Actinomycetes

What’s the Skin-ny!?

- Focal/generalized exudative dermatitis
- Hx
  - Animals on pasture
  - Several days rainfall
  - Biting flies
- Raised-scabs
  - “Paintbrush” shape
  - raw ulcerations beneath
- Diff. Dx (bacterial/fungal)?
**Dermatophilus congolensis**

- Exudative/ulcerative dermatitis in ruminants, horses
  - rarely other species incl. humans (zoonotic: focal pustular)
- **Common** in tropical/subtropical regions:
  - Africa, India, Australia, New Zealand,
  - Caribbean, etc. N.A. as well
- Dermatophilus/Streptothricosis:
  - "Rain Scald"/ "Rain rot": horses/cattle
  - Lumpy wool disease: sheep
    - Economically impt. – co-exists with
      - Fleece rot (*Pseudomonas* spp.)
      - Fly-strike (blowfly myiasis)
    - “Strawberry foot-rot” (+ ORF virus?)
      - ulcerative dermatitis pastern of ovine hoof
  - Scratches, Dew Poisoning, Mud Fever/Mudfoot:
    - names to describe infections around the pastern area of horses hooves

**D. congolensis**

- **Pathogenesis:**
  - Motile zoospore (infective form) released from infected skin in wet conditions
  - Transmission:
    - Direct contact
    - Biting flies, ticks (*Amblyomma* – localized immunosuppression issue more so outside of N.A)
  - Germination → branching filaments penetrate epidermis (injury)
    - Battery of virulence factors
  - Exudate, inflammation (PMN infiltration), epidermal cell death, scab
**D. congoensis**

- **Diagnosis:**
  - Signs, Hx, animals involved etc.
  - Gram/Giemsa stained smear prepared from scab material
  - Gram- +ve branching filaments
    - "Railroad-track" morphology
    - Coccoid motile zoospores
  - Blood agar - aerobe
    - Small, greyish-yellow, β-hemolytic

- **Treatment:**
  - No vaccines – strain variation, skin Ab’s
  - Management:
    - Moisture/ Pest control
    - Skin Trauma
  - Topical Txt
    - scab removal - iodine or copper sulfate
    - Topical Abx (mupirocin)
    - Skin trauma, ticks, wet
    - Systemic Abx – Pen or Pen/Strep
  - Breeding for resistance - Martinique
    - *Bos indicus* - Maillard et. al.,
    - MHC II - based program
    - Reduced infection from ~ 72 % to ~ 2 %
    - Efforts with Sheep ongoing
Nocardia spp.

- Pyogranulomatous suppurative infections
- Ubiquitous saprophytes (soil, decaying veg, compost, animal feces)
- *N. asteroides* complex most common
- Strict aerobes, nonmotile
- G+ve, branching-filaments
  – pleomorphic (rods, coccobacillus)
  – weakly acid-fast

Nocardia asteroides: smear from canine transtracheal aspirate (gram stain)

Nocardia spp.

- Bovine mastitis most impt. clinical manifestation in domestic ruminants
  – Note: Nocardial mastitis is not a common pathogen in well managed dairy farms
  – Poor hygiene – soil contamination
  – Edema, fibrosis, draining sinuses
  – Seropurulent, viscous secretion
  – +/- whitish-granules (“sulphur-granules”) – accumulations of bacteria, protein, polysaccharide and CaPO₄

- *N. asteroides* and *N. otitidiscaviarum* isolated most often

- Intervention – prognosis poor once established – cull is option
  – Prevention – mastitis management, hygiene, teat-dips etc.
  – culture, identification
  – Possibly novobiocin early
Canine Nocardiosis

- Cutaneous-subcutaneous form: (cats, horses as well)
  - Ulceration or granulomatous swelling with draining fistulous tracts (see arrow)
  - +/- abscessation of draining lymph node (L.N.)

- Respiratory form: (dogs, horse)
  - Can be sequel to cutaneous-subcutaneous form
  - Direct infection – Inhalation
  - suppurative pleuritis/peritonitis
    → pyrexia, respiratory difficulty
    → +/- dissemination

- Disseminated form:
  - abscesses in heart, liver, kidney, brain

Diagnosis and Intervention

- Dx
  - Direct examination of exudate, milk, respiratory lavage etc.
  - “sulphur -granules” ?
  - Microscopic/acid-fast?
  - Culture:
    - BA: nonhemolytic
    - Sabouraud (SAB): selective media for fungi
    - Actinomyces spp. are SAB -ve

- Txt
  - Surgical
  - TMS, tetracyclines (12 wks)
  - Penicillin resistant