Introduction

– Overview of books and journals on avian medicine
– Psittacine nutrition and related diseases
– Diseases discussed by presenting signs

Books and Journals

Avian Medicine: Principles and Application
Ritchie, Harrison & Harrison (Eds)
Wingers Publishing Inc.
Currently available through:
http://www.exoticdvm.com
Books and Journals

Avian Medicine and Surgery
Altman, Chubb, Dorresteijn & Quesenberry (eds)
WB Saunders
ISBN: 0721654460

Books and Journals

Exotic Animal Formulary
Third edition
Carpenter (ed).
WB Saunders
ISBN: 0721601804

Books and Journals

Clinical Avian Medicine
Two volumes
Harrison & Lightfoot (eds)
Available through:
http://www.exoticdvm.com
### Food sources for wild psittacines

- Seeds (dependant on season)
- Flowers + Nectar
- Insects + Larvae
- Fruits + Nuts
- Leaves
- Bark
- Clay
Why are psittacines fed seeds?

- Cheap
- Easy to store
- Easy to transport
- It is readily eaten by psittacines

Why is a diet of JUST seeds insufficient?

- Seeds are deficient in at least 21 nutrients

Why can “seed eaters” survive in nature?

- Kirk Klasing
- Seed eaters:
  - Predominantly eat young/green seeds
  - Rich in vitamins and minerals
  - Are a lot more active in nature
  - Intake of seeds is much higher (they need more energy)
  - With the higher intake of seeds more vitamins and minerals are consumed
  - Live outdoors
  - UV-light results in adequate synthesis of vitamin D
### Potential supplementation of seed based diet

- **Sprouting seeds**
  - Advantage
  - Readily eaten
  - Proteins are better utilized
  - Stimulates reproduction
  - Disadvantage
  - Does not compensate for all deficiencies
  - Risk of under and over dosing

- **Vitamins**
  - Does not compensate for all deficiencies
  - Risk of under and over dosing

- **Fruits and vegetables**
  - Not rich enough to compensate for deficiencies

- **Eggfood**
  - Relative good source of supplementation

### Risk of providing supplemented diets

- **Cafeteria style feeding**
  - Bird selects what it likes
  - Dominant bird prevents consumption of all nutrients in subordinate birds
  - Preferences vary between birds
  - Does a bird know what it needs?????

- **Frequently seen diet related diseases**
  - Hypovitaminosis A
  - Hypocalcemia / hypovitaminosis D₃

### Diet related diseases

- **Hypovitaminosis A**
  - Chronic / recurring infections
Diet related diseases

- Hypovitaminosis A
  - Chronic / recurring infections
  - Respiratory fungal infections (aspergillosis)

- Egg binding

- Gout (obstruction ureters)
Diet related diseases

- Hypovitaminosis A
  - Chronic / recurring infections
  - Respiratory fungal infections (aspergillosis)
  - Egg binding
  - Gout (obstruction ureters)
- Hypocalcemia / hypovitaminosis D$_3$
  - Secondary hyperparathyroidism
  - Osteomalacia
  - Hypocalcemia syndrome African Grey Parrot

African Grey Parrot (falls from perch)

- DDx falling from perch
  - Cardiac disease
  - Lead intoxication
  - Hypocalcemia
    - Typical for African Grey Parrot
- Cause
  - Hypocalcemia due to:
    - Calcium deficient diet (SEED)
    - Lack of vitamin D$_3$ (sun light)
African Grey Parrot (falls from perch)

- Diagnosis
  - Plasma calcium below 2 mmol/L (ref. 2.1 – 2.6 mmol/L)
  - Ionized calcium below 1.2 mmol/L

- Treatment
  - Ca-borogluconate (50 – 100 mg/kg IM)
  - Extra calcium added to the diet
  - Multi-vitamin injection (incl. vit D<sub>3</sub>)
  - Switch to a complete (extruded) diet (after recovery)

Diet related diseases

- Most important consequences of a deficient diet
  - Suboptimal functioning
  - Decreased egg production
  - Decreased breeding results
  - Decreased resistance to infections
  - Decreased feather quality
  - Etc.

Problems usually occur when it is too late!

Extruded diets

- Advantages
  - Contains all nutrients in correct quantities (?)
  - Bird cannot select between different ingredients
Extruded diets

- Disadvantages
  - Boring
  - "Not a "natural" diet

Enrichment

- In zoos they often use food
  - "puzzles"

Advice from avian veterinarians

- Extruded diets are advised
- Choice of brand is based on personal preferences
  - Food coloring
  - Smell of the food
  - Organic or not
- Composition of extruded diets can be improved
- Addition of seeds, nuts, vegetables and fruit is possible
- Enrichment
  - Branches, paper etc. to chew on
  - Food puzzles
The weak parrot

Example history
- 4-year-old blue and gold macaw
- Bought one week ago in pet shop
- Since 3 days ruffled feathers
- Since 2 days anorexia
- Nasal and ocular discharge
- Uses upper beak to remain perched
- Green urates in feces

Important points within the history
- Recently bought bird
- In general: a sick bird
- Green urates $\Rightarrow$ Severe liver failure
- With this history one HAS to think about:

PSITTACOSIS

Causative agent:
- Chlamydophila psittaci (formerly Chlamydia psittaci)

ZOONOSIS $\Rightarrow$ Reportable disease

Therefore: Do your diagnostics FIRST
Diagnostics

- Take a swab from the:
  - Conjunctiva
  - Choana
  - Cloaca
PSITTACOSIS

The weak parrot

- Diagnostics
  - QuickVue® [ELISA] (antigen)
  - Cloaca swab

Prof. Dr. D. Vanrompay
Universiteit Gent, Fac. bio-ingineriën en technieken
Vakgroep Moleculaire Biotechnologie
Coupure Links 653
9000 Gent, Belgium
Intermezzo (protein electrophoresis)

Protein electrophoresis provides good indication of humoral response

- Albumin
  - (Biochemical analysis does not give reliable results)
- Globulins
- Total protein
- Albumin / globulin ratio

<table>
<thead>
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The weak parrot

PSITTACOSIS

- Therapy
  - Individual
  - Doxycyclin 75-100 mg/kg IM (once per week, 5 weeks)
  - ONLY Vibramycine IV (Pfizer) may be used
  - Aviary
    - Medicated food (Roudybush?)
    - doxycycline hyclaat, 800 mg/l through the drinking water

- Boarding ?
  - Very contagious
  - Zoonosis

- When anorexia => force feeding
**Budgy with crusts**

- **Description**
  - Budgerigar
  - Male
  - 0.5 years of age
- **History**
  - Progressive formation of crusts around beak and legs

- **Diagnostics**
  - Skin scraping
- **Diagnosis**
  - Knemidocoptes laevis
- **Therapy**
  - Ivermectin 0.2 mg/kg SC
  - 1 gtt Ivermectin 0.1 % topically

**Antiluchtpijpmijt (Bogena)**

**Alopecia in a parrot**

**Causes of alopecia**

- **Infectious**
  - Viral
  - Parasitic
    - Giardia (Cockatiel)
  - Bacterial
  - Fungal
- **Hormonal** (hypothyroidism)
- **Plucking**
  - Automutilation
  - Partner
Alopecia in a parrot (PBFD)

Psittacine Beak and Feather Disease (PBFD)
- Circovirus infection

Wild cockatoos in Australia are infected

Symptoms (classic)
- Loss of feathers over entire body
- Abnormal feathers
- Affected upper beak
- Discoloration of feathers

The birds are usually younger than 3 years of age

Alopecia in a parrot (PBFD)

Symptoms (acute)
- African Grey Parrots
- Younger than 6 months of age
- Acute onset of symptoms
  - Anorexia
  - Vomiting
- No feather abnormalities
Alopecia in a parrot (PBFD)

- **Diagnostics**
  - Parrot with feather abnormalities
    - Symptoms
    - PCR from heparin blood
    - Skin biopsy of affected feather follicle
  - Parrot without feather abnormalities (p.
    - When positive; recheck in 90 days
  - Young African Grey Parrot
    - PCV and leucocytes (leucopenia!)

- **Symptoms**
  - PCR from heparin blood
  - Skin biopsy of affected feather follicle
  - Young African Grey Parrot
    - PCV and leucocytes (leucopenia!)

- **Prognosis**
  - Usually birds die within one year after diagnosis

Alopecia in a parrot (PBFD)

- **Therapy**
  - None

- **Prognosis**
  - Usually birds die within one year after diagnosis

Respiratory distress

- **Differential diagnosis**
  - Respiratory system
    - Upper respiratory tract (up to the syrinx)
    - Lung and airsacs (usually a more chronic presentation)
  - Circulatory system
    - Space occupying mass (within celomic cavity)
Respiratory distress

- Upper airways
  - Nares
  - Sinuses
  - Trachea (obstruction)

- Distend during respiration
- Very difficult to empty due to tracheal obstruction
- Open beak breathing
- Starts with change of voice
- Followed by open beak breathing
- In combination with clearly audible respiratory stridor

- Flushing of the sinuses
Respiratory distress (tracheal obstruction)

- Diagnostics
- Radiograph
- Tracheoscopy

No diagnostic value
It does have a prognostic value
Respiratory distress (tracheal obstruction)

- Diagnostics
  - Radiograph
  - Tracheoscopy
  - CT-scan

Respiratory distress (initial treatment)

- Respiratory distress:
  - Extra oxygen!!!!!

Never use corticosteroids in birds

Respiratory distress (tracheal obstruction)

- Therapy
  - Placement of airsac tube
Respiratory distress (tracheal obstruction)

- Therapy
  - Placement of airsac tube
  - Try to suck up the obstruction
- Medication
  - Itraconazole (10 mg/kg 1q24h PO, minimally 1 month)
  - Side effects seen in African Grey Parrots: vomiting and anorexia
  - Terbinfine: 10 – 15 mg/kg q24h PO
Respiratory distress (tracheal obstruction)

- Therapy
  - Placement of airsac tube
  - Try to suck up the obstruction
  - Medication
    - Itraconazole (10 mg/kg 1q24h PO; minimally 1 month)
    - Side effects seen in African Grey Parrots
    - Terbinafin: 10 – 15 mg/kg q24h PO
    - Nebulise
      - Enolconazol (4µg/ml air) or Amphoteracin B (1 µg/ml)

Respiratory distress (lung disease)

- Diagnostics
  - Radiograph
  - CT
  - Clear lungs
  - Affected lungs
  - Widening of the distance between lung and wall of the thorax
Respiratory distress (lung disease)

- **Diagnostics**
  - Radiograph
  - CT
  - Blood examination
    - PCV, leucocytes + diff.
    - TP + spectrum
    - Albumin / globulin ratio
    - Uric acid, bile acids, ASAT, CK

- **Respiratory distress (lung disease)**

- **Blood examination**

- **Endoscopy**

- **Treatment**
  - Respiratory distress
    - Oxygen
  - Antibiotics such as (a minimal treatment of 2 weeks):
    - TMP/S (10 mg/kg q12h, PO)
    - Enrofloxacin (15 mg/kg q12h, PO)
    - Amoxicillin + clavulanic acid (100 mg/kg q8-12h, PO)
  - Antimycotics (minimal treatment of 4 weeks; in humans more than 6 months):
    - Itraconazol (10 mg/kg q24h, PO)
    - Terbinafin (10 – 15 mg/kg q24h, PO)
Respiratory distress (cardiac disease)

- History
  - Dyspneic
  - Chronic history
  - Fell from perch
  - Enlarged "abdomen"

- Diagnostics
  - "Abdominal" palpation
  - Auscultation of the heart
  - Abdominocentesis

- ECG
Respiratory distress (cardiac disease)

- Diagnostics
  - "Abdominal" palpation
  - Auscultation of the heart
  - Abdominocentesis
  - ECG
  - Ultrasound

Respiratory distress (cardiac disease)

- Treatment
  - Ascites
    - Furosemide (0.15 – 2 mg/kg q12-24h)
  - Cardiomyopathy
    - Digoxin (0.02 – 0.05 mg/kg q24h)
    - Enalapril (0.5 mg/kg q12h PO (empirical dose))
  - When the bird is too dyspneic
    - Euthanasia

Proventriculular dilatation disease

- Formerly known as:
  - Macaw wasting disease
  - Neuropathic gastric dilatation
  - PDD
Proventricular dilatation disease

- Susceptible species
  - Psittacines
  - Wild Canadian geese
  - Wild spoonbills
  - Weavers
  - Toucans

Proventricular dilatation disease

- Symptoms
  - Undigested seeds in the stool
  - Vomiting
  - Weight loss despite good appetite
  - Neurological signs
    - Tremors
    - Opisthotonus
  - Enlarged proventriculus on radiograph (next slide)
  - Mortality

Radiological diagnosis is: proventricular dilatation
This does not provide the clinical diagnosis!!
Proventricular dilatation disease

- Differential diagnosis
  - Heavy metal intoxication
  - Gastric foreign body
  - Gastric tumor
  - Macrorhabdus ornithogaster (megabacterium)
Proventricular dilatation disease

CONFIRMATION OF DIAGNOSIS

- Crop biopsy (biopsy of proventriculus is too risky)
  - Polyneuritis with round nucleated cells

- Cause
  - Most likely a virus

- Treatment
  - Fair to poor prognosis
  - Is it wise to treat, or should you consider euthanasia?

Proventricular dilatation disease

CONFIRMATION OF DIAGNOSIS

- Crop biopsy
  - Polyneuritis of round nucleated cells

- When treatment is considered:
  - Force feeding (2.5% of body weight)
  - SQ fluid (50 ml/kg)
  - Metoclopramide (0.5 mg/kg divided q12h)
  - [cisapride (1 mg/kg q12h)]
  - Antibiotics (Amoxycillin 100-125 mg/kg q8-12h)
    - TMP/S and enrofloxacin may lead to vomiting
    - Celecoxib (Celebrix®) 10 mg/kg q24h PO
Cloacal prolaps

- Differential diagnosis
  - Egg binding
  - Enteritis
    - Bacterial
    - Parasitic
  - “Behavior related”
  - Unknown

- Initial evaluation
  - Check for presence of egg
  - Palpation
  - Radiograph
  - Restore normal anatomy
  - Place sutures on cloaca
    - DO NOT use purr string suture
    - BUT place 2 separate sutures

Cloacal prolaps (egg binding)

- Treatment
  - SQ fluid and force feeding (depending on condition)
  - Ca-boro gluconate (50 - 100 mg/kg IM)
  - Prostaglandin E (prepedil®); in the cloaca
Oxytocin (1-2 IE/kg IM) – ONLY when “cervix” is open => is often NOT the case
Quiet, dark surrounding with high humidity and temperature
Remove egg through the cloaca
When not possible => laparotomy

Cloacal prolaps (egg binding)

- Treatment
  - SQ fluid and force feeding (depending on condition)
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  - Quiet, dark surrounding with high humidity and temperature
  - Remove egg through the cloaca
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Cloacal prolaps (egg binding)

- Removing egg through cloaca
  - Drill hole in egg; suck contents out of egg; crush egg shell; remove pieces of egg shell

Cloacal prolaps (unknown origin)

- Common in Cockatoos
  - Attracting attention may play a role
  - Possibly due to weakening of sphincter muscles
- Treatment options
  - Different types of surgery
    - Decreasing diameter of cloacal opening
    - Reefing of the cloacal wall
    - Suture cloacal wall to the ribs and abdominal wall
  - Combination
- Prognosis
  - Reserved
Pigeons with loose stool

- Description
  - Racing pigeons
  - Both sexes
  - All ages
- History
  - Loose stool

Pigeons with loose stool

- Loose stool can be due to:
  - Diarrhea
  - Polyuria

Pigeons with loose stool

- DDx diarrhea
  - Salmonella / E. coli
  - Hexamita
  - Age => Younger than 1 year
  - Worms
  - Adenovirus infection
- DDx polyuria
  - Paramyxo type: 1 pigeon
  - Weaning diarrhea
  - When squabs are 1 week of age
Salmonellosis is caused by:
- Salmonella typhimurium var. Copenhagen

- **4 forms**
  - Intestinal form
  - Systemic form
  - Joint involvement
  - Meningitis
  - Rare

Diagnosis
- Clinical signs
- Culture of the feces
  - A sample from the loft ensures prevents false negative results due to intermittent shedders
- Serology is not possible anymore (Netherlands)
- Post mortem examination and culture

Pigeons with loose stool

- **Therapy**
  - Optimize hygiene, housing etc.
  - Antibiotics
    - For instance: Enrofloxacin, TMP/SMX
  - Cull affected animals
  - They can remain carriers

- **Prevention**
  - Vaccination
    - Does not protect for 100%
Pigeons with loose stool

- Most important symptoms of a PMV-infection in pigeons:
  - Polyuria
  - Torticollis

Pigeons with loose stool

- Therapy
  - None
- Prevention
  - Vaccination

Dyspnea in a canary

- Description
  - Outside aviary with 40 canaries
- History
  - Dyspnea is seen in many canaries
  - It started at the beginning of the summer
Dyspnea in a canary

- Most likely causes
  - Tracheal mites
    - Helpful hint during examination: Clicking sound during breathing
  - Pox virus infection

Dyspnea in a canary

- Treatment
  - None
  - Prevention
    - Feather follicle
    - Sub cutaneous
  - Vaccination
    - Wing web method

HOW?

There are 3 methods to vaccinate against pox

Dyspnea in a canary (vaccination)

A local pox lesion should appear within 1 week
Pigeon with lesions in oral cavity

- Description
  - City pigeon
  - Male
  - Age unknown

- Description
  - Foul smelling material in the oral cavity

Pigeon with lesions in oral cavity

- Differential diagnosis
  - Trichomonas gallinae
  - Candida

- Most likely diagnosis
  - Trichomonas gallinae

- Diagnosis
  - Crop swab
Pigeon with lesions in oral cavity

- Trichomonas gallinae causes inflammation of the:
  - Crop
  - Umbelicus
- Therapy
  - Rondidazol through the drinking water

Amazone Parrot with red stool

- Description
  - Blue fronted Amazone Parrot
  - 8 years of age
- History
  - Is sometimes loose in the house
  - Suddenly very lethargic and bright red stool
Amazone Parrot with red stool

- Differential diagnosis red stool
  - Digestive system
    - Infectious (Clostridium, salmonella, coccidiose)
    - Inflammation / Tumor
  - Urogenital system
    - Egg binding
    - Inflammation / Tumor
    - Lead poisoning
    - Cloaca
    - Tumor (papilloma)

- What else would you want to know within the history?
  - Is the gender of the bird known?
  - Does he/she have respiratory difficulties?
  - Does he/she have diarrhea?
  - Is the bird without supervision out of the cage?
  - Is there a possibility of contact with heavy metals (lead)?
    - (Old) paint, fishermen's lead, rifle pellets
Amazone Parrot with red stool

- Physical examination
  - No abnormalities

- Further diagnostics
  - Radiograph
  - Blood examination
    - Lead (ref. < 2 µmol/L)
    - Uric acid
Amazone Parrot with red stool

- Final diagnosis
  - Lead intoxication

- Therapy
  - Ca-EDTA (versenate) 30 – 50 mg/kg q12h IM (SQ)
  - Laxate (peanut butter, paraphin, barium sulphate)
  - SQ fluids (to minimize kidney damage)
  - [Penicillamin 55 mg/kg q12h PO]

Any questions?

Thanks for flying me in!