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NIGERIAN JOURNAL OF PLANT PROTECTION

INSTRUCTIONS TO AUTHORS

GENERAL INFORMATION: *Nigerian Journal of Plant Protection*, is a scientific and periodic Journal that covers various aspects of plant protection, in the areas of agricultural biology, environmental biology and crop protection. It also falls into the multidiscipline of mycology, bacteriology, virology, nematology, entomology, weed science etc. as it affects protection of agricultural crops. Review articles, original research reports and short communications are welcome from authors for publication in the Journal.

PREPARATION OF MANUSCRIPTS: Manuscripts should be prepared in standard English Language and typed in double space on one side of A4 size paper leaving, 0.5cm margins on all sides of the paper. The manuscript should not be more than 15 pages tables, figures and plates inclusive. However, more pages attract additional charges. **Colour prints at request** will attract additional charges as decided by the Editor-in-Chief

TITLE: The title should be concise and typed in bold capital letters. Scientific names should be used as appropriate and should be italicised. The title should generally reflect the content of the article.

RUNNING TITLE: A running title of not more than eight words, which is a phrase that give an idea about the study should be indicated in parenthesis below the main title.

AUTHOR(S) NAMES: The name(s) of the author(s) should be indicated below the title of the article in full surname(s) and initials, followed by their full addresses. The chief or the corresponding author should be so indicated and the phone number(s) and the e-mail address(es) had to be written after the postal address.

ABSTRACT: The abstract should be written in concise form without losing the focus and clarity of the study. The abstract should be able to answer the questions on, the objectives of the study, how it was carried out, the results obtained, the inferences drawn from the results and the conclusion. The abstract should not exceed **250 words**. Uninformative sentences such as 'the significance of the results is discussed' are not acceptable.

KEY WORDS: Key words of not more than seven that conform with the content of the article should be provided as the footnote of the abstract for indexing and other purposes.

INTRODUCTION: This should contain brief introduction of the background information of the study, its purpose and significance. Besides, a short review of the pertinent literature should be provided.

MATERIALS AND METHODS: This aspects should contain detailed information of the methodology utilised in the work of study. It should contain repeatable methods which will remove any doubt in the confidence in the work of the author. In case of using universal methodology, proper reporting and citations of relevant literatures should be put in place for further referencing and any deviation should be indicated with proper justification. Also, appropriate experimental design, mode of data collection and statistical analyses should be clearly indicated.

RESULTS : The results reporting should be concise and clear with relevant supporting data transformations/visual aids such as , tables, graphs and pictures (plates). Appropriate numbering of the data transformations (tables, graphs and plates) in the relevant sections of the texts where the supporting aids belong should also be put in place. The results should only be reported in this section without discussing them. Duplication between this section and the discussion must be avoided.

DISCUSSION: The discussion should be the inferences drawn from the results as indicated in the previous section. Furthermore, implications and consequences of the results reported here should be backed up with previous relevant and recent literatures from past workers on the subject matter. Comparative analyses should be drawn from the inferences in relation to previous works.

CONCLUSION:The contribution to scientific knowledge and suggestions for further research in line with the study could be indicated here.

REFERENCES: References must conform with the Harvard style i.e. authors' names and date in the text. If there are three or more authors the first author's name should be followed by *et al.*, ensuring that different references with the same name and date are differentiated by a, b, etc. In the references list of the names and initials of all the authors must be given, with the date, article, title, journal title in full, volume, number and first and last page numbers. References to books should be given in this order, after the date; the chapter title, book title, editors of book (if different from authors of chapters), volume number edition, page numbers of the chapter, publishers and town of publication, ensure that all references that appear in the text also appear in the reference list and *vice versa*, and that they are consistent in the spelling of authors' names, date etc. **The list of literature cited should be numbered and the numbers should be used in citing the reference within the text instead of their names and years.** This information is very important and manuscript will be rejected if it is not strictly adhere to.

Note that paper may be rejected or publication delayed if the submitted paper departs in any way from the required style.

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NIGERIAN SOCIETY FOR PLANT PROTECTION

PRESIDENTIAL ADDRESS BY PROFESSOR D.B. OLUFOLAJI

The Nigerian Society for Plant Protection has come of age, ranking with notable National and International scientific Societies worldwide. As its concern for agriculture remains paramount in its agenda, the mission and vision of the Society remains undaunted towards its goals at all times. Since food production is inevitable to mankind and other animals survival, the protection of our plants therefore is an issue that must not be taken lightly.

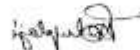
The clarion call to all the stake holders in agriculture, both public and private sectors alike should still be very dear to them if we have the collective duty to feed the teeming world population.

Our inputs are very important to achieve this goal. Since a sick plant can not give the best in terms of growth, development and yield, our duty is to keep these plants healthy for our benefit and survival on earth. If our inputs in terms of fertilizers, good seeds and sound farming systems are alright, if the appropriate pest and disease control measures are not put in place, the farm produce will suffer great setbacks on the farm.

However, management of the agro-ecosystems should be handled with caution since an attempt to completely eliminate the pests and pathogens will alter the ecosystem and could be detrimental to the well being of the animals which rely on the agro-ecosystem for their survival.

I call on members in various establishments to carry out a meaningful research and attend both local and international conferences regularly in order to raise our standard in our areas of research. This will also assist us in widening our scope of knowledge. Let me also inform you as I have done before that our Society is a registered member of "International Society of Plant Pathology". The last Congress was held in 2008 in Torino, Italy and the next one will take place in August 25-31, 2013 in Beijing, China. I also implore you to join some of these related International Societies: American Phytopathological Society, British Society for Plant Pathology among others.

Thanks for the opportunity you have given us to serve you.



Prof. D.B. Olufolaji
(National President)

Brief from the Editor-in-Chief

Our Journal has finally stabilized despite the set backs of yester years. The confidence which members had in the 70s , 80s and 90s have come back and members aswell as non members have been patronising our Journal for dissemination of their research informations to the scientific world. As usual, this issue has been produced to meet the 38th edition of the Annual Conference at The Mike-Okpara University of Agriculture Umudike near Umuahia (10th-13th March, 2013).

The fact that articles which cut across the six disciplines of plant protection: Mycology, Bacteriology, Virology, Entomology, Weed Science and Nematology could be seen in this package is an indication of the umbrella status of Nigerian Journal of Plant Protection over the mentioned disciplines. It is our hope that this status will continue to be maintained for a long time to come. Since we have no discrimination against any dicipline, please do send your articles and we will give you equal treatment without any prejudice.

In line with the popular demand, the guide to authors is included in this edition to facilitate preparation of our manuscripts and to ease the problems of the Editorial Team.

Please do make use of the instructions to the letter to assist us in serving you better.

It should also be noted that sequel to the general increase in the price of commodities in the country as a fall out from increase in the price of petrol, we have to increase the processing and publication fees of the Journal to meet the increase in publication cost. Please you have to bear with us. We will not like to deep much into the purse of the Society for subsidy on the production cost of the Journal.

I hereby appreciate the efforts of my Associate Editors notably among them are Prof. A .Enikuomehin of Federal University of Agriculture Abeokuta and Dr. Abiodun Joseph of Joseph Ayo Babalola University, Ikeji-Arakeji, Osun State. They have performed very well and very supportive in making the publication of the Journal a reality at all times. Please try to further publicise our Journal among your colleagues to increase the level of our patronage. We are poised to serve you better than before, God's willing.

For modesty sake , the Editorial Team of the Journal will change to avail other members the opportunity to serve the Society. Thus, the address of the Editorial Team will change very soon. You will be duely notified of the new address.

I implore you to give the next Editorial Team a better support than the ones given to us.

Thanks for your support at all times in the past .

Thanks for the opportunity you have given us to serve you. Farewell.

Sincerely yours



Prof. D.B. Olufolaji

Editor-in-Chief (2008-2013)

RELATIVE ABUNDANCE OF VIRAL DISEASES OF FIELD-GROWN PEPPER (*CAPSICUM ANNUUM*L.) IN A DERIVED SAVANNAH ZONE OF NIGERIA

Ayo-John¹ E. I., O. O. Odedara¹, O. P. Oni¹, O. Danie¹, A. O. Liadi², and E. Akpogume¹

¹Department of Crop Protection, Federal University of Agriculture, Abeokuta, PMB 2240, Nigeria

²Department of Microbiology, Federal University of Agriculture, Abeokuta

SUMMARY

Pepper (*Capsicum annuum*) is a popular spice grown worldwide and Nigeria accounts for about 50% of the African production. Viral diseases are limiting factors in the production of field grown pepper resulting in poor fruit yield and quality leading to great economic losses. To determine occurrence of virus symptoms and the identity of these viruses, leaf samples of field-grown peppers were collected between 2008 and 2010, and tested by enzyme linked immunosorbent assay (ELISA) for *Tomato spotted wilt virus* (TSWV), *Tomato yellow leaf curl virus* (TYLCV), *Cucumber mosaic virus* (CMV), *Potato virus Y* (PVY) and *Pepper vein mottle virus* (PVMV). High viral disease incidences (50 to 100%) were observed in the surveyed fields and the degree of symptom expressions were moderate [3] to severe [5]. Major virus symptom types were mosaic and reduced leaf symptoms occurring in 32.4% of the leaf samples collected. Other symptom types were vein banding and leaf curl and mottle which occurred in 21.3% of each of the leaf samples respectively. A total of 106 samples out of 136 (77.9%) reacted positively in ELISA with at least one virus. *Pepper vein mottle virus* and CMV were the most prevalent viruses occurring in 28.7 and 21.3% of the leaf samples respectively. Others were TSWV (17.9%) and TYLCV (11.8%) . The widespread occurrence of these viruses in southwest Nigeria has serious implications for pepper production. An important and urgent strategy for control of virus diseases on pepper in these areas is the development of resistant cultivars for distribution to farmers.

Keywords: pepper, detection, virus symptoms, disease incidence, distribution, survey

Pepper (*Capsicum annuum*) is grown worldwide (5) and is a major vegetable crop in Nigeria (2). *Capsicum annuum* and *C. frutescens* are among the world's most popular vegetable being used mainly as spices and condiments (4). Peppers, likewise are good sources of income to small producers in many developing countries (16). In West Africa and Nigeria in particular, *C. annuum* and *C. frutescens* are third among the cultivated vegetables being utilized in the dry state as spice (21). They provide spice and colour to foods as well as essential

vitamins and minerals (16). Hot and sweet pepper are grown by small, medium and large producer or integrated to agribusiness with considerable socio-economic importance. It offers occasional employment for a significant number of people during the harvesting period. Pepper production has not met its demand due to various factors of which viral disease is a major one. (22,3). Pepper suffers great losses worldwide due mainly to potyvirus infections like *Tobacco etch virus* (TEV) which are mainly confined

to North America (20). Others are *Potyvirus E* (Poty E) occurring in Southern France (15); and *Pepper vein mottle virus* (PVMV) (6,7) reported to be endemic in pepper and other solanaceous crops in West African countries (11,18). Ethiopia (1), and South Africa (8).

Virus infection on pepper results in disease symptoms such as reduction in size of young leaves, leaf curl, mottling and vein clearing, puckering, deep mottling and curling inwards of leaves, stunted growth due to shorter internodes and bunchy top (16).

During previous diagnostic surveys, virus-like symptoms were observed on field grown pepper in southern Nigeria. These are the areas where breeding for resistance and virus control management strategies are urgently needed. Investigations of incidence and distribution of pepper viruses are very important in developing diagnostic and appropriate control measures. Information on virus disease incidence and the identity of viruses infecting field-grown pepper crops are not available in southern Nigeria. Similarly periodic disease severity and potential economic impact of virus infection on pepper production has not been well evaluated. This type of information would serve as the basis for breeding programs that would enhance agricultural commercialization of the crop. The purpose of this work was to determine virus symptoms and identify of viruses infecting field-grown pepper crops under natural tropical condition.

Virus survey and collection of leaf samples

Surveys were conducted between July and August of 2008 to 2010 in seven Local Government Areas (LGA) in Ogun State

namely Obafemi Owode, Odeda, Ifo, Remo North, Abeokuta North, Abeokuta South and Yewa North where peppers are grown (Figure 1). The fields were inspected visually and leaf samples showing virus-like infection were evaluated in each farm based on symptoms observed. Disease incidence was estimated within a 4 m x 4 m sub-plots in each farm by counting the number of plants that expressed virus-like symptoms and expressed as a percentage of the total number of plants within the subset. Virus symptom expressions were rated on five symptomatic plants within the plant population in the sub-plot. A disease severity scale was developed by the authors based on previously observed virus symptoms on pepper where: 1 = no visible symptoms, 2 = mild symptoms (less than 10% of the total leaves) such as mosaic, mottling, yellowing, vein banding or necrosis, 3 = moderate symptoms greater than 10% but less than 50%, 4 = severe symptoms greater than 50% but less than 75% accompanied with reduced leaf lamina or distortion, 5 = severe symptoms greater than 75% plus leaf distortion and general stunting of the plant was used.

Leaf samples were collected from five to 10 young symptomatic plants for virus detection and placed in sample bags before storing in cooling box containing ice packs during transportation to the Biotechnology Laboratory, University of Agriculture, Abeokuta. Leaf samples were tested within three days for viral infections using enzyme linked immune-sorbent assay (ELISA) with specific polyclonal antibodies to *Tomato spotted with virus* (TSWV), *Tomato yellow leaf curl virus* (TYLCV), *Cucumber*

mosaic virus (CMV), *Potato virus Y* (PVY) and *Pepper vein mottle virus* (PVMV) obtained from Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH (DSMZ), Braunschweig Germany.

Detection of PVMV and CMV in pepper leaf tissues by DAS-ELISA

The leaf samples (approximately 0.1 g) were homogenized in 1 ml of phosphate buffered saline (8.0 g NaCl, 0.2 g KH_2PO_4 , 1.1 g Na_2HPO_4 , 0.2 g KCl/L, pH 7.4) containing 0.05% v/v Tween-20 (PBS-T) and also 2% w/v polyvinyl pyrrolidone (PVP). The sap from each leaf sample was added to double wells in ELISA plate and tested using DAS-ELISA with PVMV and CMV commercial polyclonal antibodies from DSMZ (Germany), in accordance with the method of Clark and Adams (9). The ELISA plates were each coated with 100 μl CMV and PVMV IgG diluted in coating buffer (1.59 g Na_2CO_3 and 2.93 g NaHCO_3 /L, pH 9.6) according to the manufacturers' specification and incubated at 37°C for 2 h. The plates were decanted and washed three times with PBS-T using a wash bottle, at 3-min intervals and were blotted dry by tapping on tissue paper. With the aid of a micro-pipette, 100 μl aliquots of extracted leaf saps were added to designated wells, and incubated overnight at 4°C (12-16 h). The plates were decanted, washed and blotted dry. Also, 100 μl of IgG-alkaline phosphatase to the different antibodies used were diluted as specified by the manufacturers in conjugate buffer (½

strength PBS containing 0.05% v/v Tween, 0.2% w/v egg albumen) and added to respective wells and incubated at 37°C for 2 h. The plates were washed and blotted before 100 μl aliquots of freshly prepared substrate (10 mg p-nitro phenyl phosphate dissolved in 10 ml of substrate buffer) were added into the wells. The ELISA plates were read after incubation at room temperature for one hour or overnight at 4°C, using ELISA plate Reader model MINDRAY, MR-96 at 405nm. A sample was regarded positive if the average absorbance reading at 405nm was more than double the mean of healthy controls.

Detection of TSWV and TYLCV using TAS-ELISA

The TAS-ELISA kit (DSMZ, Germany) had IgG MAb (monoclonal antibodies) and RaM-AP (Rabbit antimouse alkaline phosphate) to TSWV and TYLCV. After trapping the IgG on the ELISA plates, the wells were blocked with 200 μl of 2% skim milk in PBST and incubated at 37°C for 30 min. The blocking solution was decanted and the plates tapped dry before addition of antigen. Also, 100 μl MAb diluted in conjugate buffer and 100 μl of RaM-AP (Rabbit anti-mouse alkaline phosphate) were used as specified.

Virus symptoms and Disease incidence on field grown pepper

Similar virus symptoms were observed on pepper plants in farms surveyed. The locations which were distant from each other

