ND Vaccination In The Hatchery

UNTIL recently the presence of maternal antibodies in varying quantities in chickens from vaccinated parents has prevented active immunisation before 3-6 weeks of age.

But there are several advantages if chickens can be vaccinated against Newcastle Disease at one day old especially if they are vaccinated in the hatchery and the resulting protection will last for some length of time. The advantages are 1. ease of handling 2. no stress from application of Newcastle disease vaccines during the growing period 3. the earliest possible protection and 4. some relief to a vaccination programme which is already full.

During development work on oil emulsion vaccines, it was realised that the rate of release of antigen was relatively slow and that the nature of the emulsion had an effect on the rate of release. The possibility of making a vaccine which could be administered at day old and which would provide antigen when the chick was old enough to respond was investigated.

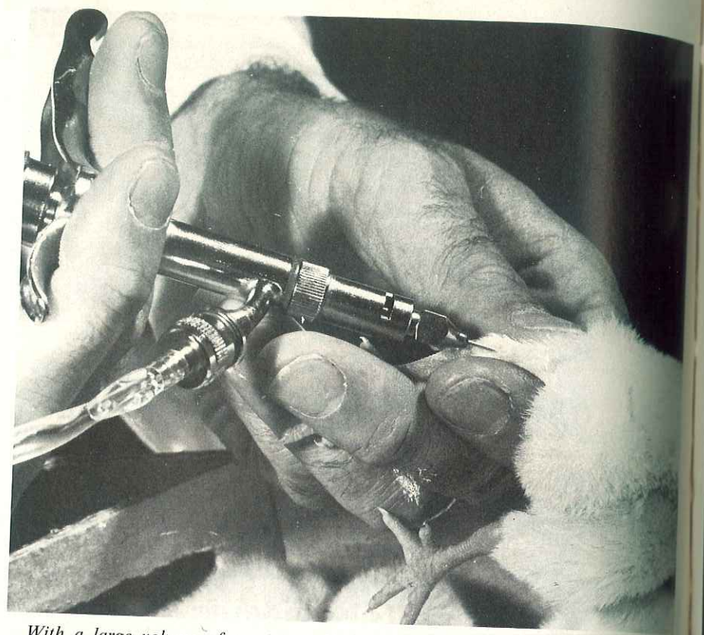
A series of experiments were designed to carry out the investigation. The chickens used were commercially available hybrids. The vaccines used were from experimental batches of allantoic fluid in oil emulsion, production batches of Newcadin Emulsion vaccine (Evans Medical Limited, Speke, Liverpool) and live Hitchner B1 vaccines (commercially available vaccines).

The earlier experiments in the series showed that chickens with high maternal antibody levels would only produce low HI titres in response to the oil emulsion vaccines given at day old. Although this response varied inversely with the maternal antibody level the titres reached would not have been acceptable where parent birds are normally well vaccinated and transfer antibodies to the chickens at a fairly high level.

The rate of release of antigen as judged by the onset of detectable antibodies in 6 week old chickens after vaccination could be varied by altering the nature of the emulsion but the amount of alteration possible was very small and not of practical use.

Experiments with vaccine of different potencies showed that the potency of the oil emulsion vaccine had a significant effect on the serological response of the chickens—as would be expected. Table 1 shows some of these earlier experimental results.

At the time of these experiments it was



With a large volume of vaccine, half should be injected in each leg. (Courtesy Burroughs Welcome)

TABLE 1 Serum BAI Antibody response of chickens with high & low maternal antibody levels, given oil emulsion vaccine with or without live attenuated vaccine at two days old. Results given as geometric mean titre (log base 2) from 20 birds per group

VACCINE GIVEN	AGE (DAYS)								
	2	7	14	21	28	35	42	49	56
0.5ml E1	4.2	1.0	1.9	3.3	5.2	6.3	5.1	6.5	4.5
0.5ml E1	7.6	6.1	4.4	1.3	1.4	2.4	3.1	3.6	2.7
0.5ml E2	7.7	4.8	4.2	1.0	1.0	1.0	1.0	1.0	1.0
0.5ml E1 + B1	8.1	5.6	4.5	3.9	4.3	6.1	6.2	5.3	5.0
0.25ml E1 +B1	7.4	5.5	5.4	2.1	3.1	4.4	5.7	4.5	5.2
UC	4.2	1.0	1.6	1.0	1.0	1.0	1.0	1.0	1.0
UC	7.2	5.6	3.4	1.0	1.0	1.0	1.0	1.0	1.0

E1 = High potency emulsion vaccine

E2 = Low potency emulsion vaccine

B1 = Live Hitchner B1 vaccine

UC = Unvaccinated controls

TABLE 2 The effect of Mareks disease vaccination on the BAI antibody response of chicks with oil emulsion killed NDV vaccine and live Hitchner B1 NDV vaccine at day old

Group Vaccn. Schedule	Log2 BAI (gmt) Antibody titre at age in weeks									
	0	1	2	3	4	7	19	12	14	18
MD OE/NDV B1/NDV	9.0	9.0	9.2	5.5	4.9	4.0	6.3	6.5	6.0	5.4
OE/NDV B1/NDV	9.0	8.6	10.6	5.4	4.6	3.5	7.3	6.5	6.1	6.0
Controls	9.6	8.1	9.6	5.2	3.7	1.0	1.0	1.0	1.0	1.0

MD = Mareks disease. OE/NDV = oil emulsion killed Newcastle disease vaccine. B1/NDV = live Hitchner B1 Newcastle disease vaccine.

TABLE 3 Serum antibody response in a flock given oil emulsion, and B1 vaccines and Mareks vaccine at one day old and with or without a booster dose of oil emulsion vaccine at 16 weeks of age.

Age in weeks	LOG2 HAI TITRES 1	1	2	3	4	5	6	7	8	9	10	11	12	13	mean titre
5			1	2	2	3	5	1	4	1	1				5.95
11*			3	1	1	4	4	4	2						5.32
16	1	1			3	2	2	4	3	1	2	1			6.35
20	2				1	1	6	4	5	1					6.10
20+										1	3	8	7	1	11.2

* Insufficient serum from one sample

\+ Birds which received 0.5 ml of Newcadin Emulsion at sixteen weeks.

not unusual for flock owners to administer live Hitchner B1 vaccine by spray to day-old chicks. Although this did not produce a serological response it was assumed that the chickens' defence against ND would be enhanced by a cell blocking or interference mechanism.

In one experiment it was decided to include this treatment in one group of birds along with the injection of Newcadin Emulsion vaccine. The various groups of chickens were monitored by testing weekly serum samples for HI antibodies. This showed that the group given both dead and live vaccine at day-old was giving a good response as is also shown in table 1.

Half a millilitre is a large quantity of material to inject into a day-old chicken's leg muscle and in the experiments was normally divided equally between the two legs. Further experiments showed that half this dose of a satisfactorily high potency vaccine was still effective, (table 1).

Further experiments to test this vaccination routine in chicks treated as they would be in normal commercial conditions included treatment with and without the administration of Marek's disease vaccine. A field trial on 6700 commercial replacement pullets was also carried out at this time and Tables 2 and 3 give the results of these.

There was no effect on the response to the Newcastle Disease vaccines from the concurrent administration of Marek's disease and the chickens grew well during the rearing period. The response to a further injection of 0.5 ml Newcadin Emulsion at 16-20 weeks was marked, achieving HAI titre levels well above the

ND-Impfung in der Brüterei

Zusammenfassung—Bis vor kurzem hat das Vorhandensein elterlicher Antikörper—in verschiedenen Konzentrationen—in den von geimpften Elterntieren abstammenden Küken eine aktive Immunisierung vor der 3. bis 6. Lebenswoche verhindert.

Einiges spricht aber dafür, wenn man Küken bereits am ersten Lebenstag gegen die Newcastle Krankheit impfen kann, vor allem, wenn die Impfung in der Brüterei erfolgt und der Schutz eine Weile vorhält. Die Vorteile sind 1. einfache Handhabung, 2. das Fortfallen der Bestressung durch die Newcastle-Impfung in der Aufzucht, 3. frühestmöglicher Schutz und 4. eine Entlastung des bereits überfüllten Impfprogramms.

Im Verlauf der Entwicklungsarbeiten an der Olemulsions-vakzine wurde man sich darüber klar, dass Antigene relativ langsam freigesetzt würden und dass die Art der Emulsion dieses Freisetzen beeinflusst. Die Möglichkeit, einen Impfstoff herzustellen, der, am ersten Tag verabfolgt, Antigene dann bereitstellt, wenn das Küken zur Reaktion alt genung ist, wurde untersucht.

Diese Untersuchung wurde mit einer Reihe von Versuchen durchgeführt. Bei den Tieren handelte es sich um gewerblich verfügbare Hybriden. Die verwendeten Impfstoffe stammten aus Versuchschargen aus Allantois-Flüssigkeit in Ömulsion, Produktionschargen des Newcadin Emulsion Impfstoffs (Evans Medical Ltd. Speke, Liverpool) und Lebendimpfstoff Hitchner B1 (gewerblich verfügbar).

Versuche mit Impfstoffen verschiedener Potenzgradigkeit zeigten, dass die Potenz der Olemulsionsimpfstoffe eine bedeutende Auswirkung auf die serologische Reaktion der Tiere ausübten, was zu erwarten war. Tabelle 1 enthält einige dieser im frühen Untersuchungsstadium erzielten Resultate.

1/2 ml ist sehr viel, wenn man diese Menge in die Beinmuskulatur eines Eintagskükens injizieren will; bei den Versuchen wurde die Injektionsmenge im allgemeinen zu gleichen Teilen zwischen beiden Beinen aufgeteilt. Weitere Versuche zeigten, dass die Hälfte dieser Dosis bei einem hochpotenten Impfstoff ausreicht (Tabelle 1).

Bei weiteren Experimenten wurde dieses Kükenimpfverfahren praxisnah untersucht—so wie es unter gewerblichen Bedingungen angewandt werden würde, mit bzw. auch ohne Marek-Impfung. Ein an 6700 gewerblichen Junghennenküken durchgeführter Feldversuch wurde gleichzeitig durchgeführt; die Resultat sind den Tabellen 2 bzw. 3 zu entnehmen.

Die Reaktion auf den Newcastle Impfstoff wurde durch gleichzeitige Verabfolgung eines Marek-Impfstoffs nicht beeinflusst; die Tiere zeichneten sich während der Aufzucht durch gutes Wachstum aus. Die Reaktion auf eine weitere Injektion von 0,5 ml Newcadin Emulsion bei 16 bis 20 Wochen war merklich; es wurden HAI-Titerwerte erheblich über den Minimalwerten erreicht, die generell als erforderlich erachtet werden—nicht nur als Schutz gegen Morbidität und Mortalität sondern auch als Schutz gegen einen möglichen Leistungsabfall bei einer Herausforderung durch Felderreger.

Vaccination MN Dans Le Couvoir.

Sommaire—Jusqu'à une date récente, la présence d'anticorps en quantité variable chez les poulets descendant de parents vaccinés empêchait une immunisation active avant 3-6 semaines.

Mais la vaccination des poussins à la naissance contre la maladie de Newcastle présente plusieurs avantages, particulièrement s'ils sont vaccinés dans le couvoir ce qui les immunisera pendant un certain temps. Les avantages sont: 1. facilité de manipulation, 2. pas de stress dû à la vaccination contre la maladie de Newcastle pendant la période de croissance, 3. protection très précoce, 4. allègement certain du programme de vaccination qui est déjà chargé.

Pendant les travaux sur les vaccins à émulsion huileuse, on a réalisé que la vitesse de libération des antigènes était relativement lente et que la nature de l'émulsion avait une influence sur cette vitesse de libération. On examina la possibilité de faire un vaccin qu'on pourrait administrer à la naissance et qui fournirait des antigènes quand le poussin serait assez vieux pour y être sensible.

Une série d'expériences furent conçues pour poursuivre les recherches. On utilisa comme poulets des hybrides commercialement disponibles. Les vaccins vinrent de lots expérimentaux de fluide allantoique dans une émulsion huileuse, de lots en production de vaccin Newcadin Emulsion (Evans Medical Limited, Speke, Liverpool) et de vaccins vivants Hitchner BI (vaccins commercialement disponibles).

Les expériences avec des vaccins de puissance différente ont montré que la puissance des vaccins à émul-

(S.V.P. voir page suivante)

minimum usually accepted as necessary to protect not only against morbidity and mortality but also against a drop in egg production on challenge by field infection.

Two further points may be of interest: Further monitoring of the flock which provided the figures for table 3 has shown that at 49 weeks of age the titres were averaging 7.9 and at 65 weeks 9. These are based on relatively small 20 bird samples but indicate that a satisfactory protection persists throughout laying. The other interesting point arose from a carefully controlled trial in broilers, carried out by one of the poultry companies, which showed that the day-old vaccinated birds made about £22.00 per 1000 more income than the birds vaccinated in their normal way. Even after allowing for the higher cost of the vaccine this still leaves a worthwhile extra contribution.

The results of these various experiments and trials indicate that it is possible to achieve protective HI antibody levels in growers by vaccinating day-old chickens and that this protection can last until the birds are given a further vaccination at point of lay to which the response is good. However, they do not show why these results are obtained.

It neutralises the passive maternally derived antibodies allowing the inactivated antigen, which is persistent in the oil emulsion, to produce an immune response. Since the initial decline in antibody level appears to be the same in controls and treated birds, this seems an unlikely explanation.

It is more probable that there is an immunological stimulation by the live vaccine in the young chicken which allows the active immunity to develop.

This method of vaccinating day-old chickens which can be done at the hatchery has several attractions if used in breeding and laying flocks.

—Dr W.W. Robertson

(The author is a scientist working with Evans Biologicals Ltd, Speke, Liverpool, UK—Editor)

sion huileuse avait un effet significatif sur la réponse sérologique des poulets—comme on s'y attendait. Le tableau I montre quelques uns de ces premiers résultats expérimentaux.

Un demi millilitre est une quantité importante de liquide à injecter dans le muscle de la patte d'un poussin d'un jour et pendant les expériences, on divisa généralement d'une façon égale cette quantité entre les deux pattes. Les expériences suivantes montrèrent que la moitié de cette dose avec un vaccin suffisamment fort, était encore efficace (tableau I).

D'autres expériences faites pour tester cette technique de vaccination chez des poussins traités comme ils le seraient dans des conditions commerciales normales incluent le traitement avec et sans l'administration du vaccin contre la maladie de Marek. Une expérience fut réalisée à cette occasion sur 6700 poulettes commerciales de remplacement et les tableaux 2 et 3 en donnent les résultats.

Il n'y a pas eu d'influence sur la réaction aux vaccins contre la maladie de Newcastle suite à la vaccination simultanée contre la maladie de Marek et les poussins ont normalement grossi pendant leur période de croissance. La réaction à une injection supplémentaire de 0,5 ml de Newcadin Emulsion à 16-20 semaines fut prononcée, donnant des taux de HAI bien au-dessus du minimum généralement accepté comme nécessaire pour protéger non seulement contre la morbidité et la mortalité mais aussi contre une baisse de la production des oeufs pendant une infection.

Vaccinazione contro la pseudo-peste nell-incubatoio

Riassunto—Fino a poco tempo fa la presenza di anticorpi materni in varie qualità di pulcini, provvenienti da genitori vaccinati, ha evitato l'immunità attiva prima di 3'-6 settimane d'età.

Ma la vaccinazione di pulcini contro la pseudo-peste all'età di un giorno comporta parecchi vantaggi, specialmente se sono vaccinati nell'incubatoio, e se l'immunità che posseggono, durerà un certo periodo. I vantaggi sono: 1. facile manipolazione, 2. i pulcini non subiscono stress causato dalla somministrazione del vaccino contro la pseudo-peste durante la crescita, 3. una immunità assicurata ad una età molto giovane, 4. una certa faclitazione del programma di vaccinazione, che é già molto esteso.

Durante lo sviluppo di vaccini a base di emulsione d'olio, é stato constatato che la rapidità di produzione di antigeni era relativamente lenta e che la natura dell'emulsione aveva un effetto sulla rapidità di questa produzione. E' stata esaminata la possibilità di produrre un vaccino, che puo' essere somministrato all'età di un giorno e che puo' dare antigeni al pulcino, se ha l'età di reagire.

E' stata effettuata una serie di esperimenti per studiare questa questione. I pulcini usati per questo scopo erano ibridi commerciali. I vaccini usati provenivano da carichi esperimentali di liquidi allantoici in emulsione d'olio, da carichi di produzione del vaccino a base di emulsione Newcadin (Evans Medical Limited, Speke, Liverpool) e da vaccini vivi Hitchner B, (vaccini venduti nel commercio).

Esperimenti con vaccini con diverse potenze hanno mostrato che la potenza del vaccino a base d'emulsione d'olio aveva un effetto importante sulle reazioni sierologiche del pulcino, come era da aspettarsi. La tabella 1 mostra alcuni di questi risultati anteriori.

Un mezzo millilitro é una grande dose da iniettare in un muscolo della zampa di un pulcino di un giorno e durante gli esperimenti questa dose veniva divisa ugualmente tra le due zampe. Altri esperimenti hanno mostrato che la metà di questa dose di un vaccino molto potente era sempre efficace (tabella 1).

Altri esperimenti per provare questo programma di vaccinazione con pulcini, trattati come se fossero in normali condizioni commerciali, comprendevano trattamento con e senza la somministraaione del vaccino Marek. E' stato fatto anche una prova nel campo con 6700 pollastri commerciali e nella tabella 2 e 3 sono annotati i risultati.

La somministrazione del vaccino contro la pseudo-peste non ha alcun effetto se somministrato simultaneamente al vaccino Marek e i pulcini crescevano bene durante il periodo d'allevamento. E' stata registrata la reazione ad una seguente iniezione di 0.5 ml emulsione Newcadin all'età di 16-20 settimane e sono stati raggiunti livelli del titolo HAI ben al di sopra del minimo accettato normalmente e necessario per la protezione non solo contro la morbidità ma anche contro una diminuzione della produzione d'uova, in caso di esposizione nel campo.

Vacunación Contra Newcastle En El Criadero

Resumen—Hasta época reciente, la presencia de anticuerpos en cantidades varias en gallinas, de progenitores vacunados, ha impedido la inmunización activa antes de las 3-6 semanas de edad.

Sin embargo, hay varias ventajas si se pueden vacunar las gallinas contra Newcastle al día de edad, especialmente si son vacunadas en el criadero, durando esta protección cierto tiempo. Las ventajas son: 1. facilidad de manipulación; 2. no hay tensión con la aplicación de vacunas contra Newcastle durante el período de desarrollo; 3. la protección más temprana posible; y 4. algún alivio para el programa de vacunación, que ya es completo por sí mismo.

Durante los trabajos para desarrollar vacunas con emulsión de aceite, se comprendió que el régimen de desprendimiento de antígeno era relativamente lento y que la naturaleze de la emulsión surtía cierto efecto en el régimen de desprendimiento. Se examinó la posibilidad de componer una vacuna que pudiese ser administrada al día de edad y suministrase antígeno cuando el pollito tenía edad suficiente para responder.

Se destinó una serie de experimentos a realizar la investigación. Las gallinas usadas fueron híbridas disponibles comercialmente. Las vacunas usadas, fueron de lotes experimentales de fluido alantoico en emulsión de aceite, lotes de vacuna de emulsión de Newcadin (Evans Medical Limited, Speke, Liverpool) y vacunas de virus vivo Hitchner B1 (vacunas comercialmente disponibles).

Los experimentos hechos con vacunas de diferentes potencias indicaron que la potencia de la vacuna de emulsión de aceite tenía un efecto significativo sobre la reacción serológica de las gallinas, tal como se debía anticipar. La Tabla 1 muestra algunos de los primeros resultados experimentales.

Medio mililitro es una cantidad grande de material para inyectar en el músculo de la pierna del pollito de un día de edad, y en los experimentos se dividió normalmente en partes iguales entre las dos piernas. Nuevos experimentos revelaron que la mitad de esta dosis de una vacuna de suficiente potencia era todavía efectiva (tabla 1).

Nuevos experimentos ulteriores para probar esta rutina de vacunación en pollitos tratados como lo habrían de ser en condiciones comerciales normales, incluyeron el tratamiento con y sin la administración de vacuna contra Marek. Se efectuó también en esta oportunidad una prueba práctica con 6,700 pollonas de reposición comerciales, y se muestran los resultados en las Tablas 2 y 3.

No hubo ningún efecto en la reacción a las vacunas contra Newcastle, con la administración concurrente contra Marek, y las gallinas crecieron bien durante el período de desarrollo. La reacción a una inyección adicional de 0.5 ml. de Emulsión Newcadin a las 16-20 semanas fue marcada, logrando niveles de titulación HAI muy arriba del mínimo que generalmente se acepta como necesario para proteger, no solo contra la mortalidad y morbidez, sino también contra una reducción en la producción de huevos en retos por infección práctica.