks)
25*	Intercept, Inventory, Flock age, Ambient temperature, Ambient relative humidity, Litter status (0-1, continuous between flocks)
26*	Intercept, Live animal weight, Ambient temperature, Ambient relative humidity, Litter status (0-1, continuous between flocks)

* Experimental model. Not considered during model selection.

Table G-2. Parameter and estimates for broiler NH_3 emission models tested.

Model	Parameter	Estimate	Standard Error	p-value
1	Intercept	2.141006	0.08806	<.0001
	Inventory	0.004007	0.00213	**0.0599**
	Flock age	0.006244	0.00112	<.0001
2	Intercept	1.87684	0.0924	<.0001
	Inventory	0.004044	0.0021	**0.0545**
	Flock age	0.006357	0.00111	<.0001
	Ambient temperature	0.019455	0.00239	<.0001
3	Intercept	1.968834	0.10345	<.0001
	Inventory	0.003964	0.00214	**0.0643**
	Flock age	0.00632	0.00113	<.0001
	Ambient relative humidity	0.002452	0.00082	0.0028
4	Intercept	1.748571	0.11697	<.0001
	Inventory	0.002681	0.00212	**0.2057**
	Flock age	0.006108	0.0011	<.0001
	Exhaust temperature	0.018707	0.00345	<.0001
5	Intercept	1.976981	0.11744	<.0001
	Inventory	0.002385	0.00209	**0.2539**
	Flock age	0.009209	0.00114	<.0001
	Exhaust relative humidity	0.002284	0.00127	**0.0725**
6	Intercept	1.554209	0.11193	<.0001
	Inventory	0.004043	0.00209	**0.0527**
	Flock age	0.00641	0.0011	<.0001
	Ambient temperature	0.022003	0.00243	<.0001
	Ambient relative humidity	0.004033	0.00082	<.0001
7	Intercept	1.466425	0.15096	<.0001
	Inventory	0.001182	0.00207	**0.5687**
	Flock age	0.009081	0.00112	<.0001
	Exhaust temperature	0.019527	0.00354	<.0001
	Exhaust relative humidity	0.003897	0.00129	0.0026
8	Intercept	2.007307	0.10579	<.0001
	Inventory	0.005385	0.00225	*0.0168*
	Flock age	0.005979	0.00113	<.0001
	Litter age	0.000739	0.00039	**0.0606**
9	Intercept	1.712644	0.11028	<.0001
	Inventory	0.005669	0.00222	*0.0107*
	Flock age	0.006031	0.00112	<.0001
	Ambient temperature	0.019593	0.00238	<.0001
	Litter age	0.000848	0.00038	*0.0274*
10	Intercept	2.171642	0.07708	<.0001
	Live animal weight	0.008597	0.00096	<.0001
11	Intercept	1.928609	0.08252	<.0001
	Live animal weight	0.008549	0.00095	<.0001
	Ambient temperature	0.018161	0.00236	<.0001
12	Intercept	1.995512	0.09419	<.0001
	Live animal weight	0.008616	0.00097	<.0001
	Ambient relative humidity	0.002508	0.00081	0.0021

Model	Parameter	Estimate	Standard Error	p-value
13	Intercept	1.793893	0.11027	<.0001
	Live animal weight	0.008032	0.00096	<.0001
	Exhaust temperature	0.017361	0.0034	<.0001
14	Intercept	1.9941	0.10717	<.0001
	Live animal weight	0.010261	0.00099	<.0001
	Exhaust relative humidity	0.002428	0.00126	**0.0539**
15	Intercept	1.60581	0.10407	<.0001
	Live animal weight	0.008532	0.00094	<.0001
	Ambient temperature	0.020739	0.0024	<.0001
	Ambient relative humidity	0.004038	0.00081	<.0001
16	Intercept	1.490968	0.14462	<.0001
	Live animal weight	0.009791	0.00098	<.0001
	Exhaust temperature	0.018742	0.0035	<.0001
	Exhaust relative humidity	0.003947	0.00128	0.0021
17	Intercept	2.094469	0.09157	<.0001
	Live animal weight	0.008683	0.00096	<.0001
	Litter age	0.000492	0.00038	**0.1979**
18	Intercept	1.836166	0.09705	<.0001
	Live animal weight	0.008634	0.00095	<.0001
	Ambient temperature	0.018204	0.00235	<.0001
	Litter age	0.000555	0.00037	**0.1377**
19*	Intercept	1.219981	0.132	<.0001
	House status - Empty	0.348512	0.08179	<.0001
	House status - Full	-0.19037	0.06382	0.0029
	House status - Transition	0	.	.
	Inventory	0.023409	0.00539	<.0001
	Flock age	0.009799	0.00137	<.0001
	Ambient temperature	0.021999	0.00242	<.0001
	Ambient relative humidity	0.003947	0.00082	<.0001
20*	Intercept	1.611418	0.12873	<.0001
	House status - Empty	0.032309	0.08501	**0.704**
	House status - Full	-0.0448	0.07525	**0.5518**
	House status - Transition	0	.	.
	Live animal weight	0.009821	0.00132	<.0001
	Ambient temperature	0.020684	0.0024	<.0001
	Ambient relative humidity	0.004004	0.00082	<.0001
21*	Intercept	1.698344	0.14873	<.0001
	Litter condition - 0	-0.196207	0.13019	**0.1336**
	Litter condition - 1	-0.240014	0.13323	**0.0736**
	Litter condition - 2	-0.171223	0.12936	**0.1877**
	Litter condition - 3+	0	.	.
	Inventory	0.003912	0.00209	**0.0616**
	Flock age	0.006468	0.0011	<.0001
	Ambient temperature	0.021878	0.00243	<.0001
	Ambient relative humidity	0.004075	0.00082	<.0001
22*	Intercept	1.74348	0.14058	<.0001
	Litter condition - 0	-0.181283	0.12789	**0.1582**

Model	Parameter	Estimate	Standard Error	p-value
	Litter condition - 1	-0.239139	0.13262	**0.0735**
	Litter condition - 2	-0.155175	0.12642	**0.2217**
	Litter condition - 3+	0	.	.
	Live animal weight	0.008525	0.00094	<.0001
	Ambient temperature	0.02055	0.00241	<.0001
	Ambient relative humidity	0.004058	0.00081	<.0001
23*	Intercept	1.826993	0.26916	<.0001
	Litter condition - 0	-0.342542	0.26248	**0.195**
	Litter condition - 1	-0.387448	0.2668	**0.1498**
	Litter condition - 2	-0.321476	0.26767	**0.2329**
	Litter condition - 3	-0.211192	0.29837	**0.4807**
	Litter condition - 4	-0.388707	0.35539	**0.2782**
	Litter condition - 5	0.233524	0.38202	**0.5446**
	Litter condition - 6	0	.	.
	Inventory	0.003996	0.00211	**0.0586**
	Flock age	0.006459	0.0011	<.0001
	Ambient temperature	0.022396	0.00244	<.0001
	Ambient relative humidity	0.004151	0.00082	<.0001
24*	Intercept	1.820799	0.26294	<.0001
	Litter condition - 0	-0.27453	0.25551	**0.2855**
	Litter condition - 1	-0.332466	0.26214	**0.2081**
	Litter condition - 2	-0.251812	0.26185	**0.339**
	Litter condition - 3	-0.14936	0.28944	**0.607**
	Litter condition - 4	-0.298823	0.3433	**0.3875**
	Litter condition - 5	0.293234	0.36577	**0.4278**
	Litter condition - 6	0	.	.
	Live animal weight	0.00852	0.00094	<.0001
	Ambient temperature	0.021039	0.00242	<.0001
	Ambient relative humidity	0.004121	0.00082	<.0001
25*	Intercept	1.55499	0.11232	<.0001
	Litter condition - 0	-0.005074	0.05939	**0.9319**
	Litter condition - 1+	0	.	.
	Inventory	0.004049	0.00209	**0.0525**
	Flock age	0.006411	0.0011	<.0001
	Ambient temperature	0.022011	0.00243	<.0001
	Ambient relative humidity	0.004033	0.00082	<.0001
26*	Intercept	1.60712	0.1045	<.0001
	Litter condition - 0	-0.009296	0.06943	**0.8935**
	Litter condition - 1+	0	.	.
	Live animal weight	0.008537	0.00094	<.0001
	Ambient temperature	0.02075	0.00241	<.0001
	Ambient relative humidity	0.004042	0.00081	<.0001

* Experimental model. Not considered during model selection.

Table G-3. Fit and evaluation statistics for the broiler house NH_3 models tested.

Model	2LogL	AIC	AICc	BIC	Corr.	LNME[a] (%)	NME[b] (%)	ME[b] (kg day^{-1})	MB[b] (kg day^{-1})	NMB[b] (%)
1	294	316	316	309	0.632	28.14	62.63	6.725	-0.488	-4.55
2	257	281	281	274	0.439	28.24	62.96	6.66	-0.333	-3.15
3	315	339	339	331	0.65	28.04	62.54	6.615	-0.504	-4.76
4	265	289	289	282	0.435	28.95	65.12	6.992	-0.301	-2.8
5	228	252	253	245	0.711	26.67	58.58	6.306	-0.673	-6.25
6	233	259	259	251	0.473	27.93	62.16	6.575	-0.37	-3.5
7	199	225	225	217	0.6	27.27	60.36	6.497	-0.547	-5.08
8	291	315	315	307	0.643	27.45	60.92	6.541	-0.531	-4.94
9	253	279	279	271	0.5	27.45	60.87	6.438	-0.382	-3.62
10	248	268	268	262	0.731	26.23	57.13	6.114	-0.727	-6.79
11	220	242	242	235	0.572	26.38	57.55	6.066	-0.564	-5.36
12	270	292	292	285	0.746	26.14	57.04	6.012	-0.738	-7.01
13	223	245	245	238	0.615	27.09	59.63	6.382	-0.577	-5.4
14	199	221	221	214	0.755	25.02	53.93	5.783	-0.829	-7.73
15	195	219	219	212	0.597	26.07	56.78	5.984	-0.599	-5.68
16	171	195	195	187	0.694	25.67	55.71	5.974	-0.729	-6.8
17	246	268	269	262	0.747	25.68	55.81	5.973	-0.772	-7.21
18	218	242	242	234	0.609	25.75	56	5.902	-0.616	-5.84
19*	215	245	245	236	0.571	26.61	58.42	6.179	-0.543	-5.13
20*	193	221	221	212	0.618	25.58	55.41	5.84	-0.647	-6.14
21*	229	261	261	251	0.475	27.51	61.09	6.462	-0.301	-2.85
22*	192	222	222	212	0.58	25.7	55.82	5.883	-0.512	-4.86
23*	225	263	263	251	0.481	27.33	60.87	6.439	-0.302	-2.85
24*	188	224	224	213	0.58	25.59	56.03	5.905	-0.495	-4.7
25*	233	261	261	252	0.475	27.93	62.15	6.574	-0.372	-3.51
26*	195	221	221	213	0.6	26.05	56.75	5.981	-0.602	-5.71

* Experimental model. Not considered during model selection.

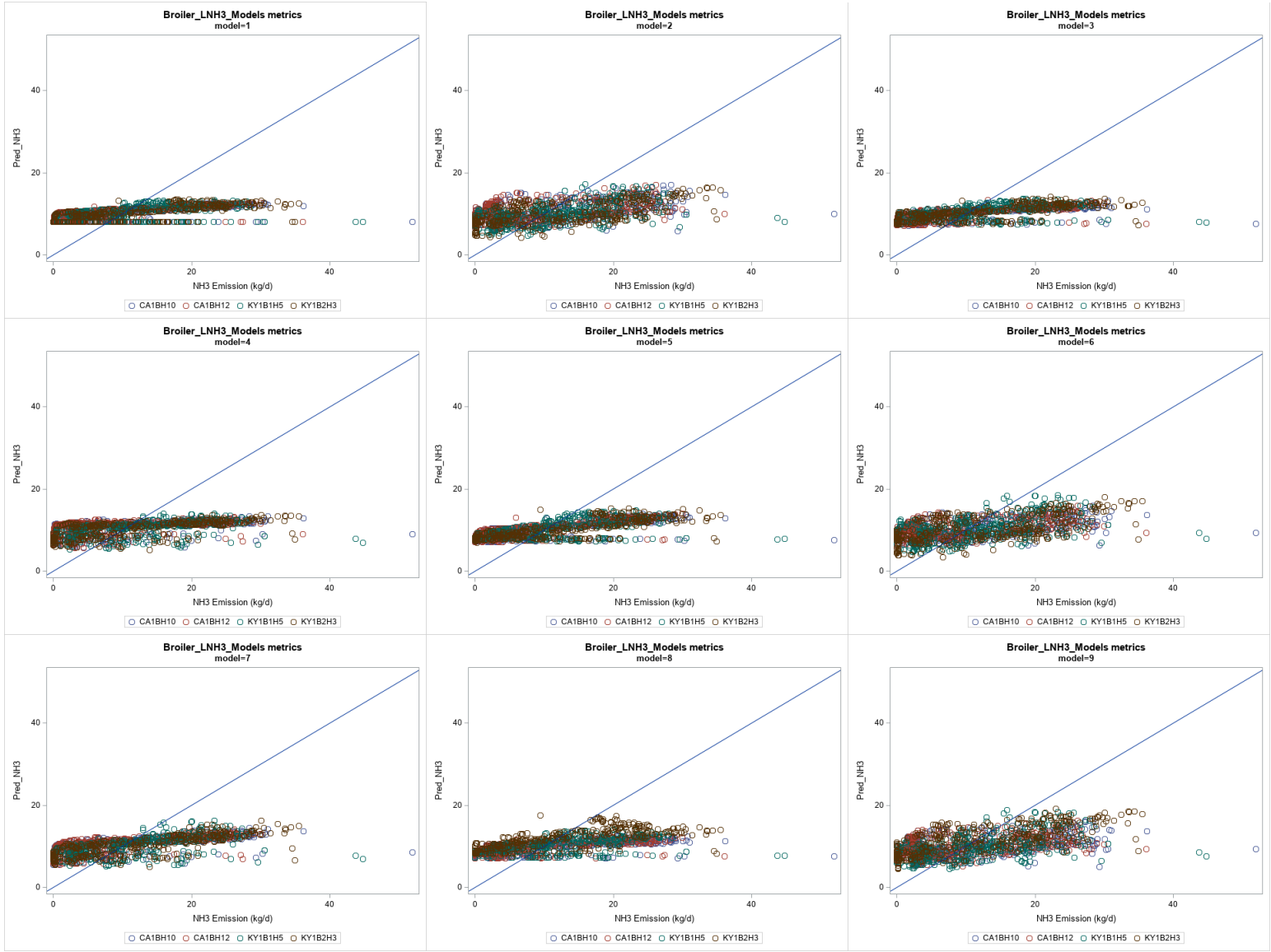


Figure G-1. Broiler house NH_3 one-to-one plots models 1 through 9.

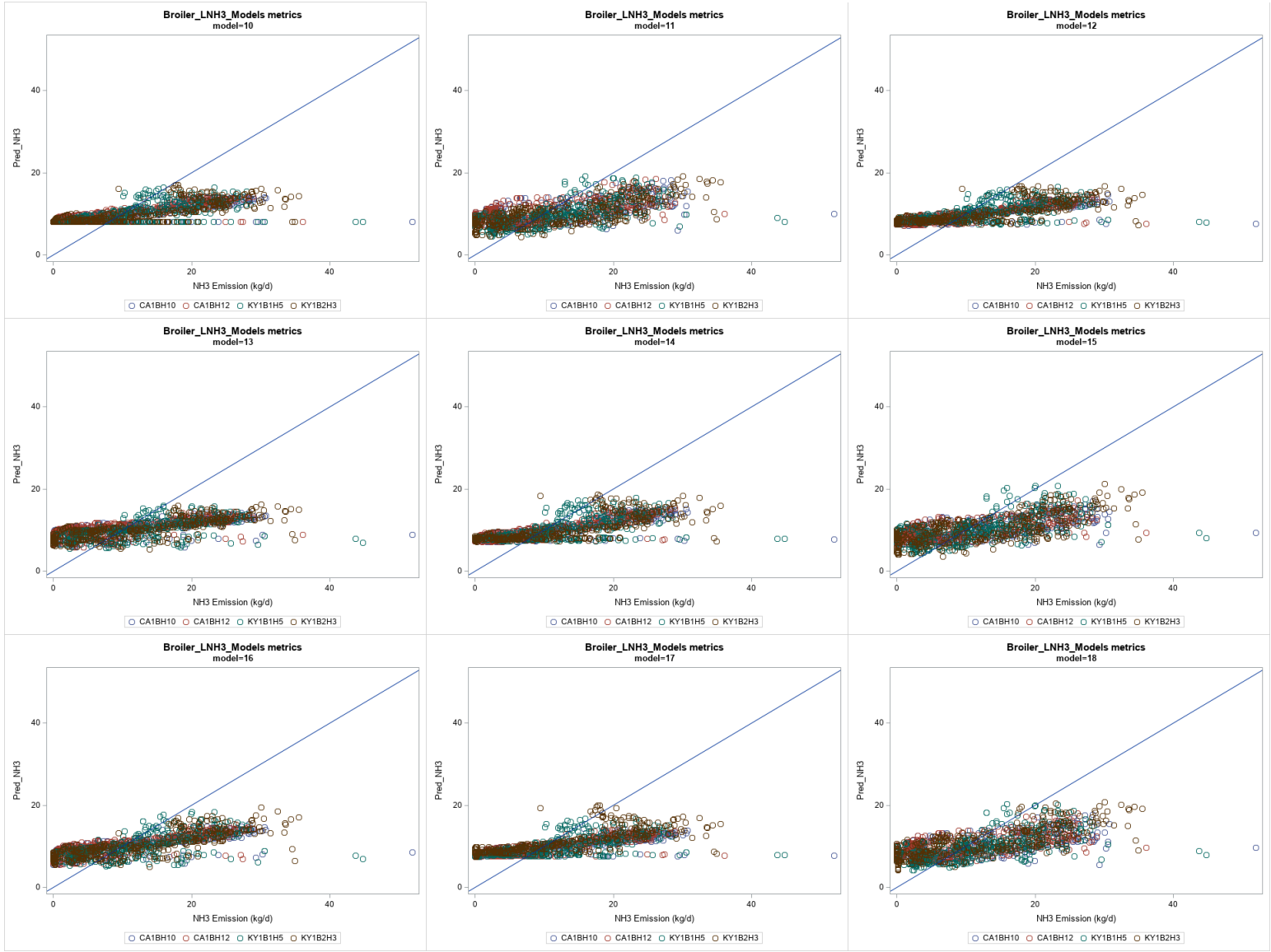


Figure G-2. Broiler house NH_3 one-to-one plots models 10 through 18.

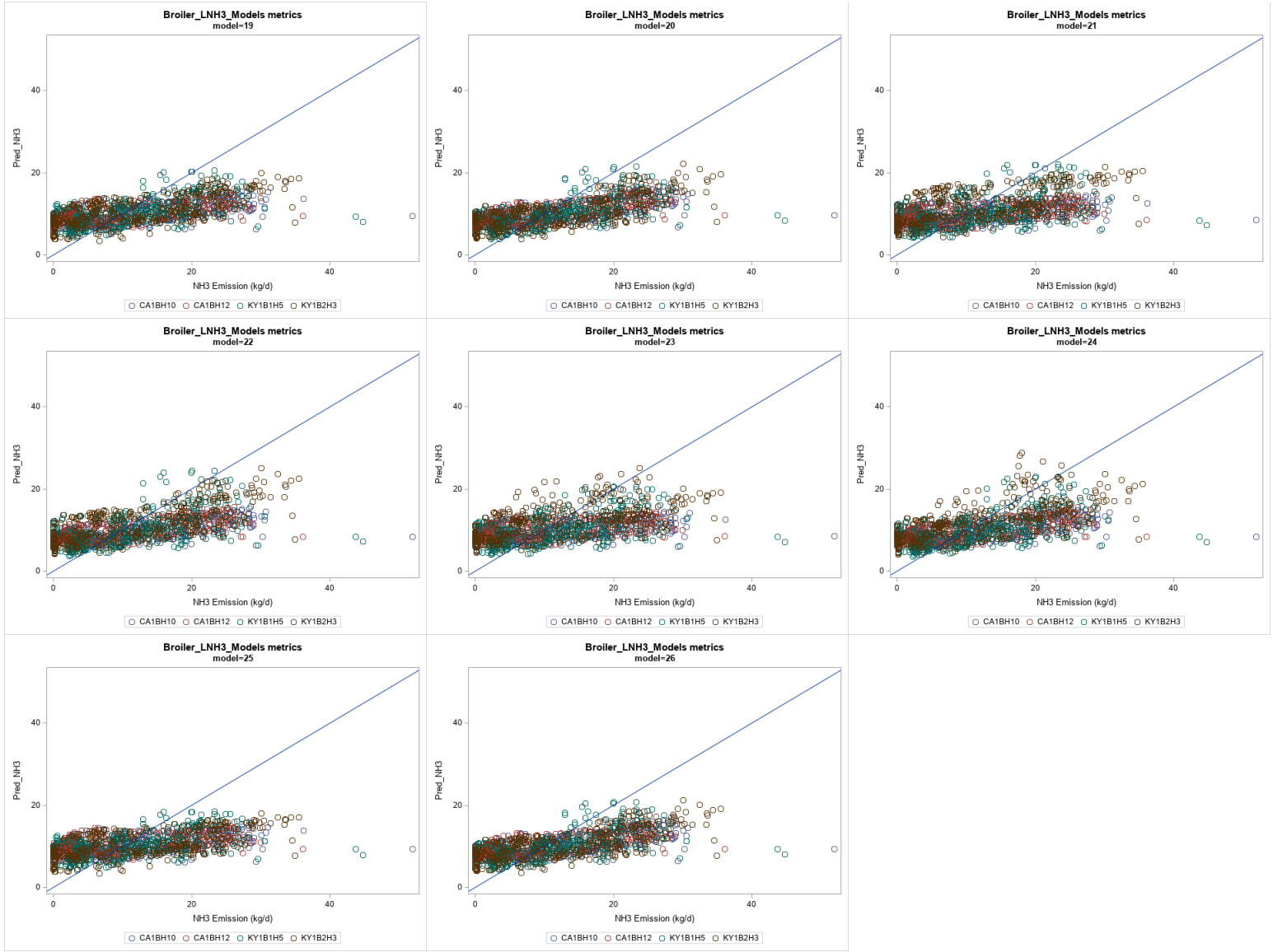


Figure G-3. Broiler house NH_3 one-to-one plots models 19 through 26.

Table G-4. Parameter and estimates for broiler H_2S emission models tested.

Model	Parameter	Estimate	Standard Error	p-value
1	Intercept	3.238152	0.09464	<.0001
	Inventory	0.011569	0.00185	<.0001
	Flock age	0.010331	0.00097	<.0001
2	Intercept	3.047834	0.13341	<.0001
	Inventory	0.011615	0.00185	<.0001
	Flock age	0.010437	0.00097	<.0001
	Ambient temperature	0.012741	0.00194	<.0001
3	Intercept	2.965993	0.13767	<.0001
	Inventory	0.011729	0.00186	<.0001
	Flock age	0.010401	0.00097	<.0001
	Ambient relative humidity	0.003932	0.00064	<.0001
4	Intercept	2.799185	0.10829	<.0001
	Inventory	0.010217	0.00184	<.0001
	Flock age	0.010215	0.00096	<.0001
	Exhaust temperature	0.019913	0.00292	<.0001
5	Intercept	2.764705	0.13682	<.0001
	Inventory	0.012237	0.00184	<.0001
	Flock age	0.012038	0.00099	<.0001
	Exhaust relative humidity	0.00725	0.00104	<.0001
6	Intercept	2.694041	0.14161	<.0001
	Inventory	0.011817	0.00183	<.0001
	Flock age	0.010462	0.00095	<.0001
	Ambient temperature	0.014857	0.00193	<.0001
	Ambient relative humidity	0.004681	0.00064	<.0001
7	Intercept	2.122484	0.15816	<.0001
	Inventory	0.010896	0.00182	<.0001
	Flock age	0.011818	0.00097	<.0001
	Exhaust temperature	0.024493	0.00297	<.0001
	Exhaust relative humidity	0.00892	0.00105	<.0001
8	Intercept	3.072379	0.10122	<.0001
	Inventory	0.013589	0.00197	<.0001
	Flock age	0.009832	0.00099	<.0001
	Litter age	0.000942	0.00033	0.0042
9	Intercept	2.857648	0.12258	<.0001
	Inventory	0.01386	0.00199	<.0001
	Flock age	0.009883	0.00099	<.0001
	Ambient temperature	0.012993	0.00194	<.0001
	Litter age	0.00105	0.00036	0.0036
10	Intercept	3.347844	0.0987	<.0001
	Live animal weight	0.016155	0.00083	<.0001
11	Intercept	3.158093	0.09372	<.0001
	Live animal weight	0.016175	0.00081	<.0001
	Ambient temperature	0.012948	0.00189	<.0001
12	Intercept	3.099418	0.09651	<.0001
	Live animal weight	0.016193	0.00082	<.0001
	Ambient relative humidity	0.003631	0.00063	<.0001

Model	Parameter	Estimate	Standard Error	p-value
13	Intercept	2.88556	0.12042	<.0001
	Live animal weight	0.01549	0.00082	<.0001
	Exhaust temperature	0.020417	0.0029	<.0001
14	Intercept	2.87973	0.1043	<.0001
	Live animal weight	0.017817	0.00083	<.0001
	Exhaust relative humidity	0.007376	0.00102	<.0001
15	Intercept	2.824278	0.10483	<.0001
	Live animal weight	0.016214	0.0008	<.0001
	Ambient temperature	0.015048	0.00189	<.0001
	Ambient relative humidity	0.004429	0.00063	<.0001
16	Intercept	2.209308	0.12817	<.0001
	Live animal weight	0.017143	0.00082	<.0001
	Exhaust temperature	0.025023	0.00289	<.0001
	Exhaust relative humidity	0.009079	0.00102	<.0001
17	Intercept	3.332486	0.10062	<.0001
	Live animal weight	0.016165	0.00082	<.0001
	Litter age	0.000107	0.00035	**0.7632**
18	Intercept	3.129836	0.09863	<.0001
	Live animal weight	0.016192	0.00081	<.0001
	Ambient temperature	0.012988	0.00189	<.0001
	Litter age	0.000192	0.00033	**0.5656**
19*	Intercept	2.235582	0.13648	<.0001
	House status - Empty	0.482262	0.07293	<.0001
	House status - Full	-0.110419	0.05531	*0.0461*
	House status - Transition	0	.	.
	Inventory	0.031579	0.00474	<.0001
	Flock age	0.015749	0.00119	<.0001
	Ambient temperature	0.014811	0.00191	<.0001
	Ambient relative humidity	0.004675	0.00063	<.0001
20*	Intercept	2.720762	0.12493	<.0001
	House status - Empty	0.095916	0.07464	**0.199**
	House status - Full	0.104275	0.06536	**0.1109**
	House status - Transition	0	.	.
	Live animal weight	0.016247	0.00114	<.0001
	Ambient temperature	0.015003	0.00189	<.0001
	Ambient relative humidity	0.004457	0.00063	<.0001
21*	Intercept	2.753961	0.17727	<.0001
	Litter condition - 0	-0.082194	0.12156	**0.4993**
	Litter condition - 1	-0.101087	0.12807	**0.4304**
	Litter condition - 2	-0.054129	0.12188	**0.6572**
	Litter condition - 3+	0	.	.
	Inventory	0.011723	0.00183	<.0001
	Flock age	0.010499	0.00095	<.0001
	Ambient temperature	0.014886	0.00193	<.0001
	Ambient relative humidity	0.004712	0.00064	<.0001
22*	Intercept	2.881035	0.13702	<.0001
	Litter condition - 0	-0.065339	0.11293	**0.5633**

Model	Parameter	Estimate	Standard Error	p-value
	Litter condition - 1	-0.115668	0.12111	**0.3403**
	Litter condition - 2	-0.042415	0.11265	**0.7068**
	Litter condition - 3+	0	.	.
	Live animal weight	0.016218	0.0008	<.0001
	Ambient temperature	0.015035	0.00189	<.0001
	Ambient relative humidity	0.00445	0.00063	<.0001
23*	Intercept	3.186563	0.25008	<.0001
	Litter condition - 0	-0.553447	0.2273	*0.0164*
	Litter condition - 1	-0.583498	0.23409	*0.014*
	Litter condition - 2	-0.551932	0.23561	*0.0209*
	Litter condition - 3	-0.640634	0.26557	*0.0171*
	Litter condition - 4	-0.399051	0.39874	**0.3216**
	Litter condition - 5	-0.184989	0.30396	**0.5444**
	Litter condition - 6	0	.	.
	Inventory	0.012393	0.00186	<.0001
	Flock age	0.010364	0.00096	<.0001
	Ambient temperature	0.015215	0.00193	<.0001
	Ambient relative humidity	0.004785	0.00064	<.0001
24*	Intercept	3.212841	0.21783	<.0001
	Litter condition - 0	-0.401194	0.20595	**0.0542**
	Litter condition - 1	-0.464505	0.21473	*0.0329*
	Litter condition - 2	-0.403092	0.2148	**0.0636**
	Litter condition - 3	-0.444981	0.24109	**0.0673**
	Litter condition - 4	-0.514205	0.34214	**0.1403**
	Litter condition - 5	-0.204029	0.27073	**0.4536**
	Litter condition - 6	0	.	.
	Live animal weight	0.016257	0.0008	<.0001
	Ambient temperature	0.015383	0.00189	<.0001
	Ambient relative humidity	0.004516	0.00063	<.0001
25*	Intercept	2.696262	0.14199	<.0001
	Litter condition - 0	-0.011758	0.05415	**0.8281**
	Litter condition - 1+	0	.	.
	Inventory	0.011838	0.00183	<.0001
	Flock age	0.010458	0.00095	<.0001
	Ambient temperature	0.014871	0.00194	<.0001
	Ambient relative humidity	0.004683	0.00064	<.0001
26*	Intercept	2.823781	0.10555	<.0001
	Litter condition - 0	0.002468	0.06278	**0.9687**
	Litter condition - 1+	0	.	.
	Live animal weight	0.016214	0.0008	<.0001
	Ambient temperature	0.015045	0.00189	<.0001
	Ambient relative humidity	0.004428	0.00063	<.0001

* Experimental model. Not considered during model selection.

Table G-5. Fit and evaluation statistics for the broilerH_2S models tested.

Model	2LogL	AIC	AICc	BIC	Corr.	LNME[a] (%)	NME[b] (%)	ME[b] (g day^{-1})	MB[b] (g day^{-1})	NMB[b] (%)
1	-299	-277	-277	-284	0.787	19	67.05	34.37	-5.684	-11.09
2	-315	-291	-291	-298	0.743	19.02	67.02	34.17	-5.626	-11.04
3	-309	-285	-284	-292	0.775	18.99	67.63	34.48	-5.585	-10.95
4	-344	-320	-320	-327	0.693	19.25	68.44	35.1	-5.039	-9.826
5	-374	-350	-350	-358	0.817	18.12	63.36	32.75	-6.345	-12.28
6	-370	-344	-344	-352	0.752	18.9	66.64	33.97	-5.689	-11.16
7	-443	-417	-417	-425	0.751	18.35	64.61	33.39	-5.85	-11.32
8	-307	-283	-283	-290	0.771	18.65	65.58	33.62	-5.56	-10.85
9	-324	-298	-298	-306	0.742	18.6	65.31	33.3	-5.575	-10.94
10	-386	-366	-366	-372	0.854	16.97	57.28	29.61	-7.184	-13.9
11	-403	-381	-381	-388	0.821	17.03	57.42	29.53	-7.029	-13.67
12	-389	-367	-367	-374	0.85	17	57.92	29.78	-7.152	-13.91
13	-435	-413	-413	-420	0.831	17.22	58.68	30.35	-7.055	-13.64
14	-471	-449	-449	-456	0.844	16.12	53.66	27.96	-7.175	-13.77
15	-454	-430	-430	-437	0.828	16.92	57	29.31	-7.107	-13.82
16	-545	-521	-521	-528	0.846	16.29	54.68	28.49	-7.355	-14.11
17	-386	-364	-364	-371	0.856	16.92	57.09	29.51	-7.206	-13.94
18	-404	-380	-380	-387	0.825	16.92	57.1	29.36	-7.079	-13.77
19*	-421	-391	-391	-400	0.818	17.71	61.8	31.51	-6.681	-13.1
20*	-456	-428	-428	-437	0.83	16.87	56.82	29.22	-7.137	-13.88
21*	-371	-339	-339	-349	0.754	18.83	66.21	33.75	-5.722	-11.22
22*	-455	-425	-425	-434	0.826	16.84	56.79	29.2	-7.098	-13.8
23*	-379	-341	-341	-353	0.744	18.57	65.42	33.35	-5.508	-10.8
24*	-460	-424	-424	-435	0.835	16.73	56.24	28.92	-7.203	-14.01
25*	-370	-342	-342	-351	0.753	18.89	66.62	33.96	-5.689	-11.16
26*	-454	-428	-428	-436	0.828	16.92	57	29.31	-7.106	-13.82

* Experimental model. Not considered during model selection.

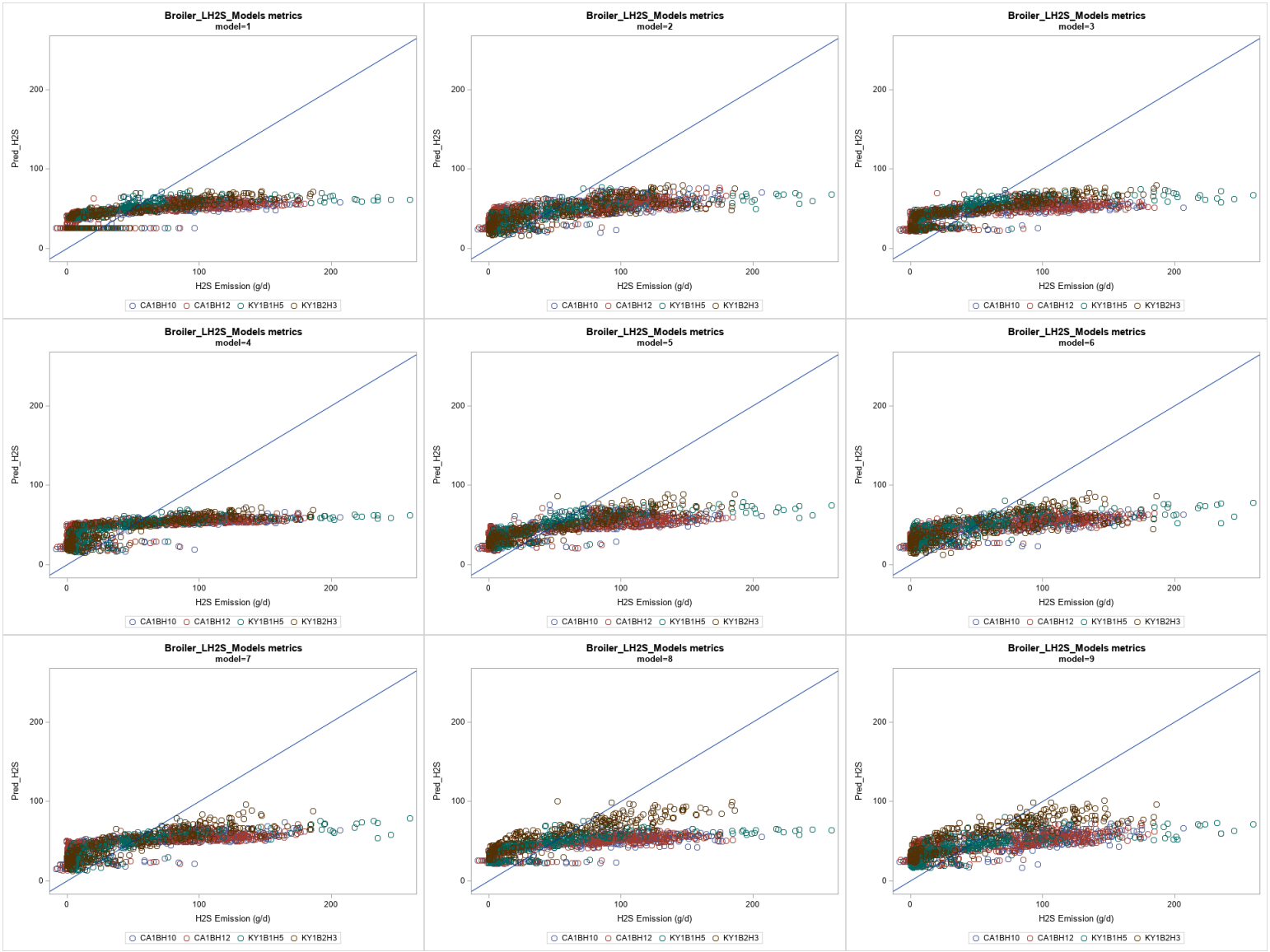


Figure G-4. Broiler house H_2S one-to-one plots models 1 through 9.

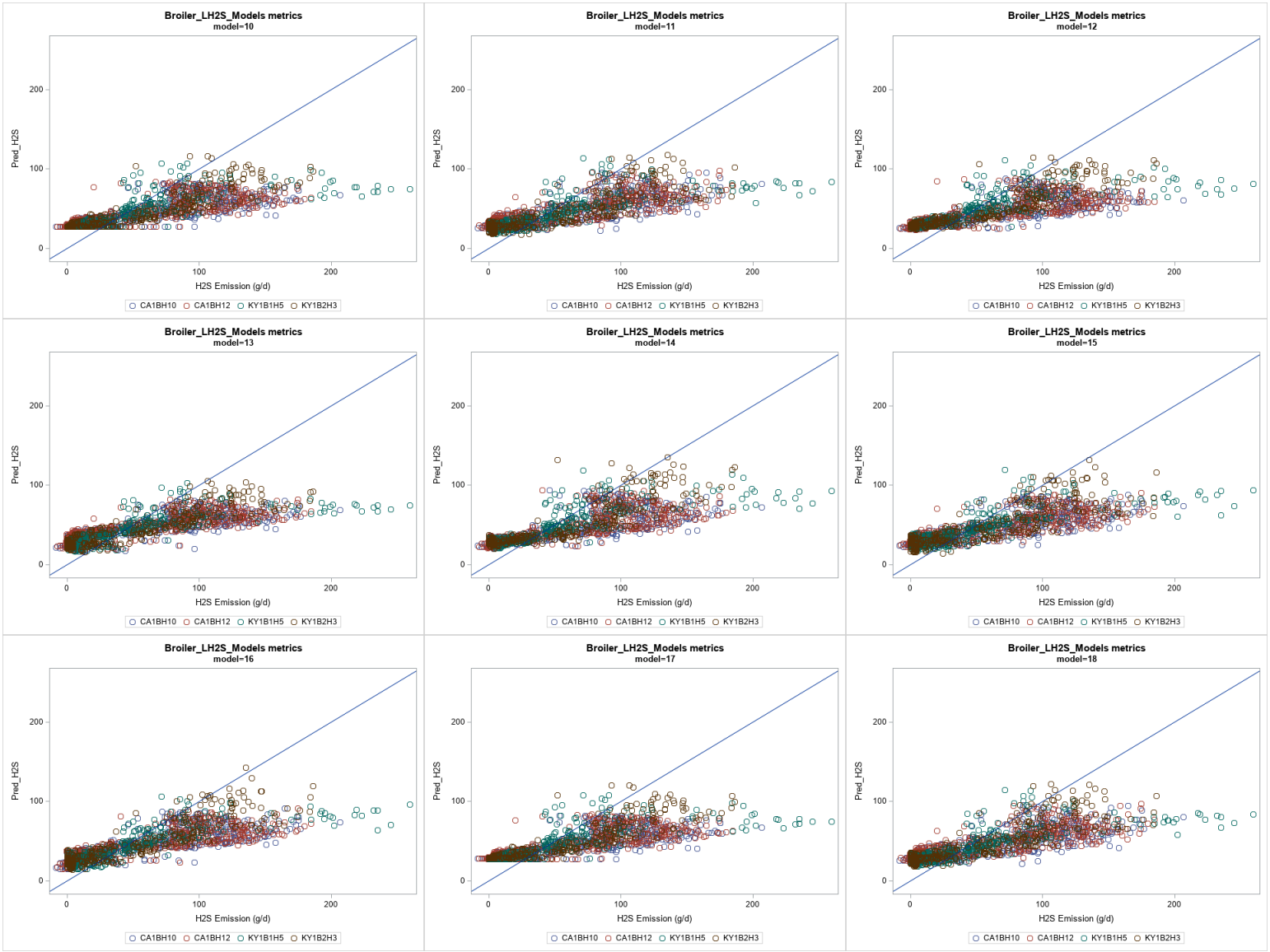


Figure G-5. Broiler house H_2S one-to-one plots models 10 through 18.

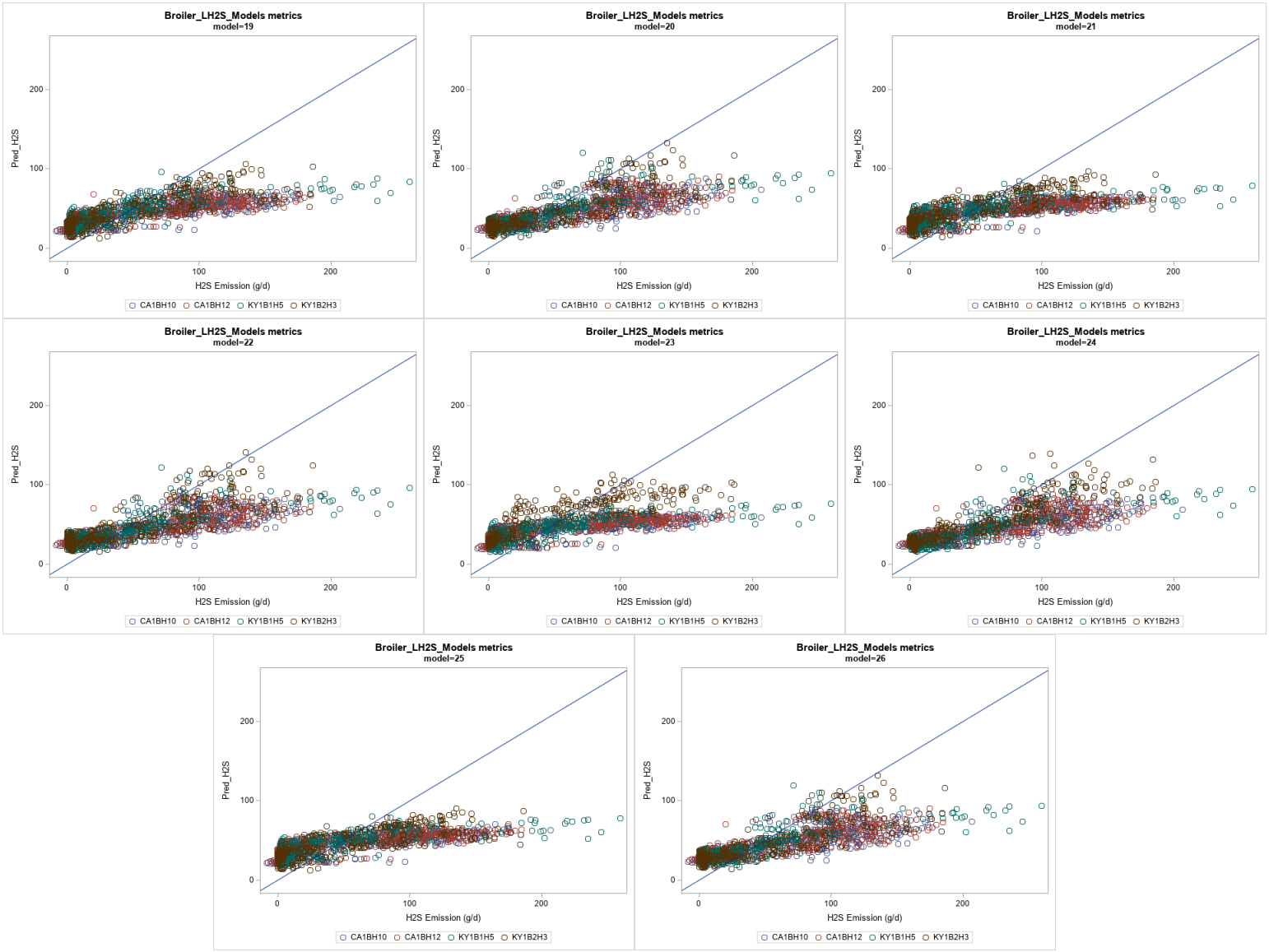


Figure G-6. Broiler house H_2S one-to-one plots models 19 through 26.

Table G-6. Parameter and estimates for broiler PM_{10} emission models tested.

Model	Parameter	Estimate	Standard Error	p-value
1	Intercept	-83.80886	67.8092	**0.2173**
	Inventory	-4.550187	3.10613	**0.1434**
	Flock age	52.809659	1.88788	<.0001
2	Intercept	-283.2642	74.9229	0.0002
	Inventory	-3.771313	3.0385	**0.215**
	Flock age	52.216562	1.81413	<.0001
	Ambient temperature	12.912983	2.38137	<.0001
3	Intercept	371.62643	92.6665	<.0001
	Inventory	-3.635579	3.08884	**0.2396**
	Flock age	52.599813	1.89216	<.0001
	Ambient relative humidity	-7.088714	0.98707	<.0001
4	Intercept	-189.9013	131.922	**0.1507**
	Inventory	-5.018895	3.14303	**0.1107**
	Flock age	52.93277	1.88669	<.0001
	Exhaust temperature	4.583624	4.88499	**0.3485**
5	Intercept	745.73411	116.978	<.0001
	Inventory	-6.11462	3.09966	*0.0489*
	Flock age	53.680718	1.94841	<.0001
	Exhaust relative humidity	-14.02385	1.60235	<.0001
6	Intercept	169.3207	103.791	**0.1032**
	Inventory	-3.094042	3.03669	**0.3086**
	Flock age	52.082748	1.82681	<.0001
	Ambient temperature	9.814411	2.42121	<.0001
	Ambient relative humidity	-6.297763	0.99786	<.0001
7	Intercept	1057.2935	192.207	<.0001
	Inventory	-5.290468	3.12616	**0.091**
	Flock age	53.500208	1.96072	<.0001
	Exhaust temperature	-10.47379	5.1689	*0.0431*
	Exhaust relative humidity	-15.16683	1.69011	<.0001
8	Intercept	-121.547	80.7387	**0.1334**
	Inventory	-3.797187	3.24148	**0.2419**
	Flock age	52.540703	1.91708	<.0001
	Litter age	0.206477	0.23846	**0.3879**
9	Intercept	-340.591	86.7614	0.0001
	Inventory	-2.676418	3.16359	**0.3979**
	Flock age	51.782093	1.84185	<.0001
	Ambient temperature	13.109537	2.39098	<.0001
	Litter age	0.296864	0.22565	**0.1902**
10	Intercept	117.60904	38.3107	0.0025
	Live animal weight	40.971581	1.32525	<.0001
11	Intercept	-84.49604	48.6431	**0.0836**
	Live animal weight	40.749075	1.24901	<.0001
	Ambient temperature	13.689473	2.2894	<.0001
12	Intercept	609.34006	74.5885	<.0001
	Live animal weight	41.17374	1.2976	<.0001

Model	Parameter	Estimate	Standard Error	p-value
	Ambient relative humidity	-7.487248	0.98091	<.0001
13	Intercept	-285.3281	121.874	*0.0197*
	Live animal weight	41.457281	1.27635	<.0001
	Exhaust temperature	15.96895	4.6156	0.0006
14	Intercept	996.13201	95.4345	<.0001
	Live animal weight	42.144392	1.28607	<.0001
	Exhaust relative humidity	-15.51406	1.55403	<.0001
15	Intercept	397.28057	87.0688	<.0001
	Live animal weight	40.872002	1.23866	<.0001
	Ambient temperature	10.401892	2.31348	<.0001
	Ambient relative humidity	-6.584463	0.99133	<.0001
16	Intercept	982.86265	179.941	<.0001
	Live animal weight	42.153577	1.2888	<.0001
	Exhaust temperature	0.413483	4.84172	**0.932**
	Exhaust relative humidity	-15.46414	1.64541	<.0001
17	Intercept	145.47064	46.9262	0.0023
	Live animal weight	41.201265	1.34828	<.0001
	Litter age	-0.238567	0.22304	**0.2863**
18	Intercept	-58.88599	55.9128	**0.2934**
	Live animal weight	40.970722	1.27951	<.0001
	Ambient temperature	13.493558	2.30203	<.0001
	Litter age	-0.195197	0.20933	**0.3524**
19*	Intercept	-316.0989	180.805	**0.0813**
	House status - Empty	563.86467	167.519	0.0009
	House status - Full	-465.8649	128.574	0.0003
	House status - Transistion	0	.	.
	Inventory	38.278207	10.6222	0.0004
	Flock age	53.691753	1.75449	<.0001
	Ambient temperature	10.742794	2.34489	<.0001
	Ambient relative humidity	-6.637487	0.99411	<.0001
20*	Intercept	382.64335	205.709	**0.0631**
	House status - Empty	-32.79518	192.391	**0.8647**
	House status - Full	25.721987	187.832	**0.8911**
	House status - Transistion	0	.	.
	Live animal weight	40.545462	1.29077	<.0001
	Ambient temperature	10.456365	2.30976	<.0001
	Ambient relative humidity	-6.577463	0.9909	<.0001
21*	Intercept	238.48527	122.535	**0.052**
	Litter condition - 0	-108.108	77.5046	**0.1648**
	Litter condition - 1	-110.9751	77.2741	**0.1529**
	Litter condition - 2	-29.78528	74.0967	**0.6882**
	Litter condition - 3+	0	.	.
	Inventory	-2.839369	3.04435	**0.3514**
	Flock age	51.897116	1.80059	<.0001
	Ambient temperature	9.567129	2.41267	<.0001
	Ambient relative humidity	-6.366502	1.00956	<.0001
22*	Intercept	319.04664	109.262	0.0036

Model	Parameter	Estimate	Standard Error	p-value
	Litter condition - 0	15.345879	72.3289	**0.8322**
	Litter condition - 1	71.499147	72.0183	**0.3222**
	Litter condition - 2	101.31801	68.44	**0.1406**
	Litter condition - 3+	0	.	.
	Live animal weight	41.007404	1.23824	<.0001
	Ambient temperature	10.703613	2.31449	<.0001
	Ambient relative humidity	-6.341142	1.00653	<.0001
23*	Intercept	219.77046	158.674	**0.1669**
	Litter condition - 0	-84.55333	134.975	**0.5317**
	Litter condition - 1	-86.16403	136.071	**0.5273**
	Litter condition - 2	-5.318475	134.601	**0.9685**
	Litter condition - 3	-31.04718	160.547	**0.8468**
	Litter condition - 4	133.38619	180.495	**0.4608**
	Litter condition - 5	64.499618	163.359	**0.6933**
	Litter condition - 6	0	.	.
	Inventory	-3.024136	3.04907	**0.3217**
	Flock age	51.905699	1.79477	<.0001
	Ambient temperature	9.604938	2.57191	0.0002
	Ambient relative humidity	-6.421984	1.01577	<.0001
24*	Intercept	305.44463	141.354	*0.0314*
	Litter condition - 0	35.963119	126.032	**0.7756**
	Litter condition - 1	93.225448	126.569	**0.4622**
	Litter condition - 2	122.75205	125	**0.3272**
	Litter condition - 3	-14.97887	148.794	**0.9199**
	Litter condition - 4	132.17369	167.162	**0.43**
	Litter condition - 5	16.277137	151.896	**0.9148**
	Litter condition - 6	0	.	.
	Live animal weight	40.999741	1.23527	<.0001
	Ambient temperature	10.500693	2.49321	<.0001
	Ambient relative humidity	-6.419067	1.01387	<.0001
25*	Intercept	176.27869	103.876	**0.0901**
	Litter condition - 0	-58.35568	57.7775	**0.3135**
	Litter condition - 1+	0	.	.
	Inventory	-2.688256	3.05744	**0.3796**
	Flock age	52.015122	1.81921	<.0001
	Ambient temperature	9.8347	2.41515	<.0001
	Ambient relative humidity	-6.315387	0.99752	<.0001
26*	Intercept	410.48382	88.2411	<.0001
	Litter condition - 0	-50.15573	55.3468	**0.3659**
	Litter condition - 1+	0	.	.
	Live animal weight	40.864747	1.23431	<.0001
	Ambient temperature	10.389272	2.30909	<.0001
	Ambient relative humidity	-6.614124	0.99136	<.0001

* Experimental model. Not considered during model selection.

Table G-7. Fit and evaluation statistics for the broiler PM_{10} models tested.

Model	2LogL	AIC	AICc	BIC	Corr.	NME[b] (%)	ME[b] (g day^{-1})	MB[b] (g day^{-1})	NMB[b] (%)
1	19,100	19,110	19,110	19,110	0.857	34.16	315.5	17.21	1.864
2	18,840	18,850	18,850	18,850	0.869	33.18	303.0	15.77	1.727
3	18,680	18,700	18,700	18,690	0.861	34.48	316.3	14.55	1.586
4	19,090	19,100	19,100	19,100	0.858	34.21	316.2	18.01	1.949
5	18,980	18,990	18,990	18,980	0.855	36.33	336.1	22.23	2.402
6	18,670	18,680	18,680	18,680	0.869	33.56	307.8	13.80	1.505
7	18,970	18,990	18,990	18,980	0.853	36.20	334.9	20.57	2.224
8	18,940	18,950	18,950	18,950	0.858	33.96	315.5	19.61	2.110
9	18,680	18,690	18,690	18,690	0.870	32.92	302.4	18.47	2.011
10	18,980	18,990	18,990	18,990	0.864	32.16	299.0	2.438	0.262
11	18,720	18,730	18,730	18,720	0.877	30.75	282.7	1.023	0.111
12	18,560	18,570	18,570	18,570	0.872	31.45	290.4	-1.812	-0.196
13	18,960	18,970	18,970	18,970	0.872	30.59	284.6	5.654	0.608
14	18,830	18,840	18,840	18,840	0.874	32.52	302.9	6.691	0.719
15	18,540	18,550	18,550	18,550	0.881	30.33	280.1	-2.222	-0.241
16	18,830	18,850	18,850	18,840	0.874	32.50	302.7	6.766	0.727
17	18,820	18,830	18,830	18,830	0.864	31.94	298.7	1.227	0.131
18	18,550	18,570	18,570	18,560	0.877	30.64	283.4	0.244	0.026
19*	18,650	18,670	18,670	18,670	0.880	31.76	291.3	14.36	1.565
20*	18,540	18,550	18,550	18,550	0.881	30.35	280.3	-0.393	-0.043
21*	18,660	18,680	18,680	18,680	0.872	33.08	303.4	16.31	1.778
22*	18,540	18,550	18,550	18,550	0.881	30.44	281.1	-2.407	-0.261
23*	18,660	18,690	18,690	18,680	0.873	32.93	302.0	16.51	1.800
24*	18,530	18,560	18,560	18,550	0.882	30.36	280.3	-2.139	-0.232
25*	18,670	18,680	18,680	18,680	0.870	33.46	306.9	14.81	1.615
26*	18,540	18,550	18,550	18,550	0.881	30.30	279.8	-1.568	-0.170

* Experimental model. Not considered during model selection.

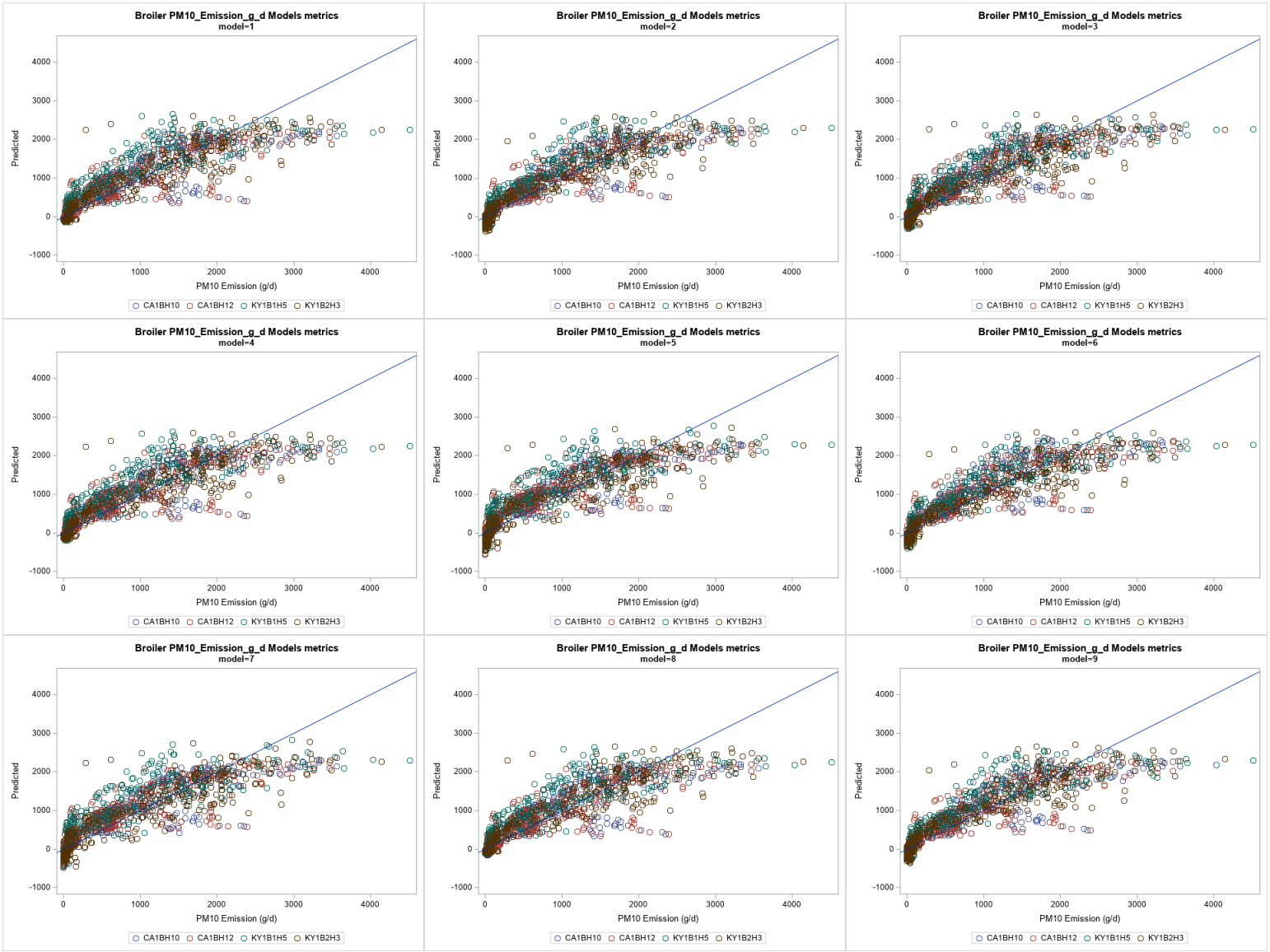


Figure G-7. Broiler house PM_{10} one-to-one plots models 1 through 9.

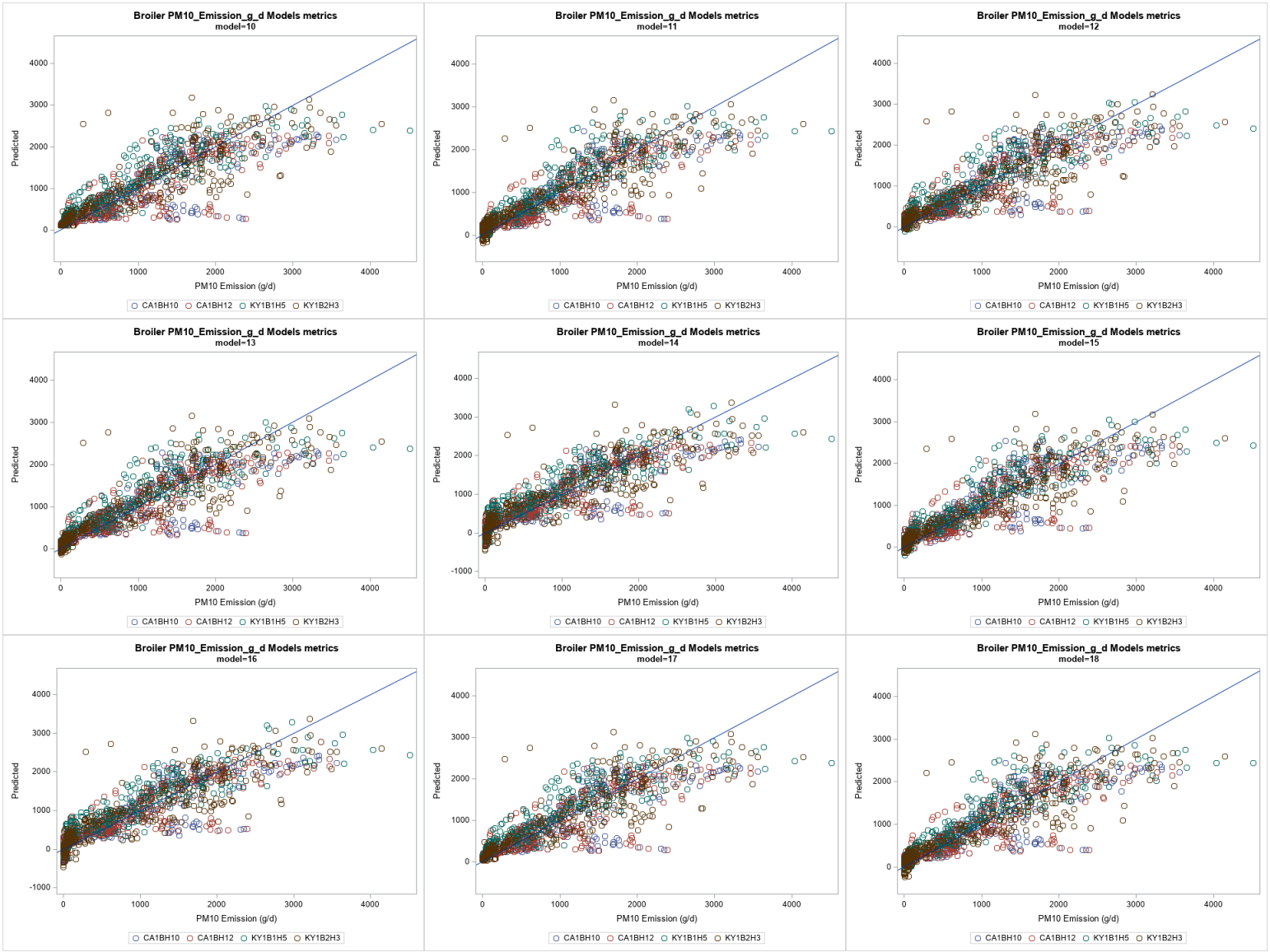


Figure G-8. Broiler house PM_{10} one-to-one plots models 10 through 18.

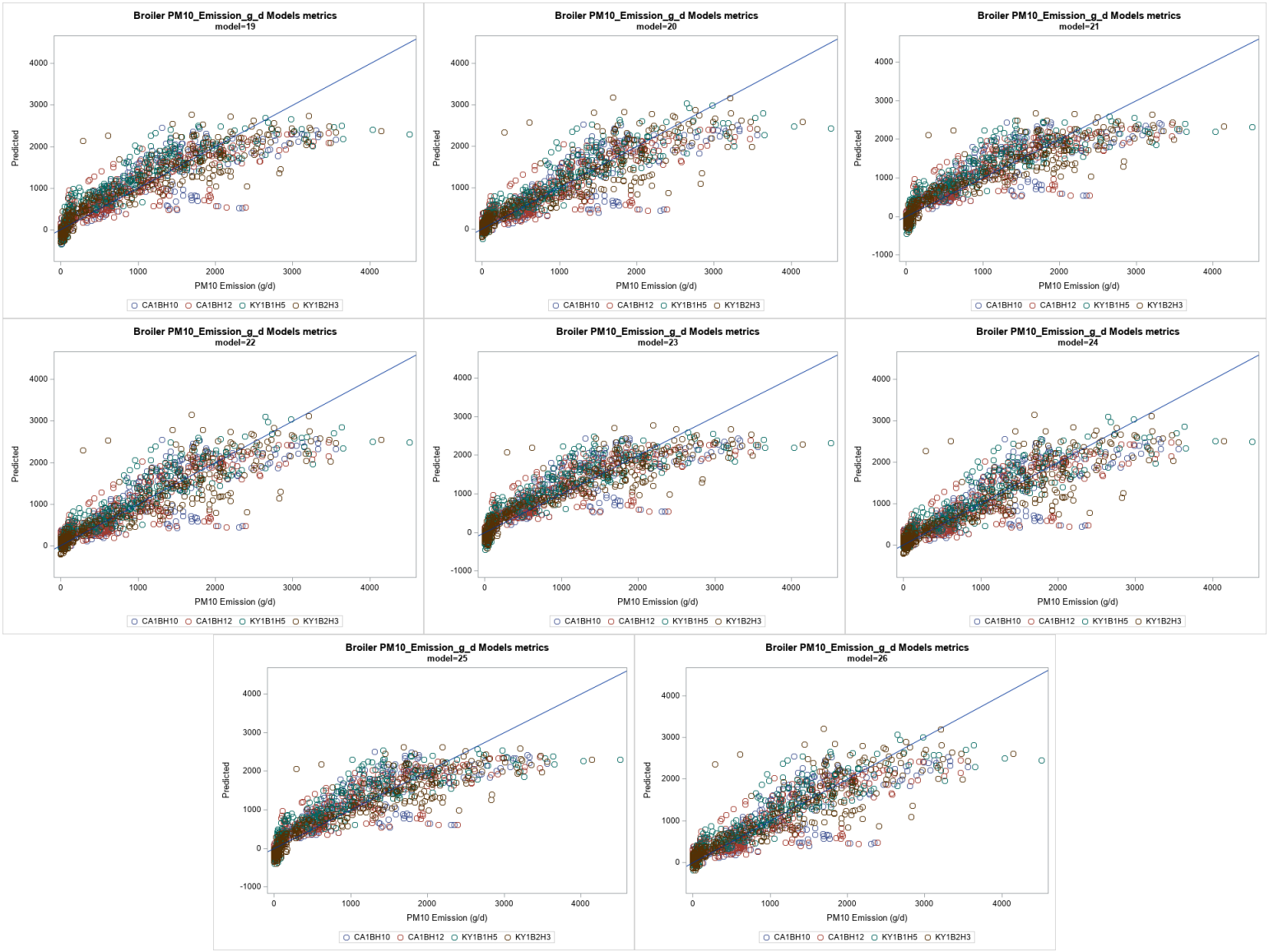


Figure G-9. Broiler house PM_{10} one-to-one plots models 19 through 26.

Table G-8. Parameter and estimates for broiler $PM_{2.5}$ emission models tested.

Model	Parameter	Estimate	Standard Error	p-value
1	Intercept	5.4417	10.3061	**0.5992**
	Inventory	-0.7406	0.4199	**0.0789**
	Flock age	4.6588	0.2920	<.0001
2	Intercept	-10.9967	10.7248	**0.3087**
	Inventory	-0.8018	0.4138	**0.0542**
	Flock age	4.7939	0.2781	<.0001
	Ambient temperature	1.1448	0.2871	<.0001
3	Intercept	42.2646	12.6136	0.001
	Inventory	-0.5686	0.4238	**0.1806**
	Flock age	4.5294	0.2965	<.0001
	Ambient relative humidity	-0.5474	0.1026	<.0001
4	Intercept	3.5376	17.7426	**0.8422**
	Inventory	-0.7413	0.4199	**0.0786**
	Flock age	4.6540	0.2939	<.0001
	Exhaust temperature	0.0873	0.6435	**0.8922**
5	Intercept	71.9225	16.0508	<.0001
	Inventory	-0.7009	0.4273	**0.1016**
	Flock age	4.3833	0.3126	<.0001
	Exhaust relative humidity	-1.0833	0.1895	<.0001
6	Intercept	25.4972	13.5339	**0.0613**
	Inventory	-0.6283	0.4272	**0.1428**
	Flock age	4.6521	0.2930	<.0001
	Ambient temperature	1.0011	0.2911	0.0007
	Ambient relative humidity	-0.5082	0.1024	<.0001
7	Intercept	86.8679	23.6366	0.0003
	Inventory	-0.7145	0.4287	**0.0963**
	Flock age	4.4209	0.3190	<.0001
	Exhaust temperature	-0.5883	0.6570	**0.3709**
	Exhaust relative humidity	-1.1165	0.1931	<.0001
8	Intercept	-10.7842	12.5020	**0.3909**
	Inventory	-0.5908	0.4170	**0.1578**
	Flock age	4.6109	0.2824	<.0001
	Litter age	0.0626	0.0339	**0.0711**
9	Intercept	-32.3044	11.7825	0.0074
	Inventory	-0.6196	0.3927	**0.1163**
	Flock age	4.7200	0.2522	<.0001
	Ambient temperature	1.2338	0.2747	<.0001
	Litter age	0.0748	0.0288	*0.0128*
10	Intercept	0.0910	5.5124	**0.9869**
	Live animal weight	4.0428	0.1668	<.0001
11	Intercept	-18.7721	5.3252	0.0007
	Live animal weight	4.0894	0.1334	<.0001
	Ambient temperature	1.3801	0.2330	<.0001
12	Intercept	37.1465	9.1956	<.0001
	Live animal weight	4.0281	0.1724	<.0001

Model	Parameter	Estimate	Standard Error	p-value
	Ambient relative humidity	-0.5146	0.1020	<.0001
13	Intercept	-19.1615	13.7563	**0.1652**
	Live animal weight	4.0307	0.1635	<.0001
	Exhaust temperature	0.8570	0.5598	**0.127**
14	Intercept	58.5277	12.6735	<.0001
	Live animal weight	4.0024	0.1982	<.0001
	Exhaust relative humidity	-0.9776	0.1828	<.0001
15	Intercept	15.7767	9.1696	**0.0862**
	Live animal weight	4.0870	0.1378	<.0001
	Ambient temperature	1.3084	0.2349	<.0001
	Ambient relative humidity	-0.4641	0.1016	<.0001
16	Intercept	52.2570	20.0747	0.0097
	Live animal weight	3.9992	0.1986	<.0001
	Exhaust temperature	0.2335	0.6029	**0.6987**
	Exhaust relative humidity	-0.9597	0.1857	<.0001
17	Intercept	-7.6487	7.8482	**0.3332**
	Live animal weight	4.0120	0.1690	<.0001
	Litter age	0.0361	0.0268	**0.1825**
18	Intercept	-27.6665	7.1418	0.0002
	Live animal weight	4.0467	0.1353	<.0001
	Ambient temperature	1.4082	0.2336	<.0001
	Litter age	0.0374	0.0211	**0.0805**
19*	Intercept	-207.8189	39.9910	<.0001
	House status - Empty	231.5465	39.1684	<.0001
	House status - Full	0.0000	.	.
	Inventory	8.1968	1.5647	<.0001
	Flock age	5.4681	0.2614	<.0001
	Ambient temperature	1.1660	0.2637	<.0001
	Ambient relative humidity	-0.4986	0.1028	<.0001
20*	Intercept	8.2529	9.4296	**0.3821**
	House status - Empty	16.7788	7.3790	*0.0245*
	House status - Full	0.0000	.	.
	Live animal weight	4.2425	0.1452	<.0001
	Ambient temperature	1.3286	0.2293	<.0001
	Ambient relative humidity	-0.4495	0.1016	<.0001
21*	Intercept	43.5806	12.3782	0.0006
	Litter condition - 0	-14.4795	12.2934	**0.2438**
	Litter condition - 1	-46.8177	9.1369	<.0001
	Litter condition - 2	-19.1363	9.0019	*0.0393*
	Litter condition - 3+	0.0000	.	.
	Inventory	-1.2122	0.3754	0.0015
	Flock age	5.1004	0.2362	<.0001
	Ambient temperature	1.0312	0.2599	<.0001
	Ambient relative humidity	-0.5237	0.1048	<.0001
22*	Intercept	26.1896	10.0260	0.0095
	Litter condition - 0	-16.3961	10.5622	**0.125**
	Litter condition - 1	-21.6113	8.0188	0.0098

Model	Parameter	Estimate	Standard Error	p-value
	Litter condition - 2	-12.7092	7.1543	**0.0808**
	Litter condition - 3+	0.0000	.	.
	Live animal weight	4.0500	0.1337	<.0001
	Ambient temperature	1.2395	0.2333	<.0001
	Ambient relative humidity	-0.4847	0.1023	<.0001
23*	Intercept	31.6412	13.4225	*0.0204*
	Litter condition - 0	4.7653	13.9604	**0.7337**
	Litter condition - 1	-31.0521	12.1051	*0.0129*
	Litter condition - 2	-1.8902	11.1277	**0.866**
	Litter condition - 3	26.0815	12.8499	*0.0477*
	Litter condition - 4	42.7670	13.1148	0.0023
	Litter condition - 5	6.8824	11.6577	**0.5587**
	Litter condition - 6	0.0000	.	.
	Inventory	-1.4277	0.3496	<.0001
	Flock age	5.3077	0.2140	<.0001
	Ambient temperature	0.6677	0.2803	*0.0176*
	Ambient relative humidity	-0.5483	0.1051	<.0001
24*	Intercept	14.2349	10.3814	**0.1719**
	Litter condition - 0	3.7291	11.4711	**0.7458**
	Litter condition - 1	-2.6776	10.1278	**0.7922**
	Litter condition - 2	6.5411	8.3794	**0.4381**
	Litter condition - 3	30.8615	10.0492	0.0029
	Litter condition - 4	46.1679	10.1446	<.0001
	Litter condition - 5	5.0404	8.7439	**0.5668**
	Litter condition - 6	0.0000	.	.
	Live animal weight	4.1235	0.1125	<.0001
	Ambient temperature	0.6931	0.2597	0.0079
	Ambient relative humidity	-0.5187	0.1015	<.0001
25*	Intercept	25.6043	13.4970	**0.0595**
	Litter condition - 0	-4.6704	11.4144	**0.6841**
	Litter condition - 1+	0.0000	.	.
	Inventory	-0.6015	0.4374	**0.1705**
	Flock age	4.6385	0.3026	<.0001
	Ambient temperature	1.0038	0.2911	0.0006
	Ambient relative humidity	-0.5070	0.1023	<.0001
26*	Intercept	16.4615	9.2301	**0.0754**
	Litter condition - 0	-9.9901	9.9237	**0.3178**
	Litter condition - 1+	0.0000	.	.
	Live animal weight	4.0753	0.1380	<.0001
	Ambient temperature	1.3067	0.2339	<.0001
	Ambient relative humidity	-0.4596	0.1015	<.0001
	Ambient temperature	10.3893	2.3091	<.0001
	Ambient relative humidity	-6.6141	0.9914	<.0001

* Experimental model. Not considered during model selection.

Table G-9. Fit and evaluation statistics for the broiler $PM_{2.5}$ models tested.

Model	2LogL	AIC	AICc	BIC	Corr.	NME[b] (%)	ME[b] (g day^{-1})	MB[b] (g day^{-1})	NMB[b] (%)
1	6,429	6,451	6,452	6,444	0.856	39.09	37.43	6.847	7.15
2	6,413	6,437	6,437	6,430	0.877	36.57	35.02	7.947	8.299
3	6,401	6,425	6,426	6,418	0.853	39.52	37.85	5.105	5.331
4	6,429	6,453	6,454	6,446	0.856	39.07	37.41	6.852	7.155
5	6,385	6,409	6,409	6,401	0.825	42.64	40.86	2.544	2.655
6	6,389	6,415	6,416	6,407	0.875	37.07	35.5	6.449	6.734
7	6,384	6,410	6,410	6,402	0.822	42.79	41	2.382	2.486
8	6,426	6,450	6,450	6,443	0.868	37.43	35.84	5.104	5.33
9	6,407	6,433	6,434	6,425	0.891	34.14	32.7	4.818	5.031
10	6,379	6,399	6,399	6,393	0.901	30.86	29.55	4.558	4.76
11	6,350	6,372	6,372	6,365	0.92	28.65	27.43	5.602	5.85
12	6,353	6,375	6,376	6,369	0.899	31.63	30.29	4.546	4.747
13	6,376	6,398	6,399	6,392	0.903	31.2	29.87	5.023	5.245
14	6,339	6,361	6,362	6,355	0.886	34.49	33.05	3.403	3.552
15	6,329	6,353	6,353	6,346	0.919	28.99	27.76	6.014	6.28
16	6,339	6,363	6,364	6,356	0.887	34.42	32.98	3.579	3.735
17	6,377	6,399	6,399	6,392	0.904	30.21	28.93	3.26	3.404
18	6,347	6,371	6,371	6,364	0.924	27.85	26.67	3.503	3.658
19*	6,362	6,390	6,391	6,382	0.895	33.61	32.18	4.261	4.449
20*	6,324	6,350	6,350	6,342	0.922	28.13	26.94	5.361	5.598
21*	6,372	6,404	6,405	6,395	0.905	32.09	30.73	3.269	3.413
22*	6,321	6,351	6,352	6,342	0.925	27.3	26.14	2.373	2.478
23*	6,362	6,400	6,401	6,389	0.907	31.37	30.04	3.265	3.409
24*	6,301	6,337	6,338	6,326	0.928	26.7	25.57	2.735	2.856
25*	6,389	6,417	6,418	6,409	0.875	36.95	35.38	6.463	6.749
26*	6,328	6,354	6,355	6,346	0.92	28.64	27.43	5.742	5.996

* Experimental model. Not considered during model selection.

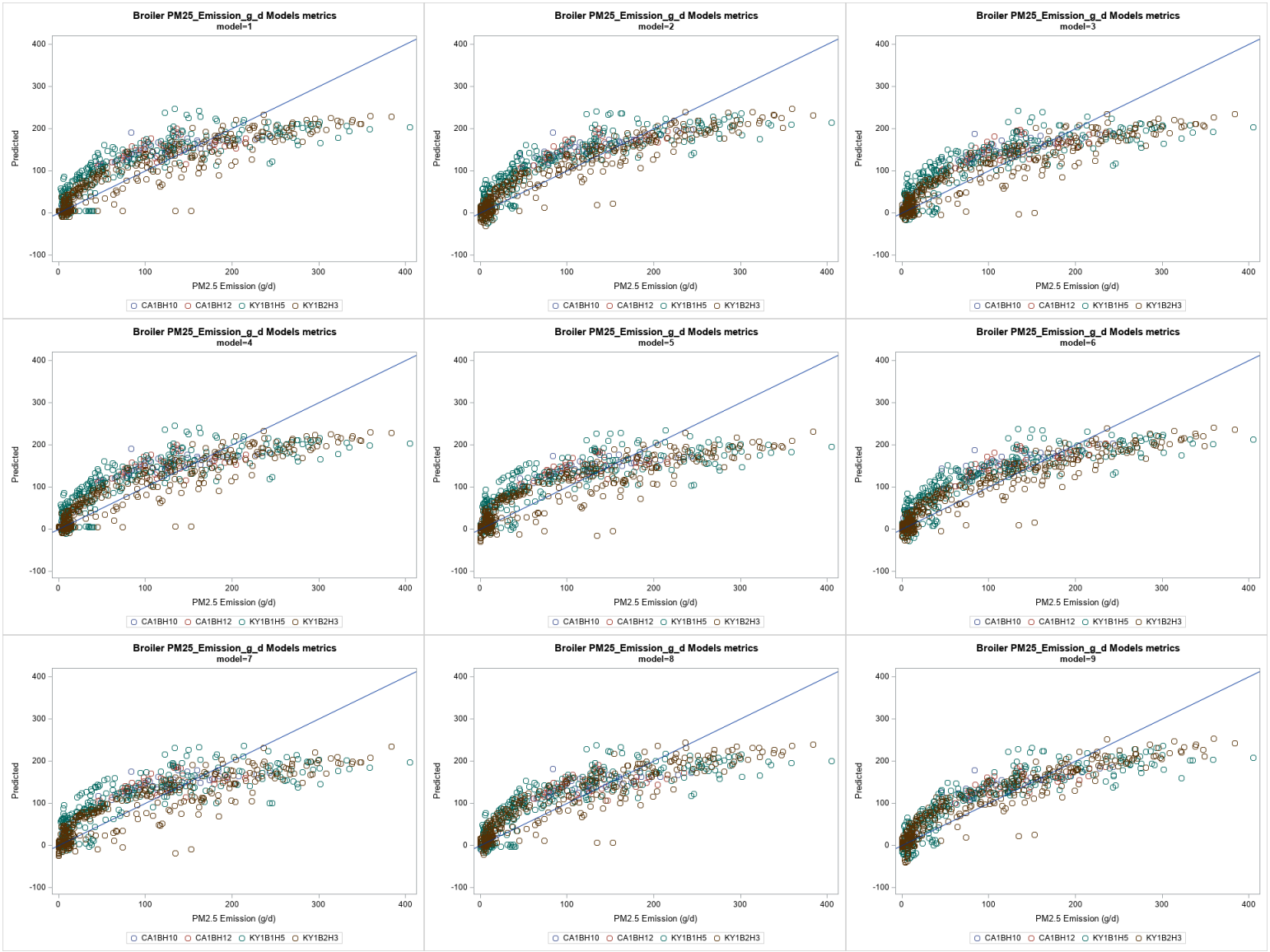


Figure G-10. Broiler house $PM_{2.5}$ one-to-one plots models 1 through 9.

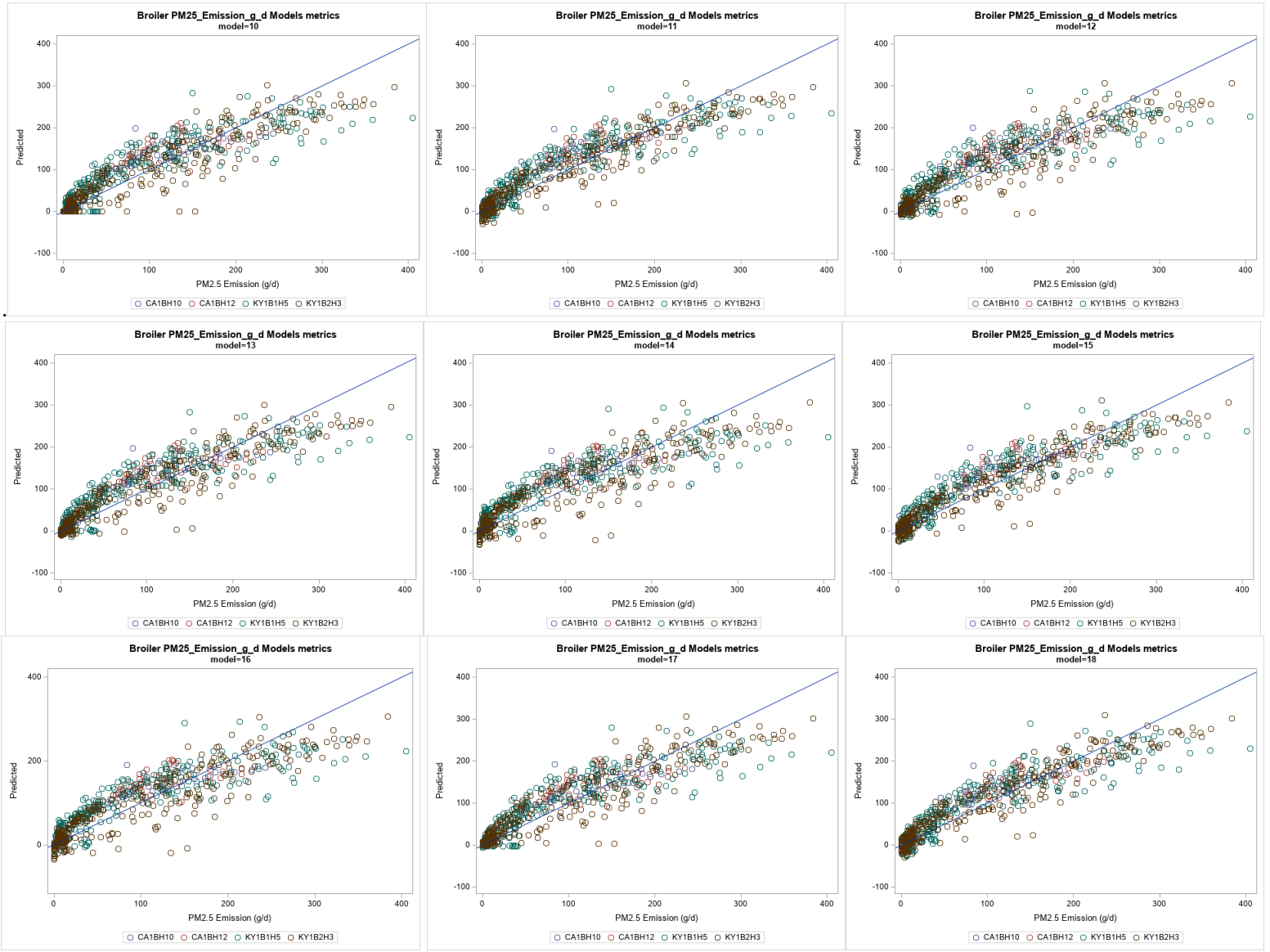


Figure G-11. Broiler house $PM_{2.5}$ one-to-one plots models 10 through 18.

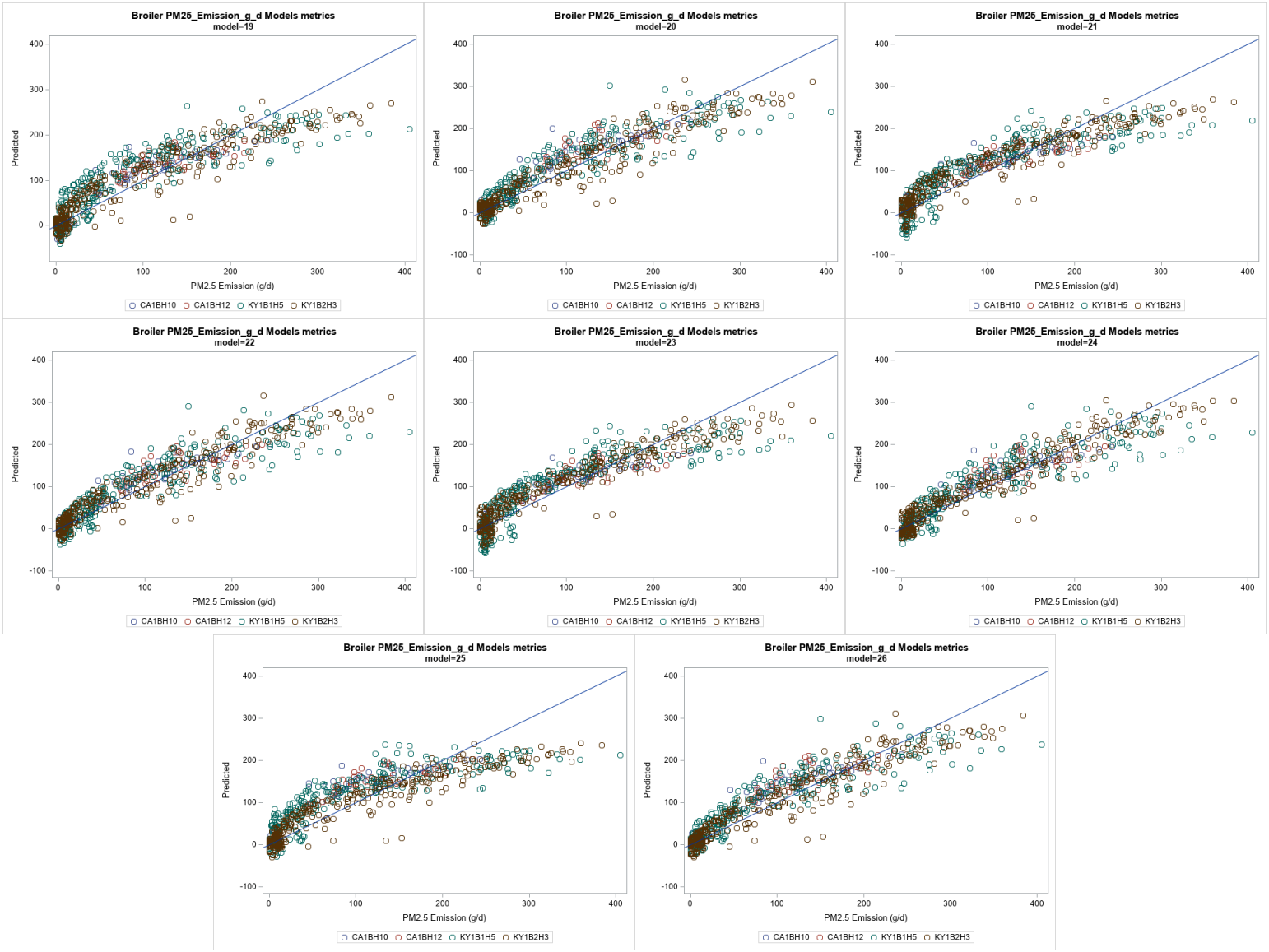


Figure G-12. Broiler house $PM_{2.5}$ one-to-one plots models 19 through 26.

Table G-10. Parameter and estimates for broiler TSP emission models tested.

Model	Parameter	Estimate	Standard Error	p-value
1	Intercept	-9.6557	204.0760	**0.9623**
	Inventory	-2.5574	9.3466	**0.7846**
	Flock age	104.7382	5.9317	<.0001
2	Intercept	-380.3797	231.6500	**0.1022**
	Inventory	-0.3446	9.3391	**0.9706**
	Flock age	103.7360	5.9399	<.0001
	Ambient temperature	24.7986	7.3499	0.0008
3	Intercept	1477.9794	292.3240	<.0001
	Inventory	-0.8648	9.1473	**0.9247**
	Flock age	104.1581	5.8657	<.0001
	Ambient relative humidity	-21.3502	3.0755	<.0001
4	Intercept	-325.9016	404.1320	**0.4208**
	Inventory	-3.2111	9.3623	**0.7318**
	Flock age	104.2022	5.9510	<.0001
	Exhaust temperature	14.6080	16.1527	**0.3666**
5	Intercept	2617.9041	385.1960	<.0001
	Inventory	-13.0652	9.4607	**0.1682**
	Flock age	106.0246	6.2596	<.0001
	Exhaust relative humidity	-40.9616	5.1387	<.0001
6	Intercept	1102.1137	310.7490	0.0004
	Inventory	1.2783	9.0908	**0.8883**
	Flock age	103.2483	5.8178	<.0001
	Ambient temperature	23.9744	7.1549	0.0009
	Ambient relative humidity	-21.1341	3.0515	<.0001
7	Intercept	2744.2152	560.5060	<.0001
	Inventory	-12.9647	9.4716	**0.1719**
	Flock age	106.2275	6.3256	<.0001
	Exhaust temperature	-4.9773	16.4485	**0.7624**
	Exhaust relative humidity	-41.2396	5.2022	<.0001
8	Intercept	-163.6890	248.8810	**0.5119**
	Inventory	-0.6718	9.4695	**0.9435**
	Flock age	104.1948	5.9202	<.0001
	Litter age	0.6786	0.6527	**0.3012**
9	Intercept	-555.2051	274.1370	*0.0447*
	Inventory	1.8041	9.4682	**0.849**
	Flock age	103.0882	5.9298	<.0001
	Ambient temperature	24.9863	7.3180	0.0007
	Litter age	0.7562	0.6541	**0.2508**
10	Intercept	327.6742	129.5490	*0.0133*
	Live animal weight	85.8005	4.1694	<.0001
11	Intercept	6.4904	163.0540	**0.9683**
	Live animal weight	85.4128	4.1936	<.0001
	Ambient temperature	23.4891	7.1422	0.0011
12	Intercept	1843.3748	250.0190	<.0001
	Live animal weight	85.9492	4.0908	<.0001
	Ambient relative humidity	-21.4815	3.0572	<.0001

Model	Parameter	Estimate	Standard Error	p-value
13	Intercept	-431.7576	374.7690	**0.2504**
	Live animal weight	85.1959	4.1155	<.0001
	Exhaust temperature	33.0818	15.3963	*0.0326*
14	Intercept	2855.1666	316.1550	<.0001
	Live animal weight	88.1279	4.1424	<.0001
	Exhaust relative humidity	-43.2595	4.9564	<.0001
15	Intercept	1518.9199	267.4160	<.0001
	Live animal weight	85.5983	4.0717	<.0001
	Ambient temperature	22.6329	6.9171	0.0012
	Ambient relative humidity	-21.2883	3.0338	<.0001
16	Intercept	2503.2558	502.7730	<.0001
	Live animal weight	87.8791	4.1232	<.0001
	Exhaust temperature	13.3234	15.1846	**0.381**
	Exhaust relative humidity	-42.4840	5.0072	<.0001
17	Intercept	391.9067	166.6160	*0.0208*
	Live animal weight	86.1345	4.1915	<.0001
	Litter age	-0.3794	0.6180	**0.5406**
18	Intercept	65.7611	195.4410	**0.7371**
	Live animal weight	85.7287	4.2178	<.0001
	Ambient temperature	23.3605	7.1339	0.0012
	Litter age	-0.3401	0.6225	**0.586**
19*	Intercept	-2677.9620	826.1130	0.0016
	House status - Empty	3899.3188	802.2550	<.0001
	House status - Full	0.0000	.	.
	Inventory	149.3099	31.5804	<.0001
	Flock age	115.8574	5.6819	<.0001
	Ambient temperature	24.1211	6.7049	0.0004
	Ambient relative humidity	-21.4043	3.0173	<.0001
20*	Intercept	1587.0139	274.6320	<.0001
	House status - Empty	-219.0261	211.4710	**0.3012**
	House status - Full	0.0000	.	.
	Live animal weight	83.8690	4.3930	<.0001
	Ambient temperature	22.9664	6.9007	0.001
	Ambient relative humidity	-21.3432	3.0327	<.0001
21*	Intercept	1218.6906	339.3860	0.0004
	Litter condition - 0	-155.4090	218.1390	**0.4778**
	Litter condition - 1	-542.0937	227.5750	*0.0193*
	Litter condition - 2	352.5125	207.5360	**0.0927**
	Litter condition - 3+	0.0000	.	.
	Inventory	-2.4936	8.8389	**0.7781**
	Flock age	106.4188	5.3411	<.0001
	Ambient temperature	22.6941	6.9219	0.0012
	Ambient relative humidity	-21.6593	3.0626	<.0001
22*	Intercept	1371.3155	306.2800	<.0001
	Litter condition - 0	72.6042	218.2450	**0.74**
	Litter condition - 1	-58.6745	226.9330	**0.7966**
	Litter condition - 2	454.6565	208.6460	*0.0317*
	Litter condition - 3+	0.0000	.	.

Model	Parameter	Estimate	Standard Error	p-value
	Live animal weight	85.9501	3.9354	<.0001
	Ambient temperature	24.0140	6.8982	0.0006
	Ambient relative humidity	-21.0888	3.0527	<.0001
23*	Intercept	1300.7101	402.9040	0.0014
	Litter condition - 0	-257.5641	330.4500	**0.4373**
	Litter condition - 1	-640.4650	337.7560	**0.0609**
	Litter condition - 2	250.4355	326.7350	**0.4453**
	Litter condition - 3	-317.0504	367.3360	**0.3897**
	Litter condition - 4	79.7894	412.4530	**0.847**
	Litter condition - 5	61.3553	374.2140	**0.87**
	Litter condition - 6	0.0000	.	.
	Inventory	-2.7122	8.7985	**0.7581**
	Flock age	106.3818	5.2982	<.0001
	Ambient temperature	25.0342	7.6586	0.0012
	Ambient relative humidity	-21.8060	3.0682	<.0001
24*	Intercept	1456.6644	374.4280	0.0001
	Litter condition - 0	-22.7663	332.2200	**0.9455**
	Litter condition - 1	-150.8261	338.6930	**0.657**
	Litter condition - 2	358.1782	328.9340	**0.2788**
	Litter condition - 3	-264.3105	369.1710	**0.4753**
	Litter condition - 4	106.0031	414.7160	**0.7987**
	Litter condition - 5	-30.4955	375.9210	**0.9355**
	Litter condition - 6	0.0000	.	.
	Live animal weight	85.8323	3.9117	<.0001
	Ambient temperature	25.4179	7.6325	0.0009
	Ambient relative humidity	-21.2226	3.0594	<.0001
25*	Intercept	1114.2398	311.0810	0.0004
	Litter condition - 0	-141.3740	220.2850	**0.5225**
	Litter condition - 1+	0.0000	.	.
	Inventory	2.2363	9.1958	**0.808**
	Flock age	103.0642	5.8135	<.0001
	Ambient temperature	23.9313	7.1439	0.0009
	Ambient relative humidity	-21.1162	3.0510	<.0001
26*	Intercept	1525.0217	270.5420	<.0001
	Litter condition - 0	-30.5439	206.7050	**0.8828**
	Litter condition - 1+	0.0000	.	.
	Live animal weight	85.5890	4.0708	<.0001
	Ambient temperature	22.6119	6.9164	0.0012
	Ambient relative humidity	-21.2830	3.0341	<.0001
	Ambient temperature	10.3893	2.3091	<.0001
	Ambient relative humidity	-6.6141	0.9914	<.0001

* Experimental model. Not considered during model selection.

Table G-11. Fit and evaluation statistics for the broiler TSP models tested.

Model	2LogL	AIC	AICc	BIC	Corr.	NME[b] (%)	ME[b] (g day^{-1})	MB[b] (g day^{-1})	NMB[b] (%)
1	11,240	11,250	11,250	11,250	0.841	33.42	770.6	11.80	0.512
2	11,170	11,180	11,180	11,180	0.844	33.20	763.8	11.02	0.479
3	11,130	11,140	11,140	11,140	0.848	34.13	785.1	-3.203	-0.139
4	11,240	11,250	11,250	11,250	0.842	33.42	770.6	13.29	0.576
5	11,180	11,190	11,190	11,190	0.831	36.81	848.7	10.17	0.441
6	11,120	11,130	11,130	11,130	0.853	33.08	760.9	-3.121	-0.136
7	11,180	11,200	11,200	11,190	0.830	36.90	850.8	9.557	0.414
8	11,240	11,250	11,250	11,250	0.843	33.25	766.6	18.57	0.805
9	11,170	11,180	11,180	11,180	0.847	32.98	758.6	18.83	0.818
10	11,230	11,240	11,240	11,240	0.851	32.00	737.9	-12.79	-0.555
11	11,160	11,170	11,170	11,160	0.853	31.22	718.2	-14.81	-0.644
12	11,120	11,130	11,130	11,130	0.859	31.47	723.9	-27.87	-1.212
13	11,230	11,240	11,240	11,230	0.854	30.86	711.5	-7.648	-0.332
14	11,160	11,170	11,170	11,160	0.857	33.20	765.6	-5.217	-0.226
15	11,110	11,120	11,120	11,120	0.863	30.50	701.6	-29.46	-1.281
16	11,160	11,170	11,170	11,170	0.859	32.87	757.8	-3.191	-0.138
17	11,230	11,240	11,240	11,240	0.851	31.93	736.3	-15.47	-0.671
18	11,160	11,170	11,170	11,170	0.853	31.21	717.9	-17.29	-0.752
19*	11,100	11,120	11,120	11,110	0.872	30.26	696.0	8.306	0.361
20*	11,110	11,120	11,120	11,120	0.864	30.41	699.6	-22.37	-0.972
21*	11,110	11,130	11,130	11,120	0.868	31.10	715.3	7.810	0.340
22*	11,100	11,120	11,120	11,120	0.867	30.51	701.7	-23.77	-1.033
23*	11,110	11,130	11,130	11,120	0.870	30.95	712.0	8.556	0.372
24*	11,100	11,130	11,130	11,120	0.869	30.46	700.6	-22.55	-0.98
25*	11,120	11,140	11,140	11,130	0.853	33.09	761.2	2.724	0.118
26*	11,110	11,120	11,120	11,120	0.863	30.50	701.5	-28.45	-1.237

* Experimental model. Not considered during model selection.

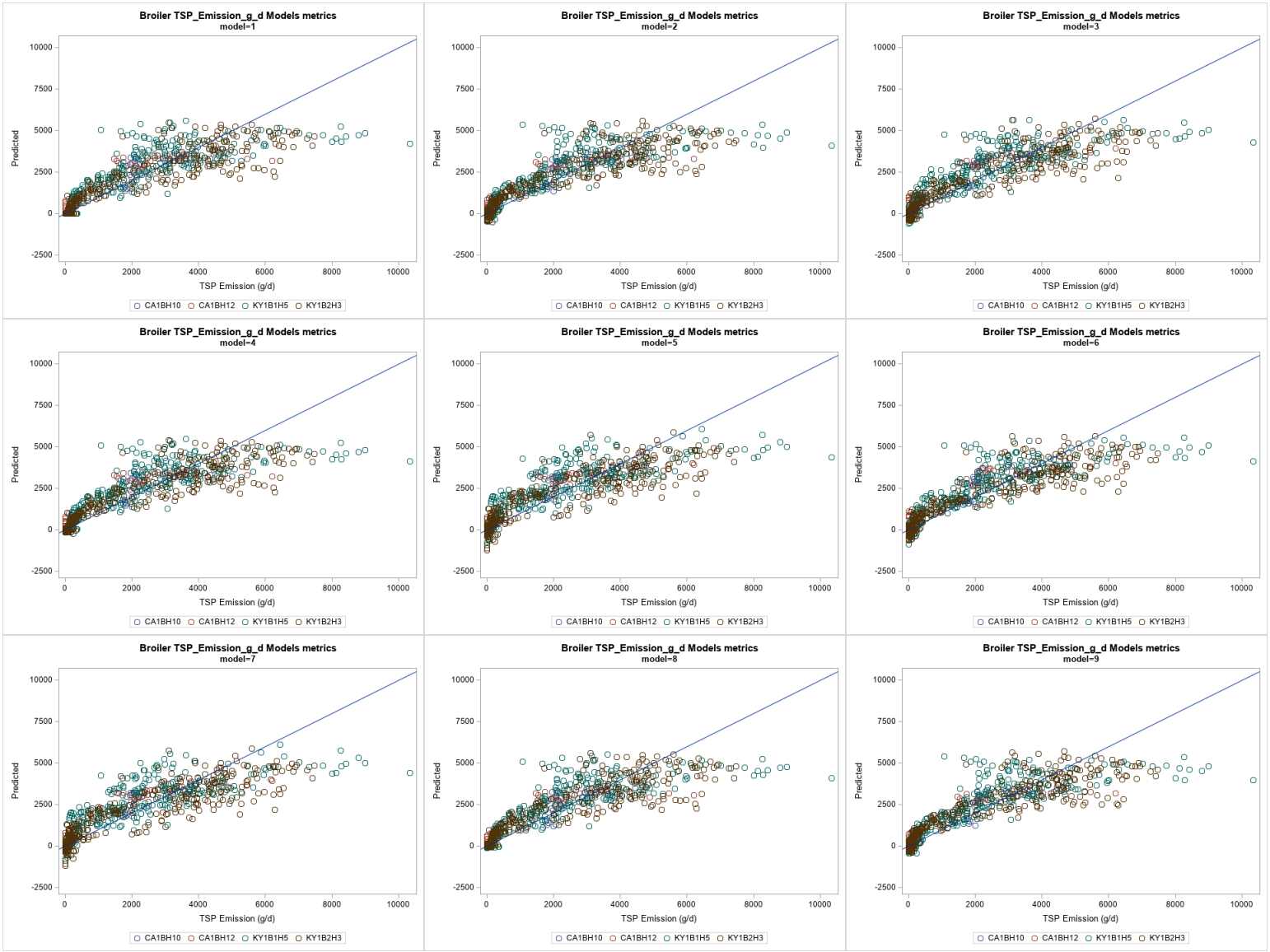


Figure G-13. Broiler house TSP one-to-one plots models 1 through 9.

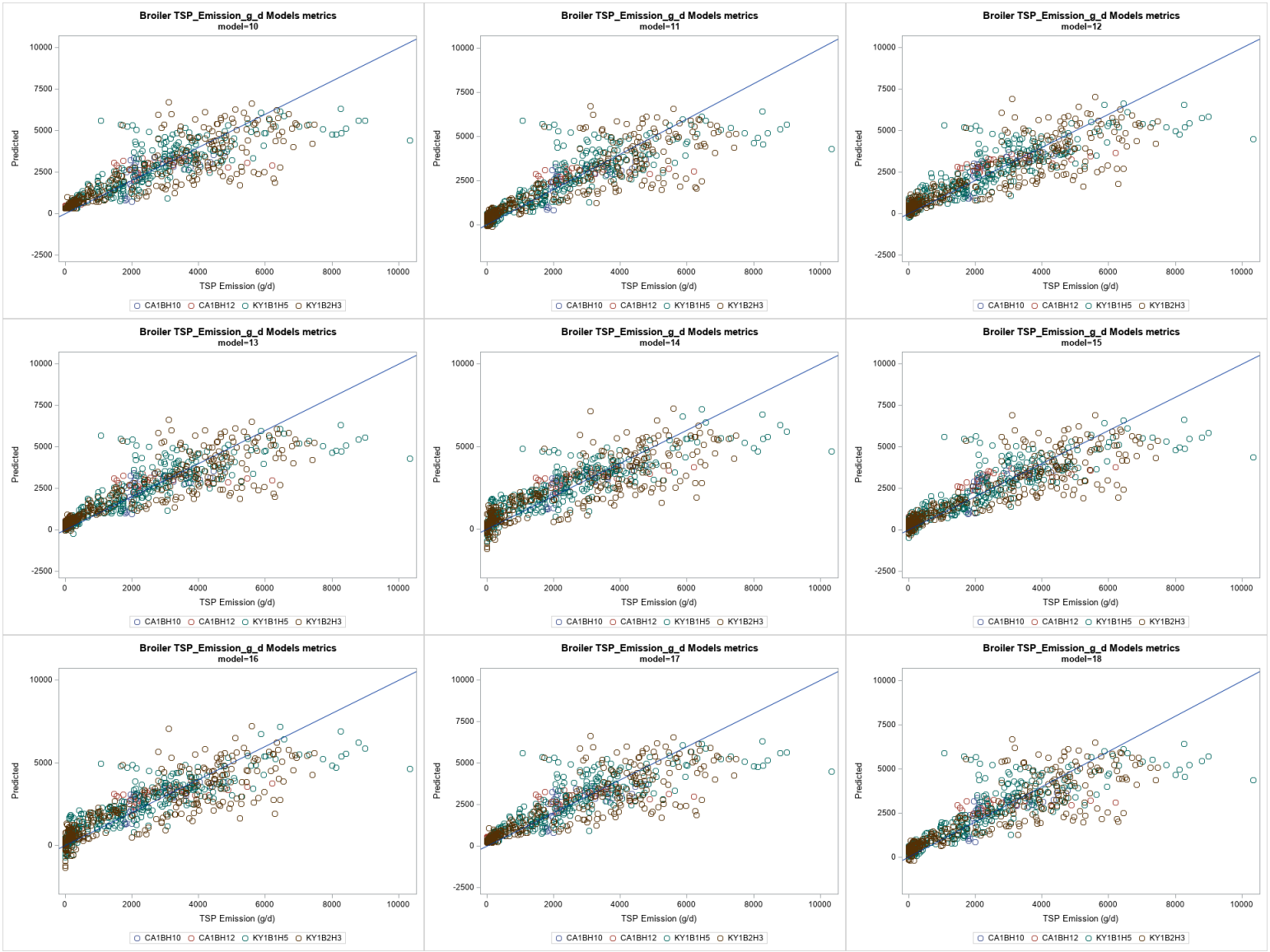


Figure G-14. Broiler house TSP one-to-one plots models 10 through 18.

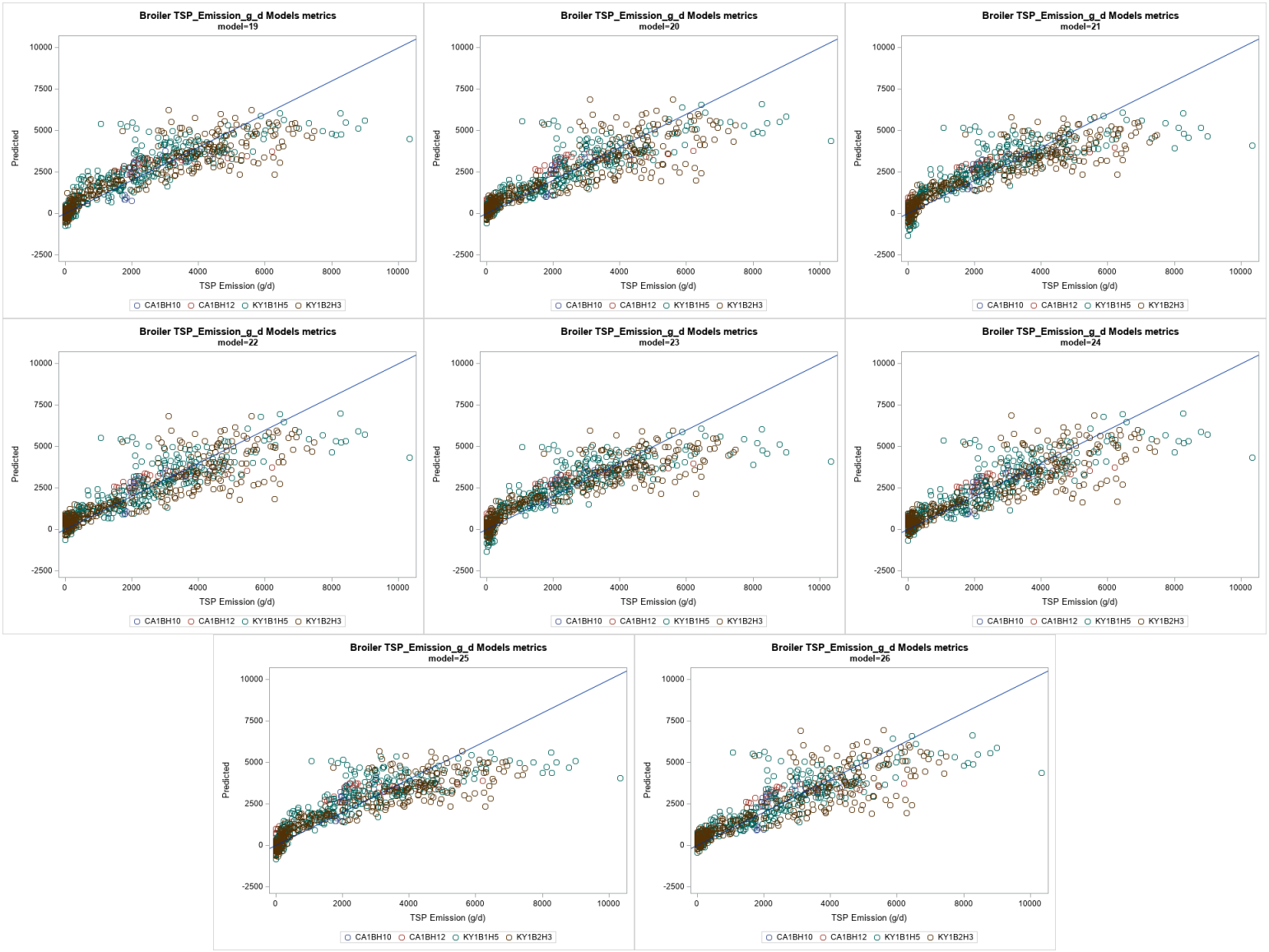


Figure G-15. Broiler house TSP one-to-one plots models 19 through 26.

Appendix H – Model Performance Evaluation

List of Tables

Table H-1. Model performance statistics, overall. H-4

Table H-2. Model performance statistics by house. H-5

Table H-3. Model performance statistics by season. H-6

Table H-4. Model performance statistics by house, by season. H-7

List of Figures

Figure H-1. Time series comparison of model (points) and observed (line) NH_3 emissions H-3

Figure H-2. Scatter plots of model versus observed emissions. H-4

Figure H-3. Scatter plots of model versus observed emissions, color coded by house. H-5

Figure H-4. Scatter plots of model versus observed NH_3 emissions by season. H-6

Figure H-5. Scatter plots of model versus observed NH_3 emissions by season, color coded by house. ... H-8

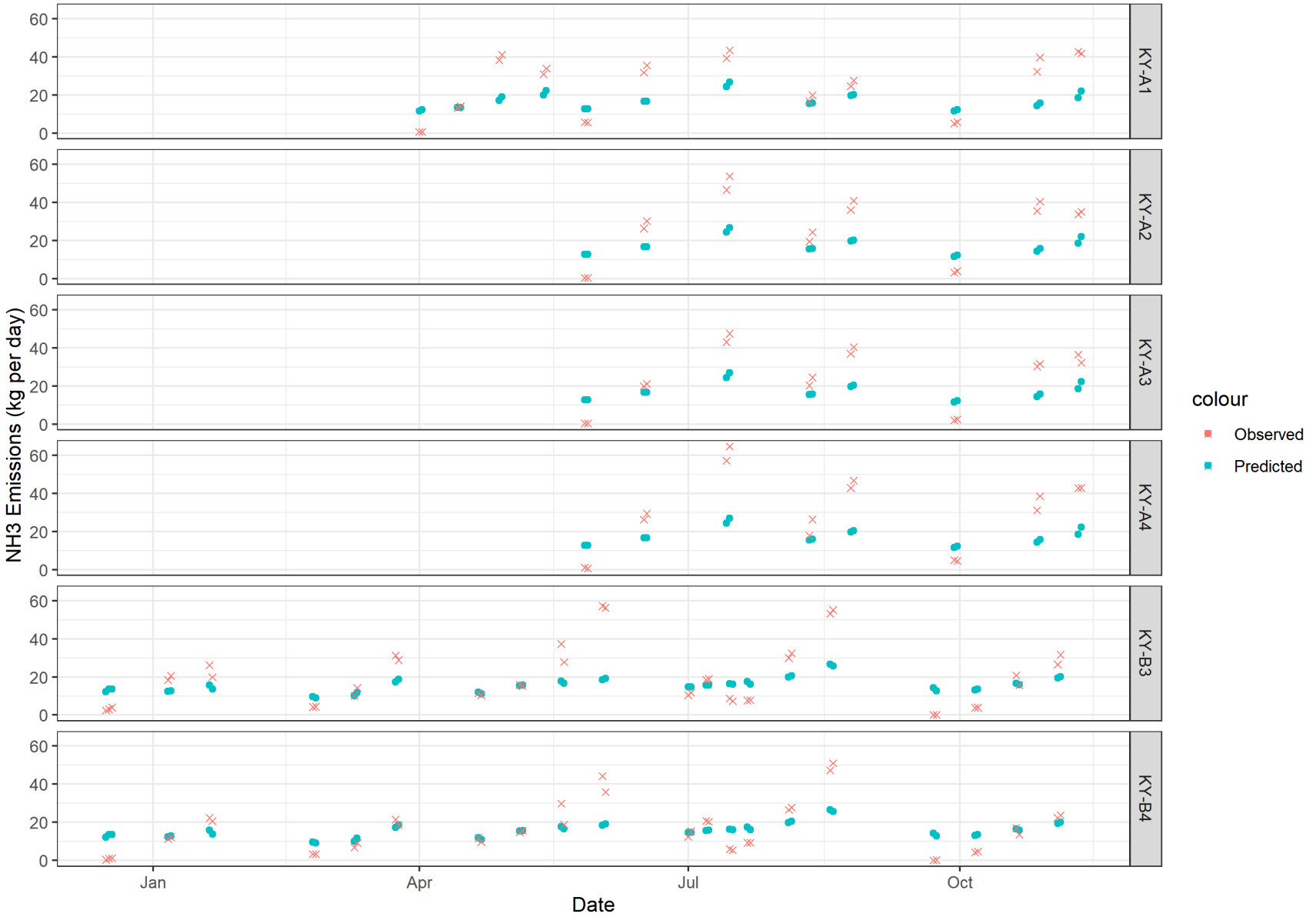


Figure H-1. Time series comparison of model (points) and observed (line) NH_3 emissions.

Table H-1. Model performance statistics, overall.

Pollutant	n	MB (kg)	ME (kg)	NMB (%)	NME (%)	r
NH_3	154	-5.21	11.01	-24%	51%	0.83

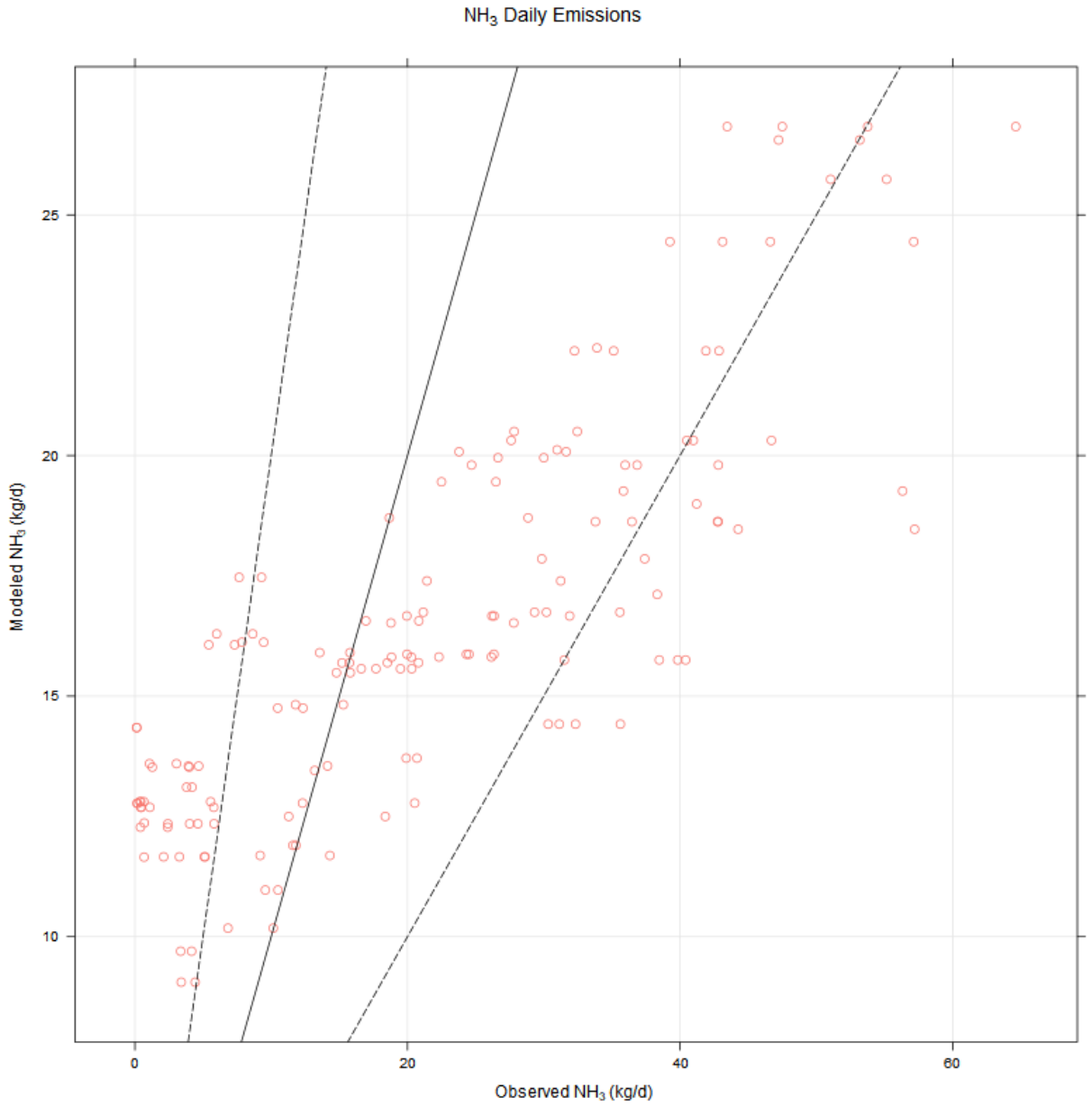


Figure H-2. Scatter plots of model versus observed emissions.

Table H-2. Model performance statistics by house.

Pollutant	House	n	MB (kg)	ME (kg)	NMB (%)	NME (%)	r
NH_3	KY-A1	24	-7.71	11.89	-31%	48%	0.80
NH_3	KY-A2	16	-9.63	14.80	-36%	55%	0.85
NH_3	KY-A3	16	-7.07	12.58	-29%	52%	0.87
NH_3	KY-A4	16	-12.55	17.31	-42%	58%	0.93
NH_3	KY-B3	41	-3.45	9.75	-18%	51%	0.78
NH_3	KY-B4	41	-0.19	7.19	-1%	45%	0.82

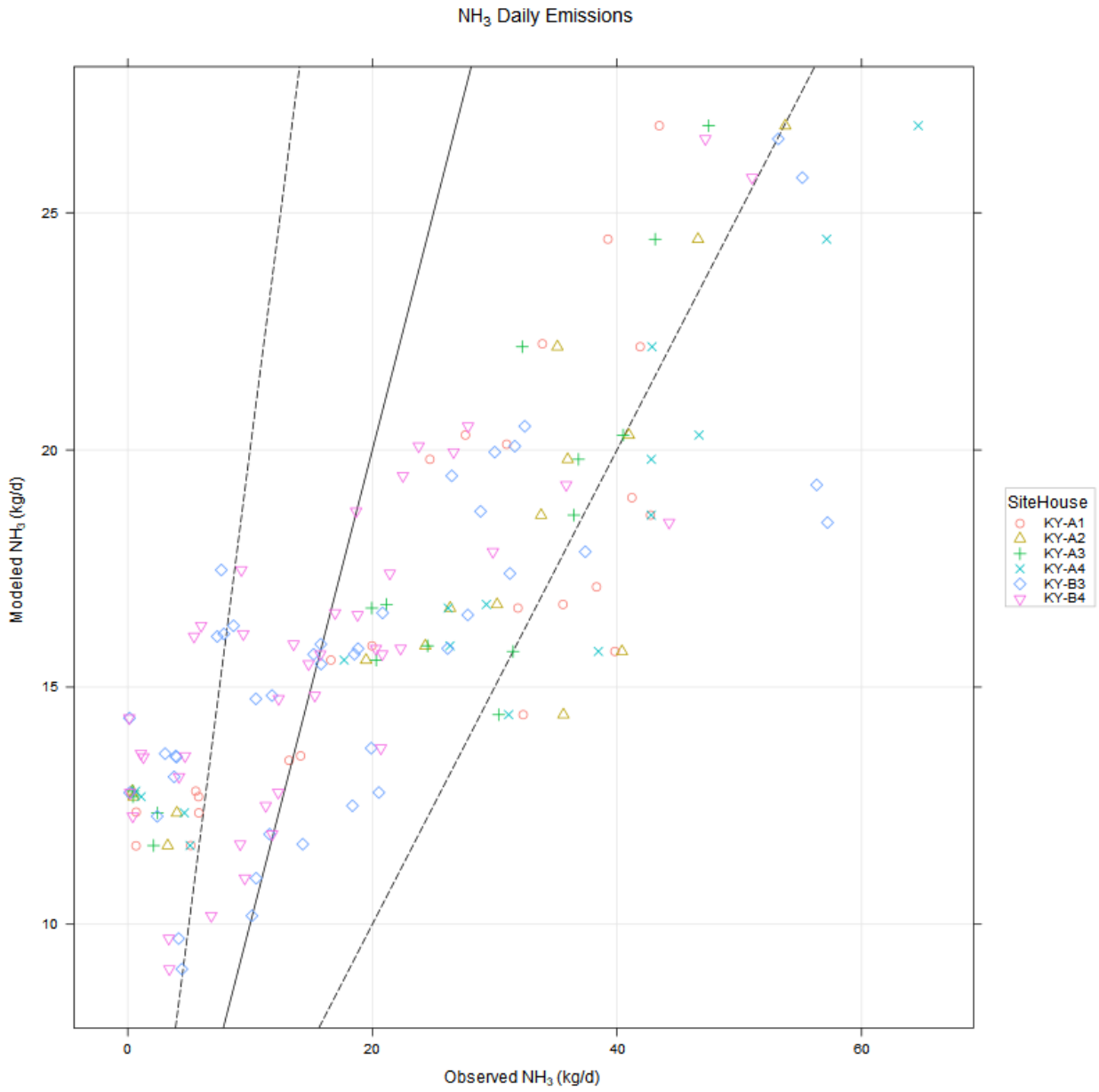


Figure H-3. Scatter plots of model versus observed emissions, color coded by house.

Table H-3. Model performance statistics by season.

Pollutant	House	n	MB (kg)	ME (kg)	NMB (%)	NME (%)	r
NH_3	spring (MAM)	36	-0.64	7.28	-4%	48%	0.82
NH_3	summer (JJA)	60	-10.81	13.48	-36%	45%	0.81
NH_3	autumn (SON)	40	-4.43	12.25	-22%	61%	0.74
NH_3	winter (DJF)	18	2.60	7.45	26%	75%	0.56

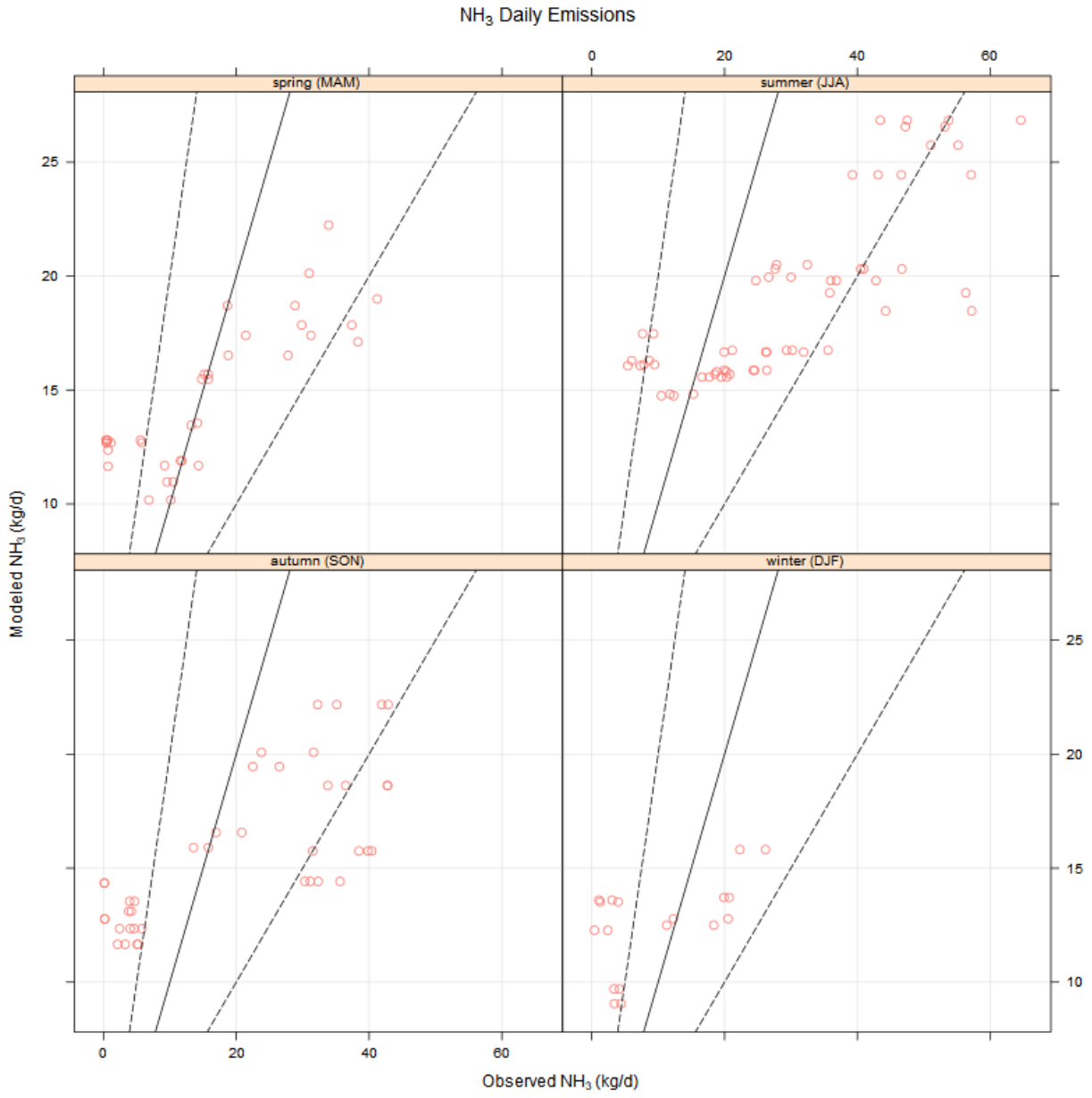


Figure H-4. Scatter plots of model versus observed NH_3 emissions by season.

Table H-4. Model performance statistics by house, by season.

Pollutant	House	Season	n	MB (kg)	ME (kg)	NMB (%)	NME (%)	r
NH_3	KY-A1	spring (MAM)	10	-2.95	10.36	-16%	56%	0.89
NH_3	KY-A1	summer (JJA)	8	-10.36	10.36	-35%	35%	0.76
NH_3	KY-A1	autumn (SON)	6	-12.13	16.48	-43%	59%	0.83
NH_3	KY-A2	spring (MAM)	2	12.33	12.33	2934%	2934%	-1.00
NH_3	KY-A2	summer (JJA)	8	-15.18	15.18	-44%	44%	0.97
NH_3	KY-A2	autumn (SON)	6	-9.54	15.12	-38%	60%	0.70
NH_3	KY-A3	spring (MAM)	2	12.32	12.32	2874%	2874%	-1.00
NH_3	KY-A3	summer (JJA)	8	-12.21	12.21	-38%	38%	0.94
NH_3	KY-A3	autumn (SON)	6	-6.68	13.18	-30%	59%	0.77
NH_3	KY-A4	spring (MAM)	2	11.87	11.87	1358%	1358%	-1.00
NH_3	KY-A4	summer (JJA)	8	-19.32	19.32	-50%	50%	0.98
NH_3	KY-A4	autumn (SON)	6	-11.67	16.43	-42%	60%	0.85
NH_3	KY-B3	spring (MAM)	10	-5.65	5.91	-28%	29%	0.87
NH_3	KY-B3	summer (JJA)	14	-8.42	14.39	-31%	54%	0.77
NH_3	KY-B3	autumn (SON)	8	2.88	8.59	22%	67%	0.96
NH_3	KY-B3	winter (DJF)	9	1.11	7.81	10%	68%	0.58
NH_3	KY-B4	spring (MAM)	10	-1.03	2.64	-7%	17%	0.87
NH_3	KY-B4	summer (JJA)	14	-5.30	10.76	-22%	45%	0.83
NH_3	KY-B4	autumn (SON)	8	4.97	6.76	46%	63%	0.95
NH_3	KY-B4	winter (DJF)	9	4.09	7.09	48%	84%	0.56
NH_3	KY-A1	spring (MAM)	10	-2.95	10.36	-16%	56%	0.89
NH_3	KY-A1	summer (JJA)	8	-10.36	10.36	-35%	35%	0.76
NH_3	KY-A1	autumn (SON)	6	-12.13	16.48	-43%	59%	0.83
NH_3	KY-A2	spring (MAM)	2	12.33	12.33	2934%	2934%	-1.00

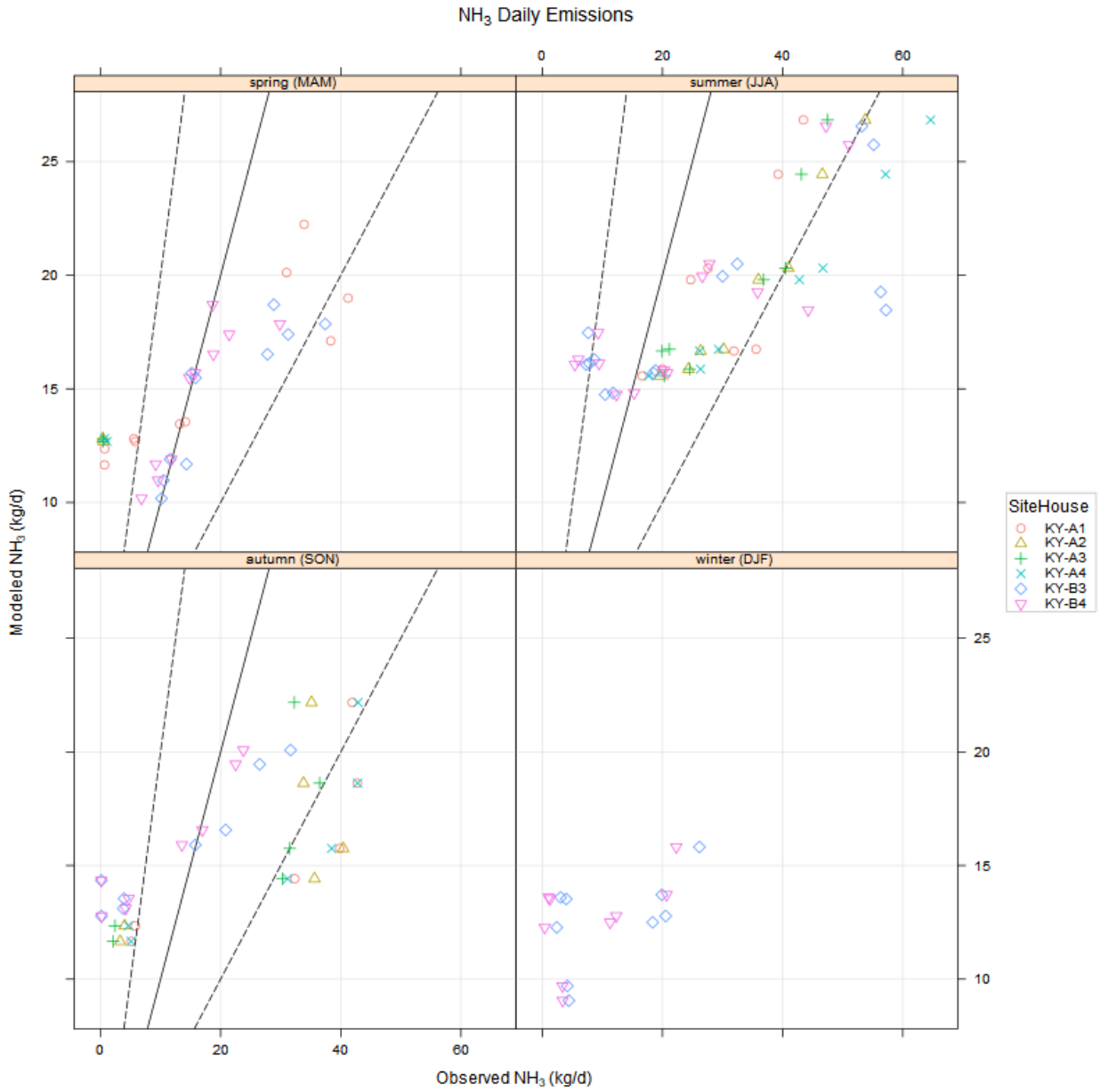


Figure H-5. Scatter plots of model versus observed NH_3 emissions by season, color coded by house.