LABORATORY AND FIELD TRIALS WITH A PARROT POX VACCINE

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INTRODUCTION

Pox virus infection is a common and devastating disease of psittacine birds. It affects birds primarily during the time of importation. Commercially available pigeon and fowl pox vaccines have not proven to be helpful in preventing parrot pox as the viruses are unrelated immunologically. This report abstracts laboratory trials with a pox virus vaccine of psittacine origin. This information is currently in press however the data will be presented. Results of field trials using the same vaccine will be reported.

LABORATORY TRIALS

Pox virus isolated from a Blue Fronted Amazon 8Amazona aestiva) was used as a vaccine in trials with Peach Faced Lovebirds (Agapornis roseicollis). The vaccine was applied by wing web puncture using single and double needle applicators. Effective immunity was evidenced by challenge with virulent psittacine pox virus administered by feather follicle inoculation. When unvaccinated contact control birds were placed with the vaccinated individuals immediately post vaccination, spread of the virus was apparent. However, susceptable birds placed with vaccinated ones at 3 weeks, 6 days, postvaccination remained uninfected from pox vaccine virus for a subsequent 11 week period. Vaccination with a single needle applicator produced a satisfactory immune response and was less traumatic. The need for a high vaccine titer, preferrably 10 4 or greater was demonstrated.

FIELD TRIALS

MATERIALS AND METHODS

A naturally occuring mild field strain of psittacine pox virus was isolated from Blue Fronted Amazons imported from Argentina. This virus was used unmodified as a live vaccine. the virus was propagated in 10 day old specific-pathogen free chicken embryos and titrated to a concentration of 10 4 embryo infective doses (EID 50)

per ml.. Preparation of vaccine and challenge virus was described by Winterfield et al. (2)

Vaccine was administered by double or single needle application in the wing web. In one trial half of the birds were vaccinated by the feather follicle/thigh route. Challenge was done by pulling feathers on the thigh, lightly scarifying the follicles with a scalpel, and applying the nutrient broth containing virus with a cotton swab. Inoculation sites were examined for takes at specified intervals. A positive reaction (take) consisted of swelling, vessicle or pustule formation, or scabbing.

Field trials were conducted using Amazon parrots prior to, during or immediately following importation and quarantine.

FIELD TRIAL #1

The first field trial was in immature Blue Fronted Amazons imported from Argentina. Eight hundred and one birds were recieved into quarantine. Birds were separated according to two age groups. The older birds were partially to fully feathered and the age was estimated at 12 weeks or older. Many of these birds were self-feeding if given a mash of a commercial monkey feed. The younger birds were sparsely feathered and required handfeeding. The age was estimated at 10 weeks or younger.

Pox lesions were observed in some of the birds within the first

few days of quarantine and permission to use the vaccine was requested from USDA. Permission for vaccination was given but was not allowed until after the 16 day sampling period for Newcastle Disease. Handfeeding of the birds unfortunately results in a more rapid spread of infection than is observed in self-feeding birds due to the spread by personel and fomites.

The birds were vaccinated on the 17th day of quarantine. Vaccine was administered by double needle wing web inoculation. By the time of vaccination 208 birds had already died and the pox infection was wide spread. Birds were kept in the original cages. Band number, cage number, and lesions noted were recorded. Some cages were left as unvaccinated controls. Birds which had severe oral or ocular pox lesions, were very thin or had upper respiratory disease were not vaccinated.

Other disease problems were present in the group in addition to pox. Many birds had oral lesions resembling Candidiasis, some had enteritis and sinusitis. A etiologic diagnosis of these problems was not possible due to quarantine constraints. National Veterinary Services Laboratory (NVSL) reported the isolation of an unidentified hemagglutinating virus from one Blue Front. The virus was non-pathogenic for chickens or turkeys.

At the time of release from quarantine (14 days post vaccination) all birds were again examined. Band and cage numbers, takes, and lesions were recorded. Birds were considered to have pox

if any of the typical oral or ocular lesions of diptheritic parrot pox were present. These include scabs on the eyes, or cere, caseous lesions in the mouth including lesions on the pharynx, tongue, glottis and commissures of the beak. Most birds which were clinically affected with parrot pox had both oral and ocular lesions. Many of the birds also exhibited subnormal weight and upper respiratory disease. Sixty seven (67) birds were not vaccinated due to illness. Of these only 3 survived until release. Figure #1

Figure #1

Summary of numbers of birds in field trial #1

801 - Recieved into quarantine

208 - Died prior to vaccination

480 - Vaccinated.

46 - Unvaccinated Controls.

67 - Too ill to vaccinate.

617 - Died in quarantine.

184 - Released (34 of these were euthanitized at the time of release, due to disease)

FIELD TRIAL #2

The second field trial took place in a holding facility in Argentina. Approximately 1400 Blue Fronts were being prepared for export. All the birds were immature, however, 75% of the birds were at least partially self-feeding. Sanitation and husbandry practices were very good. Some disease problems were present in the flock but specific diagnosis was difficult. Clinically candidiasis, bacterial pneumonia, enteritis and sinusitis were observed. The presence of chlamydiosis was suspected in the flock but could not be confirmed. The birds were placed on antibiotics. Some birds had what appeared to be early parrot pox lesions so we elected to vaccinate and planned to import the birds approximately three weeks following vaccination.

Approximately 1100 birds were vaccinated and banded. Approximately one half of the birds were vaccinated by single needle wing web inoculation and one half were vaccinated by feather follicle inoculation in the lateral tibiotarsal area of the leg. Approximately 330 birds were not vaccinated due to illness. Non-vaccinated birds were held in a separate room.

The birds were examined 4 weeks after vaccination. At this time approximately 20 birds were dying daily. 511 birds remained in the compound (some of the birds were moved to another location). Approximately 270 of these birds (54%) had obvious pox lesions.

Approximately equal numbers of birds were housed in each of five rooms, four room of vaccinates and one of non-vaccinated birds (ill at the time of vaccination). The mortality rates in the room of non-vaccinates was 2 to 4 times the daily mortality rates for each of the other rooms. Some birds in the room of non-vaccinates were found to have pox lesions. These birds may have been infected prior to vaccination of the other birds, or the infection may have been introduced by workers or mosquitoes.

Twenty 20 birds were necropsied and a variety of disease conditions were observed. Many, but not all of the birds had pox lesions. Many of the birds had chronic respiratory disease with pneumonia and caseous deposits in the airsacs and bronchi. Several of the birds appeared to have bacterial or chlamydial septicemias. Many of the birds were underweight and deficient in calcium.

The older birds again had a significantly higher survival rate and a decreased incidence of ocular and oral pox lesions. No significant difference was noticed between groups which were vaccinated by wing web or feather follicle inoculation.

FIELD TRIAL #3

Adult Blue Fronted Amazons imported from Argentina were used in the third field trial after release from quarantine. Of 597 birds recieved only 4 birds (1.5 %) died in quarantine. No viruses were isolated by NVSL.

Upon release a few birds in the flock were showing typical oral and ocular pox lesions. Approximately 580 birds were vaccinated in an attempt to stop the outbreak. Records were kept on 70 birds which were in cages in which no infected birds were found at the time of vaccination. Birds were examined, and lesions and takes were recorded at 10, 14 and 24 days (DPI).

Of the 70 birds, 49 (70 %) had good takes while 21 birds (30 %) did not exhibit good takes on days 10 or 14 (DPI). 17 of these 21 birds were healthy and free of pox lesions on day 24(DPI). Of the 70 birds, 58 (82 %) had takes and were free of lesions on day 24 (DPI), while 12 (18 %) had pox lesions.

In observing the entire flock it appeared that cages which had no affected birds at the time of vaccination generally had good takes, and low morbidity and mortality. Results were less promising in birds which were showing lesions or exposed to infected birds prior to vaccination. Approximately 83 (14%) of the 580 birds died in this outbreak and approximately 30 (5%) were left with eye defects and chronic sinusitis. Morbidity and mortality is usually much higher in natural infections and vaccination was considered a success.

Sixty days post vaccination 35 of the 70 birds were challenged. In 26 (74 %) of the 35 birds good takes had been recorded previously, and in 9 birds (26%) no takes were previously observed.

Birds were examined, and lesions or takes noted on days 10, 15, and 21 DPI. Slight edema and erythema at the challenge site was observed on day 10 DPI in six of the birds (five of these had previously observes takes). Two of these birds had slight swellings observed on day 10 DPI. All birds were healthy and free of lesions on day 21 DPI.

FIELD TRIAL #4

Red Lored Amazons (Amazona autumnalis) imported from Honduras were used in the fourth field trial. Two hundred and ninety Red Loreds were imported, and 4 birds (1.3%) died during quarantine. No signs of Pox Virus infection were observed and no viruses were isolated by NVSL.

Ten (10) birds were vaccinated by a single needle in the wing web. Nine (9) of the ten birds had takes 11 days post inoculation. The tenth bird had a take on the 21st day. All takes were mild consisting of swelling and formation of small scabs. Both medial and lateral surfaces of the wing were examined for takes. No ocular or oral lesions developed in any of the birds.

The birds were challenged 22 days post vaccination. Five Fishers Lovebirds (Agapornis fischeri) were inoculated as controls. Birds were examined for lesions on days 7, 11, 19, 21 and 31 DPI. Nine of the ten Red Lored Amazons had no reaction at the site of challenge nor did they develop any other lesions of parrot pox

infection. One bird, which previously had a good take, developed a minor periorbital scab on day seven which fell off on day 21. No systemic illness was observed and no diptheritic lesions developed. The control birds all developed positive reactions at the site of inoculation by day 21, and four of the five developed oral or ocular pox lesions by day 28.

DISCUSSION

The behavior of vaccines under field conditions cannot always be predetermined by laboratory trials. Environmental factors, concurrent disease problems, stress, nutrition, species and age differences, and other undefined factors may alter the outcome of vaccination.

The failure of trial #1 was attributed to the advanced spread of the disease prior to vaccination and the presence of concurrent disease problems. A greater survival rate however, was observed in the older birds.

In trial #2 pox was not widespread at the time of vaccination. The existence pox in the flock was suspected but could not be confirmed. Other concurrent disease conditions were present in the flock which may have resulted in some immunosuppression. The failure of this trial was attributed to: 1. The possibly of vaccination in the face of an outbreak, 2. Concurrent disease problems, and 3. Immaturity.

It was concluded that Blue Fronts which are not fully feathered are not immunocompetent to withstand the vaccine and vaccination of birds less 4 months of age would be contraindicated.

In trial #3 the vaccine appeared to slow the spread of pox in a natural outbreak in adult Blue Fronted Amazons. The vaccine was administered in the face of an outbreak with a resultant mortality rate of 14%. This is low as many outbreaks of pox in Blue Fronts result in mortality in excess of 50%. In addition the birds were protected from challenge. The safety of the vaccine in Blue Fronts however cannot be assessed until it is used in birds which are free of pox virus infection.

The low percentage of takes observed in this trial may be due to the fact that only the medial surface of the wing was examined for takes. In the fourth trial several birds which had no take on the medial surface of the wing, did have takes on the lateral surface.

Trial #4 indicated that the vaccine was safe and efficaceous in these Red Lored Amazons. Takes were mild and all birds withstood challenge with only a mild ocular scab in one bird.

In summary, the psittacine pox vaccine was shown to be capable of stimulating immunity against severe pox virus challenge in both laboratory and field trials. In field trials the vaccine was safe and efficaceous in adult Red Lored Amazons. The use of the vaccine

in the face of an outbreak showed promising results in adult Blue Fronted Amazons. In both species the vaccine was protective against challenge. The use of vaccine in Amazons prior to weaning was unsuccessful and is probably contraindicated until the birds are at least 16 weeks of age.

Further field trials are needed to determine conditions under which the vaccine can be used safely in a variety of species and age groups.

REFERENCES

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