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Research Article

Phytosis-Phytoses: An Epistemic, Novel and Emerging Concept in Public Health and One Health

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ABSTRACT

Background: In this study, we re-coined the medical term phytosis-Phytoses (LW1400) and trademarked 29680 in Africa, as a novel medical term in which a parasitic infection from plants infects humans and the same infection from humans infect plants and other animals vice versa. This is similar but in sharp contrast to a well-known medical concept of Zoonosis in which an infection from an animal infects humans and vice versa. This has not been previously observed with plants, now in our work, we have observed that an infection in plants which infects humans and vice versa is referred to as Phytosis-phytoses.

Purpose: The purpose was to report clinical cases from patients suffering phytosis and to prove that trans-kingdom transmission of infection from plants to humans and vice versa is a phenomenon that exist and yet to be considered in medical studies. In this case, unlike in zoonosis, this infection from plants to humans and vice versa, only occurs with conditions where the human is in an immunosuppressed situation.

Methods: A mixed study methods was employed based on clinical observations, clinical lived experience with patients, bacteriological and mycological laboratory as well as molecular diagnostic tools were employed. Four clinical cases of patients in different immunocompromised situation were carefully studied; Cancer patients (leukemia); diabetes situation and two clinical cases of HIV/AIDs were under studied, clinically.

Result and Conclusion: Without immunosuppression and environmental conditions, phytosis-phytoses, in the way defined here may rarely happen. Previously, Phytosis-phytoses in dictionaries has been defined as an infection of a plant with or a disease caused by parasitic fungus which is aptly referred to as phytopathology, as well as dermatophytosis where a fungus from animals infects humans but hasn't defined whether, from humans the same fungus can infects plants and other animals. In our study, Phytosis and in plural Phytoses- is defined for the first time a new phenomenon in medicine orchestrated by change in environmental conditions and immune suppression in humans.

Keywords

Phytosis, Phytoses, Immune suppression, Environment, Change.

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Introduction

Phytosis is a disease caused by a parasitic plant, such as a fungus (https://www.collinsdictionary.com/dictionary/english/phytosis). The word phytosis comes from the words phyto- and -osis. Phytosis is a type of infection caused by a vegetable parasite *Merriam-Webster.com Dictionary*, Merriam-Webster, (https://www.merriam-webster.com/dictionary/phytosis. Accessed 10 Jan. 2025). Yongabi [1] posited that the etymology of the word phytosis in Wikipedia is, grossly, limited, confusing and delves more on dermatophytosis (https://en.wiktionary.org/wiki/phytosis). Now dermatophytosis is referred to as skin infection of humans and animals as a result of a fungal infection. Although dermatophytosis has been exclusively referred in clinical microbiology and dermatologist spheres as skin infections due to fungi, certain bacterial infection and other infections such as *lichen planus* can also be the etiology of dermatophytosis as described by Yongabi [1] Botanists still, arguably, refer bacteria as plants, and by such contentious posits, dermatophytosis would, literally, mean a plant like infection of the skin, and going by the strength of botanists as an etiology of dermatophytosis [1-3]. Akin to this, a number of skin fungal and bacterial infections from animals do infect humans and are considered zoonotic - cases of strains of the etiology of streptothricosis or *Dermatophilus congolensis*, a cattle disease in the family of *Norcadia* can also infect humans in certain rare conditions [3,4] However, Yongabi et al. [1-5] observed that none of the literatures nor any clinical infectiology books and medical practice has referred a case where a fungal or bacterial infections originating from plants infect humans and from humans infect the plant tissues or cells or contaminate plants and cause disease or deterioration. This is beyond the spheres of dermatophytosis as noted by Yongabi [1,4].

In medicine, the previous concept of phytosis, a disease which is caused by a vegetable parasite, for example a fungus (https://www.thefreedictionary.com/phytosis) according to Merriam-Webster.com, Collins English Dictionary, Wordnik, Wiktionary, Dictionary.com and Medical dictionary. The above definition sticks onto a disease cause by vegetable parasites on humans [1-7] In this same direction, plant pathologists have, exclusively, looked at diseases of plants under phytopathology, and to them phytosis is a disease cause by a fungus on plants [3-9]. This is very limited understanding of the phenomenon of phytosis as first recoined by Yongabi and trademarked in 2024 in Nigeria. However, phytosis is seldom used in diagnostic plant pathology apart from the centralization as phytopathology, while in medicine a disease cause by a vegetable parasite on humans has generally been referred to as dermatophytosis or cutaneous and or systemic mycosis and the term phytosis is seldom used in medicine, but the concept phytosis being revealed in our study as we observed trans-kingdom infections from plants to humans and back to plants; from plants to other animals and back to plants and to humans [1,9-13]. This has been coined by Yongabi, 2024 and attention drawn to the Nigerian Government *(LW1400) and trademarked 29680*) and had been previously captured in the definition of phytobiotechnology which Yongabi in 2008 referred to as the founder and father of phytobiotechnology cited [1-3]. Phytosis -Phytoses expresses trans-kingdom migration of pathogens or microbes from one kingdom to another kingdom not traditionally known to habit. This is fueled by immunosuppression and climate change as observed by Yongabi in 2024. Mold fungi is the main organisms in phytosis and with the alteration of host, fungi become more invasive and adaptable [1,2,14-20].

In the one health and planetary health, the human interaction with the environment and animals has been definitive in the mainstream one health understanding [17-22]. Zoonotic diseases have been at the core but never had it been considered that phytosis plays a role in the one health phenomenon [23-34] In this study we report phytosis -phytoses, where an infection caused by a vegetable parasite from plants infects humans and from humans infect and or contaminate plants and vice versa.

Methodology and Study Area

A mixed study methods were employed at the Phytobiotechnology Research Foundation Clinic (PRF) in Cameroon, involving clinical controlled case studies and observation, laboratory culture studies and pathogen characterization at the PRF clinics and Laboratory [1,3,5,35-38]. The Phytobiotechnology Research Foundation clinics (PRF) in Cameroon is a registered medical research NGO (NW/GP/29/07/10856) in Cameroon mandated to develop and translates low-cost integrative medicine to solve pressing health and environmental problems, and to shift away from faulty conventional thinking. One of PRF's mandates is to provoke a culture of medical independence, in Africa, for a people who are basically with low health care infrastructure [1,3,7] PRF offers a variety of medical services including naturopathic, alternative and complementary clinic which provides 70% less cost of diagnosis for tropical endemic diseases for more than 50% of the rural populace of Africa, although domicile in Cameroon [2,4].

Ethical Clearance

In the research follow ups at PRF clinics in Cameroon, these researches were done both clinical and laboratory with ethical clearances **(Ref.528/RA/NWR/RDPH/August 132104; Ref.CBC/DHS-L/14/2080, August 25, 2019 and renewed yearly up to 2022).**

Clinical Case Study 1

Observation Presenting with Phytosis-Phytoses

A clinical case observation of with HIV with a CD4 count less than 50 cells/ml and a very high viral load (above 30,000) reported at the Phytobiotechnology Research Foundation Clinic, reported to our clinic with a persistent respiratory problem. The patient had met with his doctor who prescribed the requisite antibiotics (Erythromycin and Ampicillin/ cloxacillin) and the patient took the prescribed dose but with no clinical and therapeutic benefit. The doctor advised the patient to continue on the prescribed antiretroviral drugs. We did a reassessment and to trace the origin of the problem and observed it was due to eating infected tomatoes salad with a mold according methods described previously [1-3].

With worsening situation, we decided to take sputum from the patient and cultured bacteriologically on Nutrient and blood agars and mycologically on potatoe dextrose and sabauraud dextrose agars as described by standards protocols [12,23,14] and observed no bacterial isolates, yet we isolated *Aspergillus fumigatus.* A contact tracing to his home where we collected samples of the tomatoes decayed that the patient took as salad mixture with, we isolated *Aspergillus fumigatus*, consistent with the isolate from the sputum. We now took fresh tomatoes with no infection, surface sterilized it (Koch postulate) and inoculated the isolate from the patient and another with the isolate from from the infected tomato salad [32]. The fresh uninfected tomatoes both express the growth of the *Aspergillus fumigatus* similar to each other. The *Aspergillus fumigatus* isolate from the patient, the tomatoes at home and the inoculated isolate on fresh tomatoes from both patient and tomatoes from yielded aspergillus fumigatus with same growth characteristics. The molecular characteristic of all the isolates of *Aspergillus fumigatus* at 18sRNA as a marker all the isolates to have 29.4Mb genome size with 335 genes per Mb [32-34]. We didn't disclose to this result immediately to the patient, the patient continued to eat his tomatoes salad and the symptoms continued but the children who were none HIV positive and healthy never had any infection from the tomatoes. At the end of the tracing, the results were disclosed to the patient and the doctor and the patient was treated with ketoconazole antifungal drug and was completely healed.

This indicated a case of *Aspergillus fumigatus* a vegetable parasite that infected the patient and the isolate from the patient infected fresh tomatoes, but the healthy children who ate the tomatoes salad had no symptoms of the disease. This condition where the vegetable parasites infect both human from huma infect plant or contaminate the plant and vice versa is referred as phytosis-phytoses as described in phytobiotechology research by Yongabi [1,2]. This is similar to zoonosis where a disease from an animal infects human and vice versa, but in the case of phytosis differs in that Phytosis occurs with a compromised or situation with underlying health factors.

Clinical Case Study 2

A clinical case observation of case 2 was the wife of clinical case 1 also presenting with HIV with a CD4 count less than 100 cells/ml and with a rather undetectable viral load reported at the Phytobiotechnology Research Clinic, Cameroon in 2020, suffered abdominal problems due to eating infected tomatoes salad, she had no respiratory complains as the husband in clinical case 1. The patient had met with a doctor who suspected typhoid fever and dysentery, the prognostics by the doctor was typhoid and *Entamoeba histolytica* which are endemics in Africa, so the physician prescribed the requisite antibiotics which were metronidazole (flagyl 500mg) and Amoxicilline (500mg) and the patient took the prescribed dose but with little clinical and therapeutic benefit. With continuous complaint of dysentery, the physician prescribed Imodium and increased dosage of antiretroviral drugs. However, we decided to take stool from the patient and cultured bacteriologically and mycologically as in clinical case 1, we observed no bacterial isolates [2,33], yet we isolated *Geotrichium candida*. We also observed that the stool was semi formed and charcoal in colour, which the physician had previous suspected hemorrhage or use of hematinic. None of this turn out to be true. A contact tracing to his home where we collected samples of the tomatoes-lettuce salad that the patient took salad with, we isolated also *Geotrichium candidium*. We now took fresh surface sterilized tomatoes and lettuce (Koch postulate) and inoculated the isolate from the patient and another cohort from the decaying tomatoes to which we previously isolated the fungi, the fresh uninfected tomatoes and lettuce both expressed the growth of the *Geotrichium candida* similar to each other. We didn't disclose to the patient, the patient continued to eat his tomatoes salad and the symptoms continued, until at the end of the tracing where we disclosed to both the patient and the doctor. The patient was treated using ketoconazole.

This indicated a case of *Geotrichium candida,* a vegetable parasite that infected the patient and the isolate from the patient infected fresh tomatoes, but the healthy children who ate the tomatoes salad had no symptoms of the disease. This condition where the vegetable parasites infect both humans and plants and vice versa is referred as phytosis-phytoses.

Clinical Case Study 3

A clinical case observation of case 3 was a case of lymphatic leukemia patient heavily on chemotherapy at Laquintini Hosptal in Douala, Cameroon, in 2021, presented at our clinic in an exit poll, opting to be placed on food supplements at the PRF clinic. We noted that despite being on Hydroxyurea and other cohort of chemotherapies, the total white blood cell counts could only drop from millions to thousands of cells per ml of blood. The patient presented with a dry cough and with white coated tongue suggesting yeast infection. From the sputum, we did a direct Potassium hydroxide (KOH) smear and observed budding yeast and spores of fungi, a mycological culture yielded *Candida species* and *Aspergillus spp.* We decided to find out if the patient salads, vegetables etc., which she accepted. However, we took the isolated strain of the *Aspergillus spp* and inoculated into fresh sterile tomatoes and cabbage which was the composition of the salad the patient had eaten, and sprayed also on a field with cabbage and after two weeks, we observed spores of *Aspergillus* on tomatoes and we also isolated *Aspergillus spp* from the field cabbage. We concluded that the *Aspergillus* from the immune suppressed patient with leukaemia infecting plants and to which the patient eats cabbage and tomatoes clearly shows a case of Phytosis-Phytoses.

Clinical Case Study 4

A clinical case observation of case 4 was a case of type 2 diabetes with a diabetic foot ulcer at a clinic at Anambra state in Nigeria in 2022, presented at our clinic in an exit poll, opting to be placed on food supplements at the PRF. We noted that despite being on cohort of chemotherapies including insulin and metformin The patient presented with a white coated tongue suggesting yeast infection. Working with the family doctor, we collected a buccal swab we did

a direct potassium hydroxide (KOH) smear and observed budding yeast and spores of fungi, a mycological culture yielded *Candida species* and *Aspergillus spp.* We decided to find out if the kind of plant-based food the patient eats frequently, vegetables, eggplant, tomatoes, salad etc., which he accepted. We also took swabs from the wife and person in the family where they eat the same foods, no isolate of *Aspergillus* from the family members. We isolated candida from the wife. However, we took the isolated strain of the *Aspergillus spp* and inoculated into fresh sterile tomatoes, and fufu – a common cassava-based meal and after two weeks, we observed decayed of tomatoes caused by *Aspergillu*s and we also isolated according to methods previously described [2,3,34]. We concluded that the *Aspergillus* from the immune suppressed patient with diabetes type 2 infecting plants and to which the patient feeds on clearly shows a case of Phytosis-Phytoses.

Conclusion and Recommendation

Phytosis and in plural Phytoses- is defined for the first time a new phenomenon in medicine and public health orchestrated by change in environmental conditions and immune suppression in humans**.** Without immunosuppression and environmental conditions, phytosis-phytoses, in the way defined here may rarely happen, this sharply contrast with zoonosis where a disease is transmitted from animals to humans and vice versa, irrespectively of immunosuppressive condition. Previously, Phytosis-phytoses in dictionaries has been defined as an infection of a plant with or a disease caused by parasitic fungus which is aptly referred to as phytopathology, as well as dermatophytosis where a fungus from animals infects humans but hasn't defined whether, from humans the same fungus can infects plants and other animals. In this study it is observed that phytosis can be caused by bacteria and fungi and mostly fungal diversity plays a crucial role than other phyla. Phytosis truly expresses a trans-kingdom migration of microbes and or pathogens. In this scenario, microbes contaminating plant-based foods can infect persons (with underlying health challenges) handling the food and in turn the persons can contaminate the food. This has been exampled by the clinical case studies where Aspergillus fumigatus with the same genetic constituents was isolated from patient, food and following Koch postulate, the same organism causing decay in food was re isolated. It is recommended that further studies be conducted in this area to unravel the emerging disease-causing organism from plants infecting humans and vice versa.

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