The Role of Vaccination & Lab Monitoring in The Control of Poultry Diseases.

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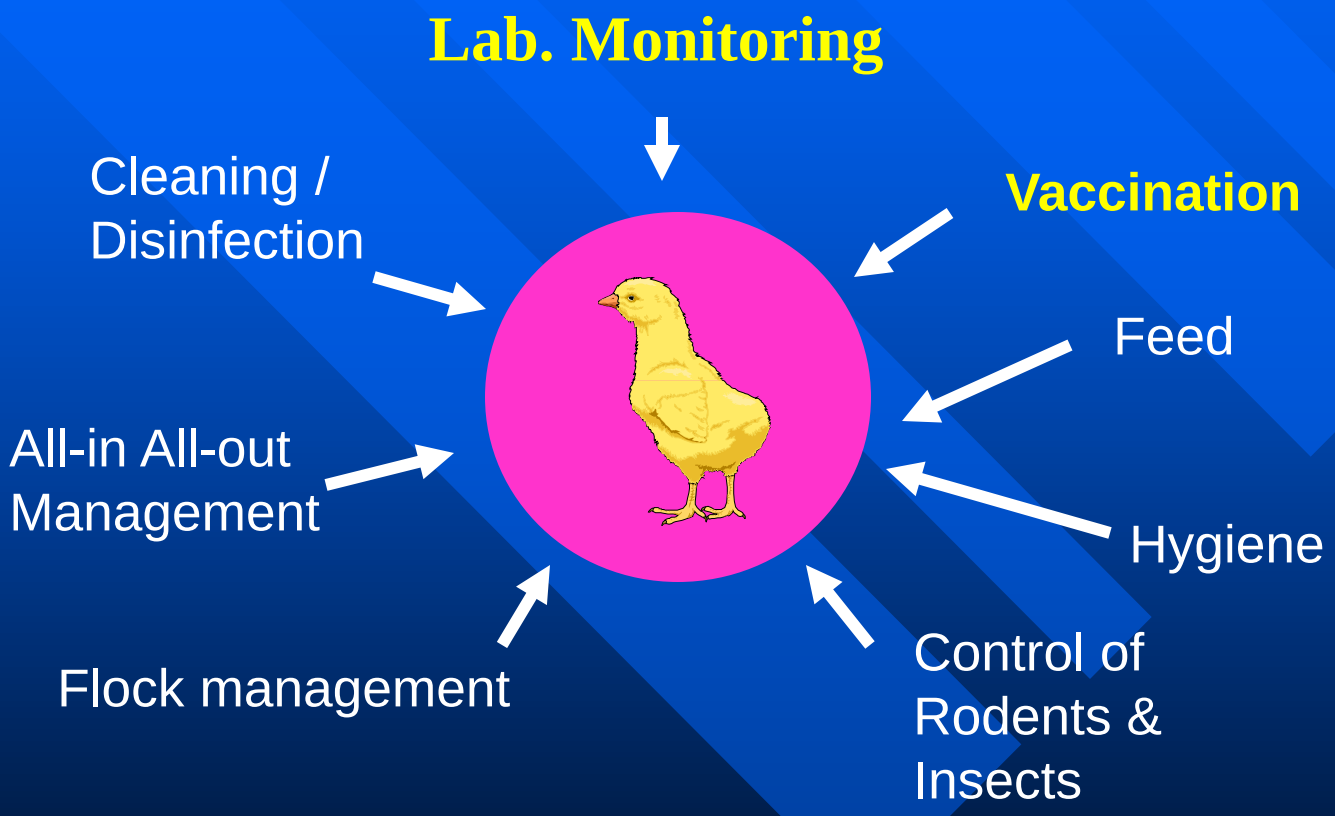
Vaccination & Lab Monitoring



Health is a balance

Disease agents:

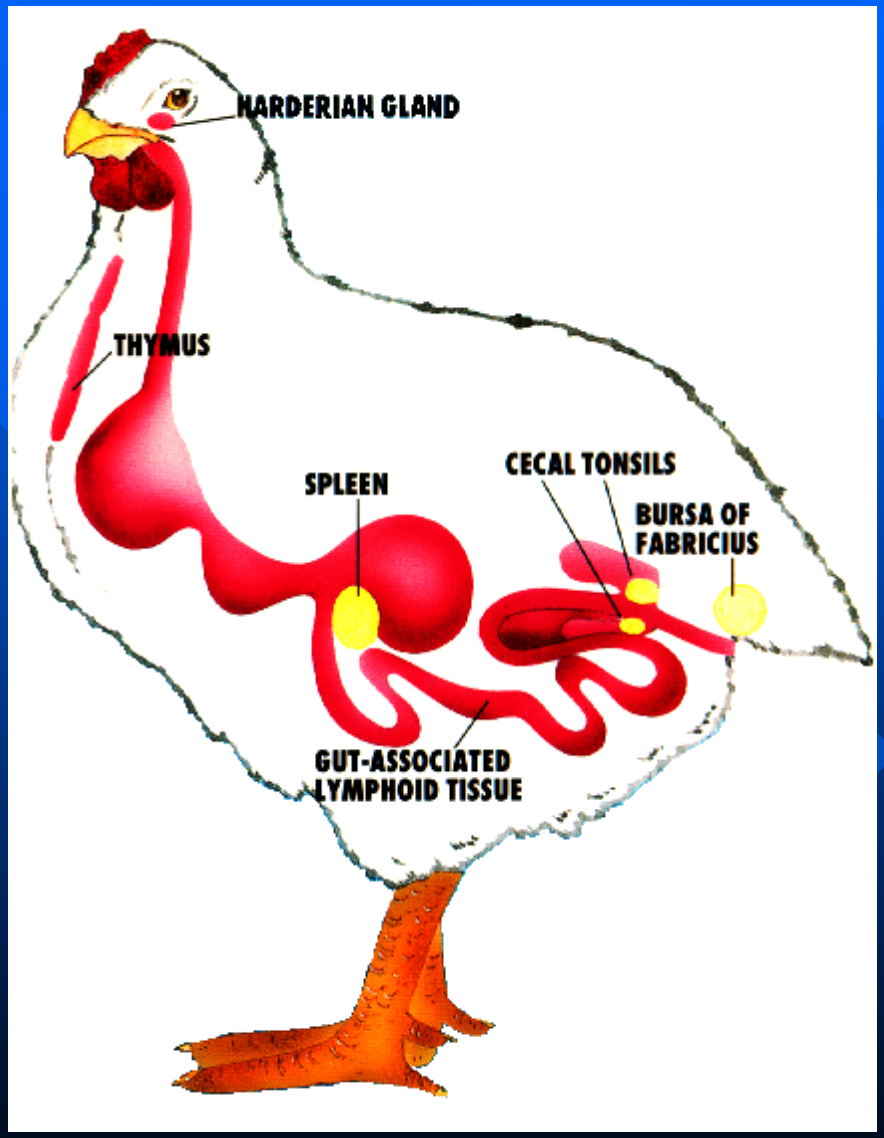
- Deficiencies
- Toxins
- Viruses
- bacteria
- Parasites

Resistance:

- Good feed
- intestinal flora
- Immunity
  * Local
  * Systemic

Defense System of Chickens against Infections

Specific Immune System



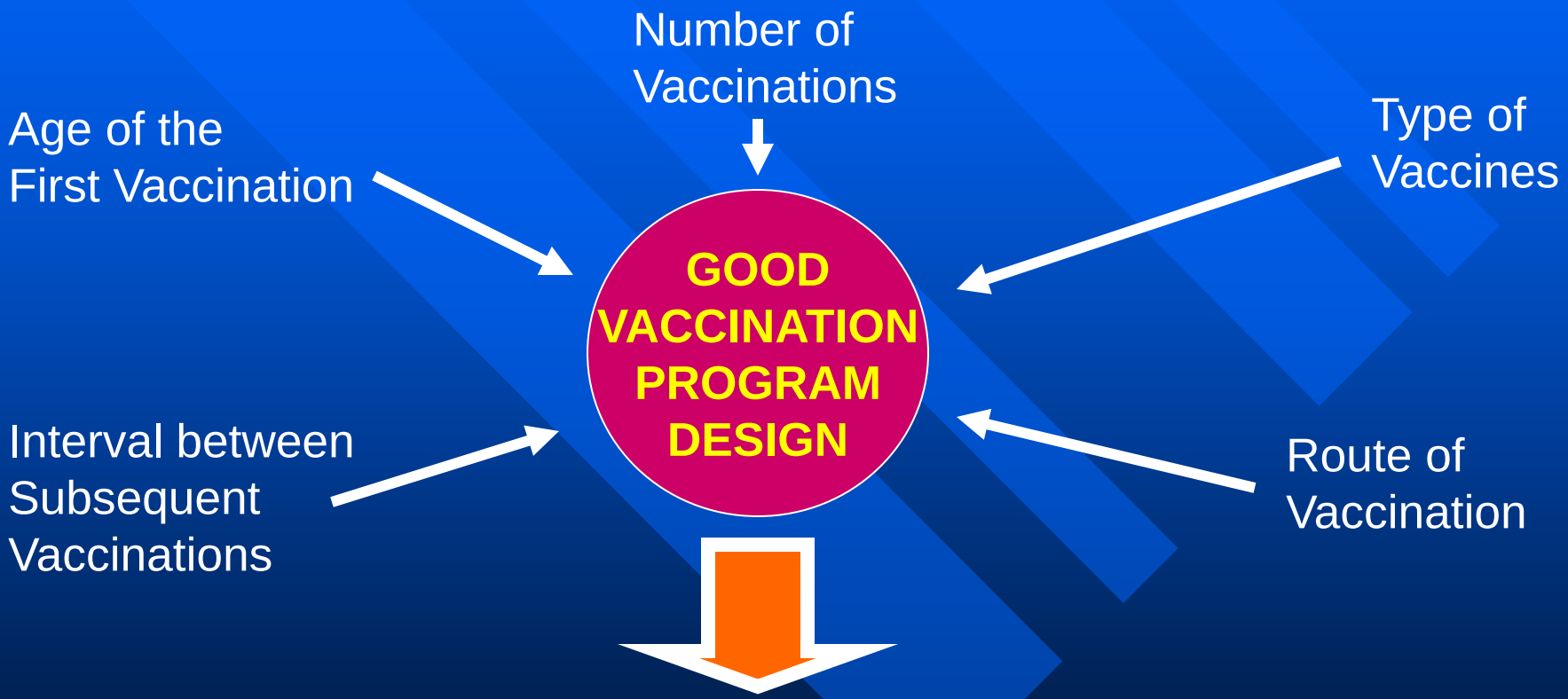
Defense System of Chickens against Infections

Specific Immune System

- Primary Organs
  - Thymus gland
    - » T-cell system
    - ➲ cell-mediated immunity
  - Bursa of Fabricius
    - » B-cell system
    - ➲ humoral immunity
  - Bone marrow
    - » Precursor blood cells
  - Yolk sac
    - » Maternal immunity
- Peripheral lymphoid tissue
  - Harderian gland
  - Caecal tonsilles
  - Spleen
  - GALT

Basics of Vaccination in Poultry

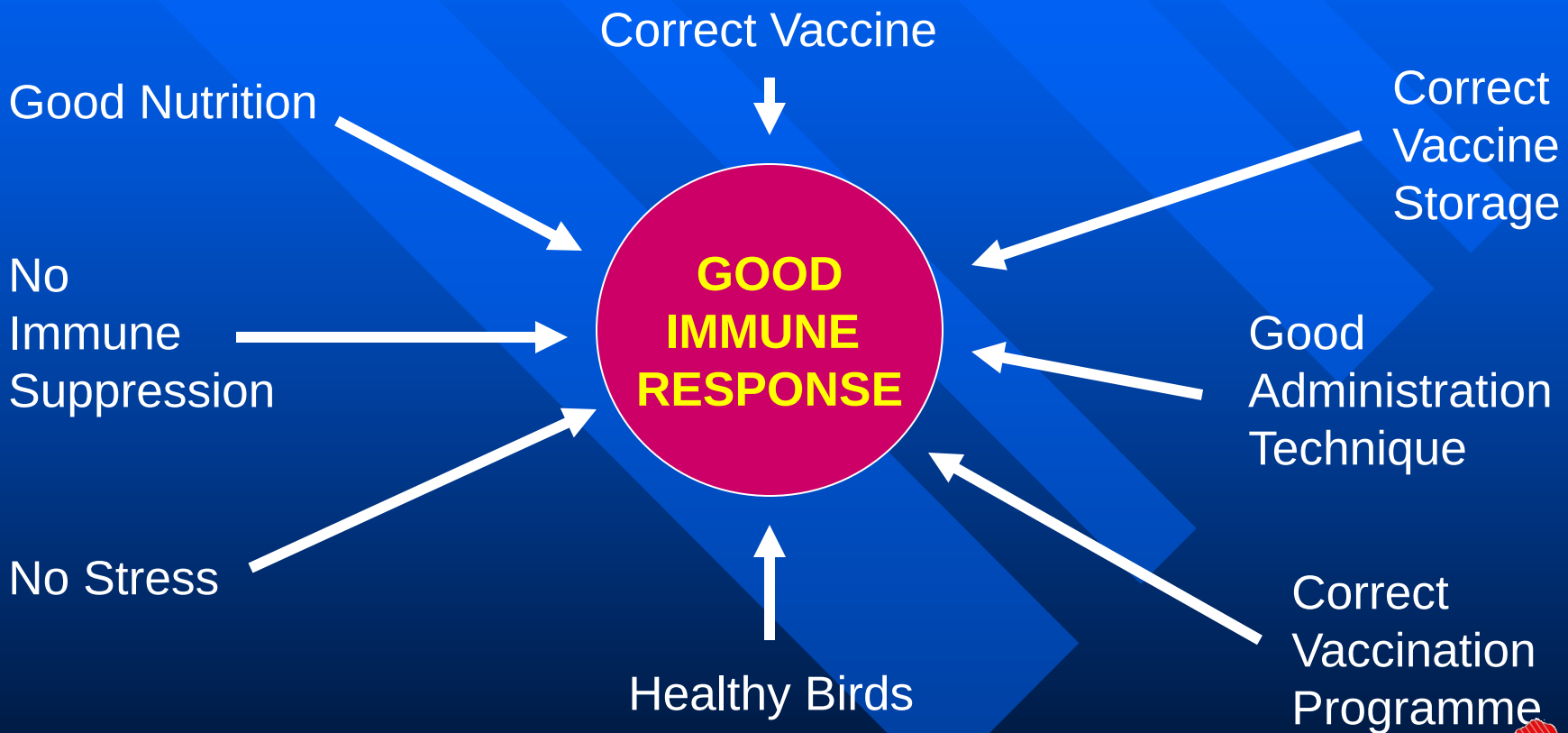
Elements of a Vaccination Program



1. Stimulation & Maintenance of Protective Immunity
2. Development of Immunologic Memmory

Basics of Vaccination in Poultry

Requirements for Good Immune Response



Basics of Vaccination in Poultry

Possible Reasons of Vaccination Failures

- Administration of a sub-optimal dose of vaccine.
  - Poor vaccine quality (rare).
  - Improper handling of the vaccine during transport and storage.
  - Errors in the vaccination technique.
- Immune suppression.
  - Immune suppressive viral infections.
  - Stress.
  - Mycotoxines.
- High levels of maternal antibodies.
- Strong field challenge.

Basics of Vaccination in Poultry

Possible Reasons of Vaccination Failures

- The causative agent is not covered by the used vaccine (e.g. IBV variants, AIV subtypes, E. coli serotypes).
- Vaccination is too late.
  - Birds are already infected at time of vaccination.
  - Field infection occurs before development of vaccinal immunity.
- Weaning of vaccinal immunity after time.

Basics of Vaccination in Poultry

Live Vaccines

- Advantages
  - Create complex immunity
    - » Humoral + cell-mediated.
    - » Different classes of antibodies.
  - Rapid onset of vaccinal protection.
  - Easy mass application.
  - No adjuvans needed.
  - No hypersensitivity reactions.
  - Production in big quantities.
- Disadvantages
  - Vaccine agent is present in poultry population.
  - Possibility of shedding of the vaccine agent.
  - Post vaccinal reactions are possible.

Basics of Vaccination in Poultry

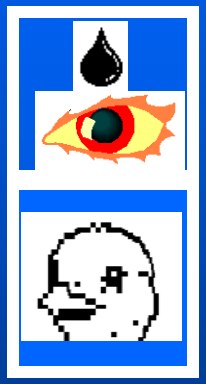
Inactivated Vaccines

- Advantages
  - No introduction of a “new living agent”.
  - No shedding of the vaccine agent.
  - No post vaccinal reactions.
  - Accurate individual vaccination.
- Disadvantages
  - Reactions of hypersensitivity possible.
  - Slow onset of protection.
  - Humoral immunity only.
  - High labour costs for application.
  - Expensive production of high quality vaccines.

Basics of Vaccination in Poultry

Methods of Vaccine-Application

- Individual Applications:



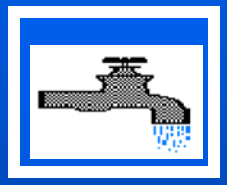
  - Eye drop vaccination
    - ➔ Very efficient.
    - ➧ Highly labour intensive; use only specific diluent.

  - Wing web, i.m. & s.c. injection
    - ➔ Very efficient.
    - ➧ Highly labour intensive; use only sterile equipment and specific diluent for live vaccines.

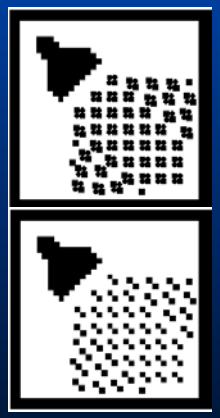
Basics of Vaccination in Poultry

Methods of Vaccine-Application

- Mass-Applications:



  - Drinking water vaccination
    - ➔ Rapid, easy, very economical, safe.
    - ↳ No disinfectants; control water quality; control water system and drinker.



  - Spray vaccination
    - ➔ Rapid, good immune response.
    - ↳ Post vaccinal reactions possible (esp. in Mg+); use distilled water only; large drops for young chicken and small drops for old chicken; control correct function of equipment.

Lab Monitoring

Main Tasks For Veterinary Labs (Poultry Dept.):

- Organized disease control program.
- Early Warning System (EWS).
  Corrective Action can be taken before disease / production losses.
- Measuring of Vaccination Performance. (Performing Q C on Vaccine quality, Vaccine application &Vaccination method).
- Diagnostic Services.
- Research on infections.

Example for Organized Monitoring Program Breeders / Layers

Age	Sample	Test
Day 1	-Transfer box paper - Serum	- Salmonella. - MG – IBD – SE-SP/G - AI
Week 9	- Cloaca swabs - Serum	-Salmonella - ND – IBV - etc
Week 16	- Droppings - Serum	-Salmonella - Se/St- MG –ND – AI -etc
Week 22	- Droppings - Serum	-Salmonella - SP/G-ND – AI – MG -etc
Week 45	- Droppings - Serum	-Salmonella - Se/St- MG –ND – AI -etc
Week 62	- Droppings - Serum	-Salmonella - Se/St- MG –ND- AI -etc

Example for Organized Monitoring Program Broilers

Age	Sample	Test
Day 1	-Transfer box paper - Serum	- Salmonella. - MG – IBD - AI
- 10 days before exit	- Droppings	- Salmonella
- Marketing Age	- Serum	- ND – IBV – AI - IBD

Example for Organized Monitoring Program

Slaughter house

Time	Sample	Test
Entrance	Caecal Content	- Salmonella. - Campylobacter
Exit	Neck Skin	- Salmonella

Serological Monitoring

Most Important serological tests

1- Hemagglutination Inhibition test (HI).

2- ELISA (indirect).

3- Rapid plate agglutination test (RPA).

4- Agar gel precipitation test (AGPT).

When Conducting Serological monitoring has to know 2 basically things:-

1- Must know what result to expect prior to testing

(Set Standards for Successful Vaccination)

2- Must know what action to take if results are not according expectation.

Interpretation of vaccination results by ELISA is usually done by evaluating the 3 main key components of immune response after vaccination, which are:-

1- **Intensity of Response**:-

As indicated by the **Mean Titer**.

Do the birds develop sufficient titers levels that are in the expected range for the vaccine used? These expected titers following vaccination are often called **“ Baseline Titers”** these Baseline titer values may vary according to type of bird , age , vaccine type , vaccination program, and other factors. Therefore, one should make their own baselines for there own vaccination programs and local conditions.

2- Uniformity of Response:-

As indicated by the **% CV**.

Is the vaccine actually getting to the all birds or not.

The general guidelines for % CV following vaccination are as follows:-

% CV	Uniformity
Less than 30 %	Excellent
From 30-50 %	Good
Greater than 50 %	Need to Improve

Persistency of Response:-

As indicated by **Mean Titer response over Time**

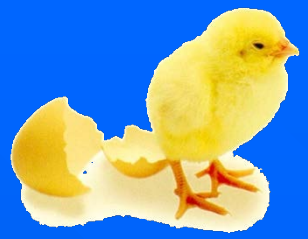
Do titers persist long enough over time, or is another vaccination needed to boost titers above minimum protective levels.

Examples of Vaccination Baselines Titers in Broiler:-

Test	Vaccine Type	Mean titer range at 35 - 40 D	Suspect Titer Infection
NDV	-Live, 2x D.W	2000 – 5000	More than 7000
	-Live, 2x Spray	4000 – 8000	More than 10000
IBV	-Live, 1x (H120)	800 – 1500	More than 3000
	-Live, 2x (H120)	2000 – 4000	More than 6000
IBD	-Live, 1x (intmed.)	2500 – 4500	More than 7000
	-Live, 2x (intmed.)	3000 – 6500	More than 9000

Examples of Vaccination Baselines Titers in layers or Breeders:-

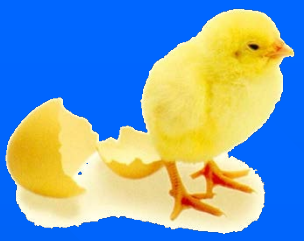
Test	Vaccine Type	Mean titer range	Wks after Vac. To test
NDV	-Live (Lasota)	2000 – 8000	2 – 3 wks
	-Inact.	10000 – 15000	4 – 7 wks
IBV	-Live (H120)	2000 – 4000	3 – 5 wks
	-Inact.	6000 – 17000	5 – 7 wks
IBD	-Live (intmed.)	2500 – 7000	3 –5 wks
	-Inact.	7000 – 12000	4 – 7 wks



Microbiological Monitoring of Hatchery

-Hatcheries need a continuous program to monitor the microbial populations in the hatchery.

-Monitoring the hatchery at least every 6 -8 weeks.

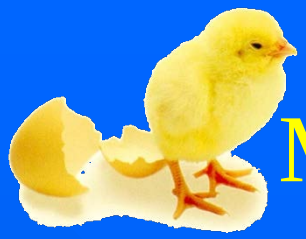


Microbiological Monitoring of Hatchery

-Take samples from every area in the hatchery and equipments.

- Some of more important area to be monitored include:

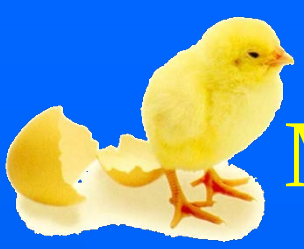
- Air intake & outlets, Setters, Hatchers, Air in chick holding and egg storage room, Tray wash area, water, and vaccination equipment.



Microbiological Monitoring of Hatchery

Samples Required:

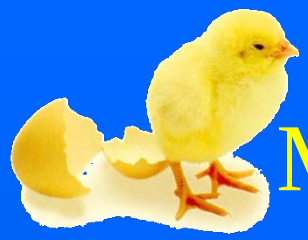
- Swab method for counting
- Air Samples.
- Egg shell monitoring by rolling method.
- Fluff samples (Bacterial count – Salmonella)
- Stamping with plate count agar (Rodac method)
- Sterility testing for vaccine equipments.
- Chicks (cull Chicks for Salmonella testing)



Microbiological Monitoring of Hatchery

- Interpretation:
- Swab counting method.
- Swab from a tow inch square area:

- Less than 10 colonie → Good.
- 10 –30 colonie → Moderate.
- Above 30 colonie → Heavy Contamination

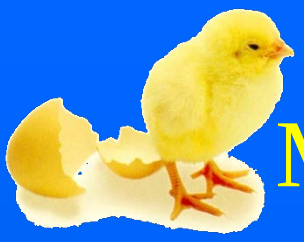


Microbiological Monitoring of Hatchery

- Interpretation:

- Air Samples Count (Salder, 1975).

Bacterial Colony Count		Score
Setters	Rooms	
0 – 10	0 - 15	1- Excellent
11 – 25	16 - 36	2- Good
26 - 46	37 – 57	3- Average
47 – 66	58 – 76	4- Poor
67 or more	77 or more	5- Bad



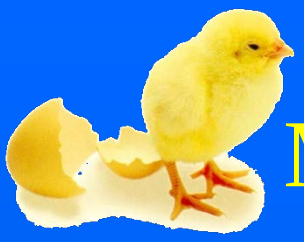
Microbiological Monitoring of Hatchery

- Interpretation:

- Fluff samples (Microbial counts /gram). (Magwood .

- 1962)

Bacterial Colony Count	Score
-25,000	Excellent
- 50,000	Good
- 100,000	Fair
100,000 +	Poor



Microbiological Monitoring of Hatchery

- Interpretation:

- Stamping with plate count agar (Rodac method) . (Stinson and Tiwari, 1978).

Bacterial Colony Count	Score
0 – 5	Excellent
6 – 15	Good
16 – 30	Fair
31 – 50	Poor
50 +	Unacceptable

Conclusion

Vaccination & Laboratory Monitoring
a very effective tools to control infectious diseases in poultry.

Thanks for your Attention