

Newcastle Disease in Village Chickens

Control with Thermostable Oral Vaccines

Proceedings of an International Workshop held in Kuala Lumpur, Malaysia, 6-10 October 1991

Editor: P.B. Spradbrow

These proceedings were first published by ACIAR in 1992. This electronic version has been created for ACIAR by Arawang Communication Group, Canberra, Australia [www.arawang.com.au]

Suggested citation this version:

Spradbrow, P.B., ed. Newcastle Disease in Village Chickens: control with thermostable oral vaccines [online]. ACIAR [Canberra, Australia] May 1999. [cited *add date accessed*]. Available from Internet: <url:http://www.aciar.gov.au/pubs2.htm>

ISBN 1 86320 260 9

© Australian Centre for International Agricultural Research, GPO Box 1571, Canberra, Australia

Contents

Preface	6
Part 1 Thermostable Vaccines and Village Chickens	7
Origin of ACIAR Project on Vaccination of Village Chickens against Newcastle Disease <i>J Copland</i>	8
Heat Stable Vaccines as One Approach to the Control of Newcastle Disease in Village Chickens <i>P Spradbrow</i>	11
Observations on Some Difficulties Encountered in Trials with Oral Newcastle Disease Vaccination <i>A R B Jackson</i>	15
A Review of the Use of Food Carriers for the Delivery of Oral Newcastle Disease Vaccine <i>P Spradbrow</i>	18
Village Chicken Production: Problems and Potential <i>R B Cumming</i>	21
The Development of Commercial Antigen and Antibody Detection Assays for Newcastle Disease Virus <i>G W Burgess</i>	25

The Scavenging Feed Resource Base in Assessments of the Productivity of Scavenging Village Chickens <i>J A Roberts</i>	29
Patterns of Newcastle Disease Virus Activity in Village Fowls and the Measurement of Effective Field Protection Following Oral Vaccination <i>J Johnston, R Cumming, B Fontanilla, and F Silvano</i>	33
The Epidemiology of Newcastle Disease in Village Chickens <i>PAJ Martin</i>	40
Computer Modelling to Expand Our Understanding of Disease Interactions in Village Chickens <i>J Johnston</i>	46
Oral Vaccines and Mucosal Immunity <i>P Spradbrow</i>	56
Alternatives to Oral Administration of Newcastle Disease Vaccines to Village Chickens <i>P Young</i>	60
The Economic Impact of Vaccinating Village Fowls: a Case Study from the Philippines <i>J Johnston, B Fontanilla, and F Silvano</i>	62

Part 2 Results from the ACIAR Project 73

An Overview of the Use of Food-Based Newcastle Disease Vaccine in Malaysia <i>A L Ibrahim, A Ideris, and A M Babjee</i>	75
Results of the Newcastle Disease Research Project at the University of Queensland <i>J Samuel, Zuhara Bensink, and P Spradbrow</i>	79
Newcastle Disease Research at the University of New England <i>R B Cumming</i>	84
Laboratory Trials of Heat-Adapted V4 Vaccine Strains of Newcastle Disease Virus in a Simple Feed-Delivery System for Vaccination of Village Chickens <i>Darminto and P W Daniels</i>	86
Field Trials of Heat-Adapted V4 Newcastle Disease Vaccines for Village Chickens Using a Village-Based System of Vaccine Coating of Feed. I. Virological Studies <i>Darminto, P W Daniels, J Allen, Ketut Sarjana, Agus Bale, and Purnomo Ronohardjo</i>	92
Widescale Implementation of Oral Newcastle Disease Vaccination in Malaysia <i>A L Ibrahim, A Ideris, and A M Babjee</i>	101
Epidemiological Studies of Newcastle Disease in Malaysia <i>Z Mahmood, A L Ibrahim, and N B Salim</i>	103

Webster's Newcastle Disease Vaccine for Village Chickens <i>B C Heath, M J Lindsey, K P McManus, and P D Claxton</i>	104
Vaccination of Sri Lankan Chickens against Newcastle Disease with Oral V4 Vaccine Delivered on Cooked Rice <i>G W L Jayawardane and D A W W D A Bandara</i>	110
Control of Newcastle Disease in Village Chickens with Oral V4 Vaccine in Thailand <i>Urasri Tantaswasdi, Jintana Danvivatanaporn, Chaisiri Mahantachaisakul, Porntip Sirivan, Arunee Chaisingh, and Tarika Pramoolsinsap</i>	118
Oral Vaccination of Village Chickens with V4 Newcastle Disease Vaccine <i>B C Fontanilla and F Silvano</i>	128
Field Trials of Heat-Adapted V4 Newcastle Disease Vaccines for Village Chickens Using a Village-Based System of Vaccine Coating of Feed. II. Field Mortality and Serological Studies <i>J D Allen, J Johnston, Darminto, J Arifin., P W Daniels, Ketut Sarjana, Agus Bale, and Purnomo Ronohardjo</i>	130
A Simple Delivery System for Oral, Heat Stable Newcastle Disease Vaccines for Village Poultry <i>P W Daniels and Darminto</i>	136
Part 3 Newcastle Disease and Village Chickens in Other Parts of Asia and Africa	141
Newcastle Disease in Village Chickens in North, West and Central Africa <i>J G Bell</i>	142
The Productivity and Nutrition of Village Chickens in Sri Lanka <i>S P Gunaratne, A D N Chandrasiri, WA P Mangalika Hemalatha, and JA Roberts</i>	144
The Role of Village Chickens in the Poultry Industry in Sri Lanka <i>M C L de Alwis</i>	149
The Poultry Industry in Lesotho <i>Lebohang Khomari</i>	153
Epidemiology of Newcastle Disease and the Need to Vaccinate Local Chickens in Uganda <i>Mukiibi Muka George</i>	155
Village Chickens and Newcastle Disease in Nigeria <i>A O Olabode, A G Lumorde, N N Shidali, and A A Chukwuedo</i>	159
Village Chickens and Newcastle Disease in Bangladesh <i>Mohd. Asadullah</i>	161
Present Status of Poultry in Nepal <i>Upendra Mishra</i>	163
Newcastle Disease in Myanmar <i>Kyaw Zaw Lwin</i>	167

Poultry Production and Newcastle Disease in Vietnam	169
<i>Tien Dung Nguyen</i>	
The Poultry Industry in Kenya with Particular Reference to the Newcastle Disease Problem	171
<i>J T Musiime</i>	
Poultry Disease in Africa and the Newcastle Disease Problem: an Overview	174
<i>J T Musiime</i>	
Part 4 Summary and Recommendations	177
Participants	181

Preface

‘There are no easy victories in the field of vaccine development and application.’

E. Norrby 1989. In: *Modern Approaches to Live Virus Vaccines*. *Advances in Veterinary Science and Comparative Medicine*, 33, 267.

THE Australian Centre for International Agricultural Research (ACIAR) has supported two consecutive projects on the vaccination of village chickens against Newcastle disease. The first project involved research at the Universiti Pertanian Malaysia and the University of Queensland. The original research groups developed the concept of a thermostable Newcastle disease vaccine and demonstrated the efficacy of vaccines based on strain V4 when they were administered on food. At the conclusion of the first project, ACIAR sponsored an international workshop in Kuala Lumpur to review these results and to consider the whole problem of village chicken production and Newcastle disease in Asia. The monograph ‘Newcastle Disease in Poultry. A New Food Pellet Vaccine’ resulted from that workshop. Village chickens were identified as a vital resource in most Asian countries and Newcastle disease was recognised as the key factor limiting full exploitation of this resource. Several Asian countries indicated their interest in participating in any future research project.

ACIAR then funded a second project on a more ambitious scale than the first project. The initial collaborators from the University of Queensland and the Universiti Pertanian Malaysia were joined by colleagues from other institutes in Malaysia and Australia, and the project was enlarged to include Thailand, Philippines, Indonesia and Sri Lanka. During this second project, further basic findings on the interactions of Newcastle disease vaccines, food carriers and chickens were obtained. Malaysia showed that large-scale control programs were feasible, successful efficacy and pilot village studies were repeated in other countries and quantities of field data were generated, collected and evaluated. Some distillations of our findings and of our musings on the project appear in this volume.

This project has been truly international in scope, with the direct involvement of six countries. It is a great strength of the ACIAR organisation that such complex, multinational programs can be accommodated, involving many government institutes and universities in very diverse countries. The project leaders and all those involved in the project acknowledge their appreciation, not only of the financial support from ACIAR, but of the organisational assistance from the ACIAR staff in Canberra and in the Embassies and High Commissions. Countries not directly concerned with the project have indicated their interest and support. In Asia, an important

indication of this support has been the continued interest of FAO and its Animal Production and Health Committee for Asia (APHCA) in the project. The presence of APHCA delegates at the workshop was most welcome. Further FAO support was evidenced by the invitation to the project leaders to address an FAO workshop on ‘Newcastle disease vaccines for rural Africa’ in Ethiopia in April 1991.

Large scientific projects rarely progress strictly to proposed timetables, and rarely bring all the answers that were anticipated. Perhaps vaccine projects are more difficult than most with ‘. . . no easy victories . . .’. We have shown that thermostable Newcastle disease vaccines can be produced and that they can protect chickens against virulent challenge, even when given on the feed. In some areas the project has progressed from the research phase to a development phase, requiring different sources of funding and deserving other forms of expertise. In other areas much research remains to be done, especially on delivery systems. Many people have contributed years of painstaking work to the project, in villages, in laboratories and at the computer. These efforts must eventually lead to an improved science of village chickens and to benefits for the villagers who own them.

As our project concludes, we can attempt an evaluation of our efforts. We know that the concept of a thermostable Newcastle disease vaccine is sound, and that oral vaccines based on these viruses can be highly protective. We acknowledge the need for further work, especially on food delivery systems. We have a greater appreciation and understanding of village chickens. These chickens, with Newcastle disease under effective control, will eventually contribute appropriately to the welfare of rural people. As a result of our project, the control of Newcastle disease in village chickens is changing in the countries that were involved. The governments in Malaysia, Philippines and Indonesia are actively planning or supporting larger trials or actual control programs with oral vaccines. In Sri Lanka and Thailand it may be more appropriate to deliver thermostable vaccines by conventional routes. Other countries, both in Asia and in Africa, are determined to take up our results to improve the performance of their village chickens.

I believe we have done something useful.

P B Spradbrow
University of Queensland