Emergence of paramoebiasis in edible crabs (Cancer pagurus) from UK waters



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Case History

- Anecdotal reports of decline in edible crab fishery
- Fish Health Inspectorate received report from member of public - 50 dead crabs washed up on a beach in Isle of Wight
- Site was visited by a fisheries officer from Inshore Fisheries and Conservation Authority (IFCA) – No samples identified at original site
- Crabs were identified on beach at site approximately 12 miles away – viable samples not possible





Sampling



- Liaised with local fishery
- Edible crabs were obtained from local fisherman
- First 30 crabs landed from a single vessel were kept for sampling
- Considered to be a representative sample of the affected population





Sampling



- Crabs transported back to the lab
- Crabs were stunned using Crustastun prior to dissection
- Histology (Gill, Heart, Hepatopancreas, Gonad and Muscle)
- Molecular (Gill, Heart, Hepatopancreas)
- TEM (Gill, Heart and Hepatopancreas)





Histology Results



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TEM



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Molecular Screening

arr AY193723.1_Neoparamoeba_sp._strain_AFSM11_small_subunit_ribosomal_RNA_gene_complete_sequence 4Y193722.1_Neoparamoeba_sp_strain_AFSM2V_small_subunit_ribosomal_RNA_gene_complete_sequence -AY686578.1_Amoeba_infecting_western_Long_Island_Sound_lobsters_from_2000_to_2002_small_subunit_ribosomal_RNA_gene_partial_sequence we AY686577.1 Amoeba from gill tissue of Long Island Sound lobster *01-9828-7 small subunit ribosomal RNA gene partial sequence — AY714351.1 Neoparamoeba pemaguidensis strain NP251002 small subunit ribosomal RNA gene complete sequence – AY714350.1 Neoparamoeba pemaguidensis strain NETH2T3 small subunit ribosomal RNA gene complete sequence ⁶³ 1.1 - AY714360.1_Neoparamoeba_pemaquidensis_strain_SED5A_small_subunit_ribosomal_RNA_gene_complete_sequence r AY714363.1 Neoparamoeba_pemaquidensis_strain_NETC1_small_subunit_ribosomal_RNA_gene_complete_sequence بالمكاني AV714362.1_Neoparamoeba_pemaquidensis_strain_SEDCT1_small_subunit_ribosomal_RNA_gene_complete_sequence 72 AY714361.1 Neoparamoeba_pemaquidensis_strain_WTUTS_small_subunit_ribosomal_RNA_gene_partial_sequence – AY686574.1 Neoparamoeba aestuarina small subunit ribosomal RNA gene partial sequence AY686575.1 Paramoeba eilhardi small subunit ribosomal RNA gene partial sequence - DQ229957.1 Neoparamoeba aestuarina isolate W4-3 small subunit ribosomal RNA gene partial sequence DQ229959.1_Neoparamoeba_aestuarina_isolate_SL200_small_subunit_ribosomal_RNA gene_partial_sequence "H_DQ229958.1_Neoparamoeba_aestuarina_isolate_S131-2_small_subunit_ribosomal_RNA_gene_partial_sequence rEF216900.1_Neoparamoeba_perurans_strain_GD-D1/3_185_small_subunit_ribosomal_RNA_gene_partial_sequence ar EF216902.1_Neoparamoeba_perurans_strain_GD-D1/1/1_18S_small_subunit_ribosomal_RNA_gene_partial_sequence EF216901.1_Neoparamoeba_perurans_strain_GD-D1/4_18S_small_subunit_ribosomal_RNA_gene_partial_sequence EF216899.1 Neoparamoeba perurans strain GD-D1/2 185 small subunit ribosomal RNA gene partial sequence L EF216904.1 Neoparamoeba perurans strain_GD-HAC/2/1_185_small_subunit_ribosomal_RNA_gene_partial_sequence EF216905.1_Neoparamoeba_perurans_strain_GD-HAC/2/2_185_small_subunit_ribosomal_RNA_gene_partial_sequence ¹ EF216903.1_Neoparamoeba_perurans_strain_GD-D1/1/2_18S_small_subunit_ribosomal_RNA_gene_partial_sequence AY193725.1_Neoparamoeba_sp._strain_SM68_small_subunit_ribosomal RNA gene complete sequence HQ132929.1_Neoparamoeba_branchiphila_strain_DE11D_small_subunit_ribosomal_RNA_gene_partial_sequence AY714365.1 Neoparamoeba branchiphila strain STAN small subunit ribosomal RNA gene complete sequence AY714366.1_Neoparamoeba_branchiphila_strain_SEDMH1_small_subunit_ribosomal_RNA_gene_complete_sequence AY714367.1 Neoparamoeba branchiphila strain NRSS small subunit ribosomal RNA gene complete sequence AY193726.1 Neoparamoeba sp. strain SM53 small subunit ribosomal RNA gene complete sequence – HQ132926.1_Neoparamoeba_branchiphila_strain_DE4A_small_subunit_ribosomal_RNA_gene_partial_sequence HQ132925.1 Neoparamoeba branchiphila strain DE3A small subunit ribosomal RNA gene partial sequence HQ132928.1_Neoparamoeba_branchiphila_strain_DE6D_small_subunit_ribosomal_RNA_gene_partial_sequence – HQ132927.1 Neoparamoeba branchiphila strain DE5B small subunit ribosomal RNA gene partial sequence AY193724.1_Neoparamoeba_sp._strain_AFSM3_small_subunit_ribosomal_RNA_gene_complete_sequence HQ132923.1 Neoparamoeba branchiphila strain DE1A small subunit ribosomal RNA gene partial sequence HQ132930.1_Neoparamoeba_branchiphila_strain_DE5A_small_subunit_ribosomal_RNA_gene_partial_sequence 🗄 HQ132924.1 Neoparamoeba branchiphila strain DE2A small subunit ribosomal RNA gene partial sequence Novel sequences

- AY686573.1_Korotnevella_stella_small_subunit_ribosomal_RNA_gene_partial_sequence

- WSSV testing was Negative
- Novel pathogen was detected in 53% of samples
- Intense infection noted in 16% corresponding with pathology
- Co-infections with other species also identified (*P. pemaquidensis, P. aesturina*)



0.323



Molecular Characterisation



Maximum likelihood tree based on partial 18s rRNA gene sequence

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Conclusions and Further work

- 1. Emergent disease, hereby defined as paramoebiasis
- 2. Further work is underway to define whether the disease is caused by a single agent
- 3. At least one of the amoeba identified within this study is novel
- 4. Paramoebiasis has not been previously reported from *Cancer pagurus*
- 5. Geographic range of novel amoeba is unknown, further work is needed
- 6. Pathology observed is considered sufficient to lead to mortality in individual crabs
- 7. Currently being written up for peer-review publication







Thank you