ATROPHIC RHINITIS IN SWINE II; BACTERIOLOGY, PASTEURELLA MULTOCIDA SEROTYPES AND PATHOGENICITY IN MOUSE VIRULENCE TESTS, PREVENTIVE MEDICATIONS AND VACCINATIONS

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Disease prevalence, characteristics, transmission, and daily weight gain in 6 herds selected for research of atrophic rhinitis have been reported in "Atrophic rhinitis in swine I" to the 1982 IPVS Congress. In the following results of cultures of nasal swabs, serotyping and mouse virulence testing of Pasteurella multocida, and preventive medication-vaccination tests will be presented.

BACTERIOLOGY:

1740 nasal swabs were cultured from a total of 420 pigs in the 6 herds investigated (herds T, W, M, A, HN, and S). 3 pigs per litter in 10 litters were randomly selected for swabbings at 2-3 wks, 5-6 wks, 3 mths, and at slaughter at 6-7 mths of age. At slaughter nasal swabs were cultured both from the anterior part of the nasal cavity (a), and from the ethmoidal area (b) in the herds T, M, and S;

Streptococci, Staphylococci, E. coli, and Bacillus spp. were frequently isolated in all groups (50-90%). Pseudomonas aerug. was infrequently isolated except for herd T (15%) and W (50%) at slaughter. Hemophilus parasuis was only occasionally isolated. No consistent pattern was found for Bordetella bronchiseptica or Pasteurella multocida within groups or in the same pig at different age at swabbing. In particular Pasteurella but also Bordetella was more frequently isolated in the ethmoidal region in comparison to the anterior part of the nostrils. Bordetella was never isolated in herd W, yet 75% of the market hogs had AR lesions at slaughter.

% isolates of Bordetella bronchiseptica;

Herd	Age at swabbing 2-3 wks.	5-6 wks.	3 mths	At slaughter a)	b)
T	1%	1%	0%	11%	19%
W	0	0	0	0	Not Tested
M	22	100	57	4	4
A	0	27	19	0	NT
AN	56	3	20	0	NT
N	26	11	16	27	NT
HN	24	70	15	15	NT
S	0	0	46	0	25

% isolates of Pasteurella multocida;

T	6%	14%	7%	14%	47%
W	8	8	0	25	NT
M	0	17	0	13	19
A	5	9	5	14	NT
AN	3	3	23	0	NT
N	0	37	26	50	NT
HN	0	4	0	19	NT
S	7	11	0	15	25

SEROTYPING OF PASTEURELLA MULTOCIDA:

68 isolates of Pasteurella multocida from the 6 herds were serotyped for particulate antigens according to technique by Heddlestone et al. (1966) (Dr.Blackburn, NVSL, Ames, Iowa). All but one of the isolates had serotype 3, but in all but 9 serotype 3 crossreacted with one to four other serotypes. Thus, serotype 4 was present in 31 isolates, serotype 5 in 43 isolates, serotype 9 in 8 isolates, serotype 10 in 10 isolates, serotype 11 in 5 isolates, and serotype 12 in 12 isolates. In herd T 38 isolates of Past. mult. were serotyped. 8 isolates had serotype 3, 8 isolates had 3x5, 7 isolates 3x4, 4 isolates 3x5x9x10x12, 3 isolates 3x4x5, 2 isolates 3x4x1, and each one of the other 6 isolates had different particulate antigen crossreactions.

48 isolates were serotyped for capsular antigens according to technique by Carter (1955,1957). Serotype A was found in 46 isolates. Only 2 isolates had serotype D. In other reports A has been the dominating serotype (e.g. Meyeringh et al.1977, and de Jong et al. 1980).

MOUSE VIRULENCE TEST:

A pilot study of 12 Pasteurella multocida isolates representing different herds and different serotypes was carried out at the Pfizer Research Center, Groton, Conn. (Drs. Farrington and Stanton). Standard operation technique for determination of LD_{50} was used. 0.5 ml of various dilutions of the bacterial suspension was inoculated i.p. Over a 4-day period 4 strains, A 3x5, A 3, A 3x5x9x12, and A 3x4x5 indicated a high virulence for mice, similar to the positive virulence control lab strain. 6 isolates indicated a medium-high virulence, and 2 isolates (both A 3x4) a low virulence.

PREVENTIVE MEDICATION - VACCINATION TESTS:

Herds T, W, and A had used commercial injectable Bordetella-Pasteurella bacterins for sows and piglets for 1-2 years prior to this investigation. Herds M, N, and S did not use vaccines. All 6 herds routinely used antibiotics in the creep feed (150-250 ppm), and in the grower feed (about 50 ppm). Despite the intensive vaccination programs a high prevalence of AR was persistent in the herds T, W, and A. It was decided to conduct a careful analysis of the control programs in the herds T and W;

Herd W: Therapy Test I; A modified live test vaccine of Bordetella bronchiseptica (Burns-Biotec) was inoculated intranasally into newborn piglets, 0.5 ml into each nostril. The sows were vaccinated with the commercial Bord.-Past. vaccine earlier used. Therapy Test II; Sows and piglets were vaccinated with the commercial federally approved Bord.-Past. bacterin; the piglets were injected at 1 and 4 wks of age. 22 pigs in each group were recorded for AR at slaughter. No differences for severity of AR was found between non-treated controls and pigs in the Therapy group II (48% mild lesions, 33% moderate, and 5% severe lesions in the controls versus 50%, 27%, and 5% for the injected bacterin group). Pigs given the intranasal vaccine showed a higher incidence of severe lesions (38% mild, 33% moderate, and 19% severe lesions).

Herd T: Test I; The same injectable Bord.-Past. bacterin as for herd W to both sows and piglets according to earlier routines at the farm. Test II; As for I with addition of i.m. injections of the piglets with a long-active tetracycline (Pfizer LA200) once a week for three weeks. Test III: Sows as for I, and piglets inoculated with the same intranasal Bordetella test vaccine as for herd W. Test IV; Vaccination of both sows and piglets with an autogenous Pasteurella mult. bacterin produced from isolates found in the herd (A 3x4x5, and A 3x4). Test V; Same as for IV with addition of injections of the piglets with LA200 as for test III. Test VI; Non-treated controls. 20-25 pigs in each group were selected at random and recorded at slaughter for AR, pneumonia, and ADG. Each group was isolated in different all-in all-out farrowing and nursery premises, and partially isolated in pens throughout the finishing period.

No significant differences were found for severity of AR between different groups, however, moderate - severe AR was found in 56-58% of the pigs in the Bord.-Past. commercial vaccine groups (I and II) in comparison to 70-75% for the other groups. There were no significant differences for ADG between the test groups. Neither was any significant improvement of AR found for any of the treatments.

REFERENCES: Carter,G.R.: Am.J.Vet.Res., 1955,16,481-484, and Am.J.Vet.Res., 1957,18,210-213. Heddlestone, K.L., Rebers,P.A., and Ritchie,A.E.: J.Immunol.,1966, 96,124-133.