SURVEY OF VIRUSES ASSOCIATED WITH FIELD-GROWN SWEET MELON (*Cucumis melo* L.) IN GOMBE STATE, NORTH EAST NIGERIA.

[1, 2]Yusuf S. M., [1]Kashina B. D., [1]Alegbejo M. D. and [1]Banwo O. O.

[1]Department of Crop Protection, Ahmadu Bello University, Zaria, Nigeria.

[2]Department of Agronomy, Faculty of Agriculture, Federal University Kashere, Gombe State, Nigeria.

Corresponding author: E-mail: yusufsalisu87@yahoo.com; Tel.: 080 61129762; 08174861661

SUMMARY

A survey of farmers' fields of sweet melon (*Cucumis melo* L.) showing virus - like symptoms was carried out to determine the incidence and severity of viruses associated with the crop in three local government areas of Gombe State, North east Nigeria in 2014 and 2015. A total of 1440 leaf samples from 72 farmers' fields were collected. The leaf samples were indexed for Melon necrotic spot virus (MNSV), *Cucurbits chlorotic yellows virus* (CCYV), *Cucurbits yellow stunting disorder* virus (CYSDV), *Zucchini yellow mosaic virus* (ZYMV), *Cucumber mosaic virus* (CMV) and *Watermelon mosaic virus* (WMV) using Double antibody sandwich enzyme- linked immuno-sorbent assay (DAS- ELISA). Plants from all the fields surveyed exhibited typical virus disease symptoms such as, chlorosis, necrosis, yellowing, mottling, leaf curling, mosaic and vein banding. The most prevalent virus symptom observed in the surveyed fields was mosaic followed by yellowing, leaf curling while necrosis recorded the least virus disease symptom. Virus disease symptom severity recorded, ranged between 2(mild) and 5(severe). Among the six viruses detected on the surveyed leaf samples by ELISA, ZYMV was the most prevalent in both dry and rainy seasons, in all the three local government areas. It occurred in 11 out of 12(97.5%), followed by CMV, WMV, CYDV and CCYDV with mean percentage occurrence of 83.3%, 63.6% and33.3% respectively, of the locations. MNSV was the least encountered virus with mean percentage incidence of 25.0%. *Zucchini yellow mosaic virus*, CMV, WMV, (Potyvirus), CYDV and CCYDV

(Crinivirus) were detected for the first time on sweet melon in North east Nigeria.

Key words: Survey, Virus, Incidence, Severity, Sweet melon, Gombe State.

The Cucurbitceae is an important plant family comprising many vegetables and fruits such as cucumber, squash, pumpkin, melon and gourds (9). They are grown in temperate, desert, tropical and subtropical regions of the world (21). Four major cucurbit crops economically important worldwide are: melon (*Cucumis melo* L.), cucumber (*Cucumis sativus* L.), watermelon (*Citrulluslanatus* (Thumb.) Mat. & Nak.), and pumpkin (*Cucurbita* spp.) (1). Some of the major cucurbits cultivated in Nigeria are: 'egusi' melon (*Citrillus colocynthis* L.), watermelon (*Citrullus lanatus*(Thumb.)Nakai & Matsum), cucumber (*Cucumis sativus* L.), fluted pumpkin (*Telferia occidentalis* L.), snake gourd (*Trichosanthes cucumerina* L.) and sweet melon (*Cucumis melo* L.).

Sweet melon, muskmelon or cantaloupe originated from the Middle East to the Mediterranean (1). Melon probably originated in East Africa where wild populations still occur e.g. in Sudan, Ethiopia, Eritrea, Somalia, Uganda, and Tanzania. It is called muskmelon, cantaloupe (English), melon (French), melao (Portuguese), mtango, monguyana, mmumunye (Swahili) and swi milo or milo (Hausa). Muskmelon is so named because of the delightful odour of the ripe fruits.

In Nigeria, sweet melon was first introduced into Dadinkowa, in the then Bauchi State by Europeans who were working in the International Vegetable Processing Company (VEGFRU) located in Dadinkowa, Gombe State, Nigeria between 1981 and 2002. It was grown as backyard vegetable gardens for local consumptions. It was after they left in 2002, that local farmers started growing the crop in large quantities. Today, Gombe State is the major producer of the crop, followed by Bauchi and Taraba States with an estimated annual production of 1.5 – 2.8 million tons per annum, sold at fruits and vegetables stalls in many towns in the North Eastern states (4). It is also transported to other states like Kano, Kaduna, Lagos, Nasarawa, and Abuja. It is consumed almost on daily basis by urban families especially during the lunar month of Ramadan for breaking religious fasts. It is a main source of income for producing households. The quantity

produced is not meeting the high demand by the teaming population of the country, hence it is not exported.

The production figures of sweet melon in Nigeria and indeed most West African countries are scanty. Annual world production of sweet melon has increased from 700,000 ha in 1992 to 1.2 million ha in 2002. Major producing countries are China with 400,000 ha, West Asia (Turkey, Iran, Iraq) 200,000 ha, the Americans (United States, Mexico, central and southern American countries) 165,000 ha, Asia (India, Pakistan, Bangladesh) 100,000 ha, European Union (Spain, Italy, France, Greek, Portugal) 95,000 ha, Romania 50,000 ha, Japan 13,000 ha and Korea 11,000 ha (24).

The most frequent virus in tropical conditions is the aphid transmitted *papaya ring spot virus* (PPSV-W, formerly WMV-1). *Cucumber mosaic virus* (CMV), *watermelon mosaic virus* (WMV-2) and *Zucchini yellow mosaic virus* (ZYMV) all transmitted by aphids especially *Aphids gossypii* Glover. Other virus diseases in melon are *melon necrotic spot virus* (MNSV), transmitted by the soil fungus Olpidium spp., the soil and seed borne *cucumber green mottle mosaic virus* (CCGMV) and *beet curly top virus* (BCTV) transmitted by the common brown leaf hoppers (*Orosius orientalis*), *Cucumber vein yellow virus* (CVYV), *Cucurbit chlorotic yellows virus* (CCYV), *Cucurbit yellows stunted disorder virus* (CYSDV) and *lettuce mosaic virus* (LMV) transmitted by aphids (*Aphids gossypii* Glover) (2). Early identification of these plant pathogens remains the focal point in the field of virology, aimed at preventing the spread of the viruses as well as developing ways of combating and reducing their effects on agricultural yield (2).

Sweet melon is an emerging crop in Nigeria; its production is on the increase and is contributing immensely to the economics of many households that are involved in its production and marketing. It is almost replacing watermelon in terms of acceptability in the production areas. Despite increase in its production and acceptability, there are disease challenges that are causing reduction in quality and quantity. Preliminary studies carried out by Agricultural Development Programme (ADP) staff, Gombe State, on the crop showed that some viruses are associated with the diseased plants which necessitated this work.

The expected benefits of this research is that knowledge about the existence and distribution of the viruses

associated with diseased sweet melon crops in the study area will serve as baseline information for further studies on the crop as it is the first work carried out on viral diseases of sweet melon in the study area and indeed Nigeria. The objectives of the study were to determine the occurrence and distribution of viruses associated with sweet melon in Gombe State being the major producer of the crop.

MATERIALS AND METHODS

Field Survey and collection of Leaf samples

A field survey was conducted covering Akko, Balanga, and Yamaltu-Deba Local Government Areas in Gombe State. Farmers' fields were examined for virus like symptoms such as chlorosis, necrotic, yellowing, mottling, chlorotic local lesions, vein banding, mosaic, mottling etc. The fields were inspected visually and leaf samples were collected in each farm from a marked 5 m x 5 m quadrant using smart sampling approach. A sample consisted of two to three leaves per plant collected from the top, middle and lower portions of the sampled plant. Moisture on the surface of the leaves was blotted dry with absorbent paper. Because of the creeping growth habit of sweet melons, care was taken not to sample the same plant more than once per site. Twenty leaf samples were collected from each farm for virus indexing. The leaf samples were placed in labeled polythene bags and preserved in coolers with ice blocks while in transit. The samples were taken to the Virology laboratory of Ahmadu Bello University, Zaria for virus indexing using enzyme linked immune-sorbent assay (ELISA). Detailed field notes on the crop were taken and the farmers were interviewed about the crop, date of planting, fertilizer use, cultural practices used, knowledge of virus symptoms, control measures tried if any and insecticides used.

Determination of disease incidence

The surveyed fields were assessed and scored for virus disease incidence (DI) by visual observation of 10 plants per quadrant and center showing typical virus symptoms. Four symptomatic and one asymptomatic leaf samples were collected from each quadrant. The number of plants that showed virus-like symptoms was expressed as the percentage of total number of plants sampled (13).

Determination of Severity

In determining the disease severity (DS) the same number of plants were selected for observation in each farm. The severity of the symptoms was scored on a scale ranging from 1 to 5: 1= No Symptom, 2 = Symptoms on 1 – 25% of leaves (mild), 3= Symptoms on 26 – 50% of leaves (moderate), 4= Symptoms of 51- 75% of leaves (severe) and 5 – 76 -100%of leaves (distortion and death) (Eni *et al.,* 2008).

DS = Sum of all disease ratings x Maximum score (100)

Number of plants assessed

Serological Identification of Sweet Melon Viruses

Six viruses, *Melon necrotic spot virus* (MNSV), *Cucurbits chlorotic yellows virus* (CCYV*), Cucurbits yellow stunting disorder virus* (CYSDV), *Zucchini yellow mosaic virus* (ZYMV), *Cucumber mosaic virus* (CMV) *and Watermelon mosaic virus* (WMV) were indexed for as described by (10) with specific polyclonal antibodies purchased from DSMZ, Germany (Leibniz-Institut DSMZ-Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH, Germany). The antibodies used in this experiment were: AS-0929, IgG; AS-0929 IgG – AP (against CMV), AS-0234, IgG; AS-0234 IgG – AP (against ZYMV), AS-0591, IgG; AS-0591 IgG – AP (against CYSDV), AS-1020, IgG; AS-1020 IgG – AP (against CCYV), AS-0131, IgG; AS-0131 IgG – AP (against MNSV) and AS-0203, IgG; AS-0203 IgG – AP (against WMV). Leaf samples (0.5 g) were homogenized in extract buffer (Sodium chloride (8.0 g), monobasic potassium phosphate with HC1) containing 0.05% v/v Tween 20 and 2% w/v PVP (Serva PVP-15 polyvinyl pyrrolidone). Each ELISA plate was coated with one of ZYMV, CMV, WMV, MNSV, CCYV and CYSDV IgG respectively diluted 1 in 1000 according to the manufacturer's (DSMZ) instructions in coating buffer (1.59 g Na_2CO_3, 2.93 g $NaHCO_3$, pH 9) in each well of the plates and incubated at 37ºC for 2 hours. The plates were washed three times with washing buffer (PBS-T) from a wash bottle. Using a pipette, 200 µl of the sap were pipette into each well and incubated overnight at 4ºC. The plates were decanted and washed before adding 200 µl antibody enzyme conjugate with alkaline 2% PVP and 0.2% albumen (Agdia, USA) was pipette into the wells of the plates and incubated at 37ºC for 2 hours. The plates were washed before addition of 200 µl of 1 mg/ml P-nitrophenyl phosphate (PNP) in substrate buffer (Agdia, USA). The plates were incubated at room temperature for 60 minutes to obtain clear reactions and the absorbance of the well contents read using Dynatech MR 500 at 405 nm. The samples with positive reactions to ZYMV, CMV, WMV, MNSV, CCYV and CYSD were observed when the absorbance value at 405 nm was twice that of the healthy control samples.

Data analysis

Field virus like disease incidence was calculated by expressing number of infected plants in the field as a percentage of the total number of plants in the field. Prevalence of disease in a given LGA was determined by expressing total number of fields with plants showing virus like symptoms as the percentage of all fields surveyed in that LGA (13).

RESULTS

Virus Survey

The results of the surveys for viruses of sweet melon in the local government areas studied in 2014 and 2015 were presented in Table 1. The incidence of the virus in the field ranged between 36.78% and 99.24% (Table 1).

Table 1: Incidence and severity of virus symptoms on sweet melon (*Cucumis melo* L.) in Gombe State during 2014 and 2015 surveys

Location	Stage of the plant growth	Mean incidence (%)	Mean Severity score	Major virus symptoms
Akko LGA				
Boltongo	Vegetative	75.98	4.12	Mo, Cu, NC, Ye
Gona	Vegetative	70.07	3.54	Ye, Mo, Mot
Kashere	Vegetative	92.53	3.17	Chl, Ye, Mo
Bangu	Vegetative	36.78	2.57	NC, Mo, Cll, Chl
Balanga LGA				
Gelengu	Vegetative	65.83	3.18	Vb, Chl, Ye, Mo
Bambam	Vegetative	99.24	4.37	Ye, NC, Mo, Mot
Degri	Vegetative	73.34	4.04	Mot, Ye, Mo
Yolde	Vegetative	57.54	2.85	Ye, Vb, Mot, Cll,
Yamaltu-Deba LGA				
Dadinkowa	Vegetative	56.79	2.22	LC, Cll, Mo.
Maikaho	Vegetative	90.84	3.19	Ye, Chl, NC, Mo
Dumbu	Vegetative	97.57	4.36	Mot, Cll, LC
Kwadon	Vegetative	74.26	3.34	Mo, Mot, LC, Ye

Keys: Mo = Mosaic; Mot = Mottling; Chl = Chlorosis; Ye = Yellowing; NC = Necrosis; LC = Leaf curling; Cll = Chlorotic local lesion; Vb = vein banding.

The highest incidence was recorded at Bambam (99.24%), Balanga LGA, followed

by Dumbu (97.57%) in Yamaltu Deba LGA, and Kashere (92.53%), Akko LGA. The lowest disease incidence was observed in Bangu (36.78%), Akko LGA followed by Dadinkowa (56.79%) in Yamaltu Deba LGA (Table 1). The highest mean severity score of 4.37was recorded in Bambam,Balanga LGA followed by Dumbu (4.36), Yamaltu-Deba LGA and Boltongo (4.12) in Akko LGA (Table 1). The most frequent viral symptom observed in the fields was mosaic followed by yellowing and mottling. The least symptom encountered was necrosis (Table 1). Other symptoms observed were mottling, yellowing, mosaic, chlorosis, vein banding, necrosis, leaf curling, chlorotic local lesions. Most farmers in the study area did not differentiate between effects of environmental factors and virus diseases symptoms on their crops.

Serological Detection of Viruses Infecting Sweet Melon

Serological analysis of the leaf samples by Double antibody sandwich enzyme- linked immuno-sorbent assay (DAS- ELISA) showed the presence of ZYMV, CMV, MNSV, CCYV, CYSDV and WMV (Table 2). The mean absorbance values for ZYMV were consistently three times the absorbance value of the healthy plants. The most widely distributed virus was ZYMV which occurred in 11 of the 12 (91.7%) of the locations. This was followed by CMV which occurred in 10 out of the 12 (66.7%). Watermelon mosaic virus (WMV) occurred in 58.3% of all the locations while CCYV and CYSDV occurred in 30% of the locations. The virus with the least distribution was MNSV (25.0%) which occurred in 3 out of the 12 of the locations (Table 2).

Seasonal Distribution of viruses infecting sweet melon in Gombe State

The distribution of six viruses identified and confirmed by DAS-ELISA from the infected sweet melon leaf samples in Gombe State were presented in Tables 3 and 4 for 2014 and 2015. In 2014, *Zucchini yellow mosaic virus* (ZYMV) recorded the highest prevalence with average incidences of 21.6% and 27.1% in rainy and dry seasons (Table 3). This was followed by CMV, with average incidence of 13.4% in the rainy season and 14.6% for WMV in the dry season in the same year. *Melon necrotic spot virus* (MNSV) recorded the least average incidence of 3.3% in the rainy season and 0.0% in the dry season. *Cucurbit chlorotic yellow virus* recorded average incidence of 4.2% in both rainy and dry seasons while CYSDV recorded average

incidences of 6.5% and 7.5% in rainy and dry seasons (Table 3). The seasonal distribution of the 6 viruses in 2015 showed that ZYMV recorded the highest average incidence of 32.4% in the rainy season and 29.4 in the dry season). This was followed by CMV, WMV, and CCYV with average incidence of 17.4%, 14.8% and 5.0 % respectively (Table 4). *Watermelon mosaic virus* (WMV) and CCYV recorded higher average incidences of 20.3% and 5.5% in dry season (Table 4). The distribution of the viruses between the local areas surveyed showed that ZYMV had the highest mean percentage incidences of 23.4% and 24 30.0% in rainy and dry seasons in Yamaltu- Deba LGA while CMV had 15.0% in Akko LGA and 21.3% in Balanga LGA. *Watermelon mosaic virus* (WMV) had the highest percentage incidences of 12.5% in Akko LGA and 16.3 % in Balanga LGA in rainy and dry seasons (Tables 3 and 4). In all the survey carried out it showed that ZYMV was the most prevalent virus on sweet melon in Gombe State followed by CMV, WMV, CYSDV, CCYV and MNSV.

Table 2: Results of serological detection of viruses in Sweet melon (*Cucumis melo* L.) leaf samples collected in Gombe State during 2014 and 2015 surveys

Location	Viruses detected in five leaf samples											
	2014						2015					
	ZYMV	CMV	WMV	MNSV	CCYV	CYSDV	ZYMV	CMV	WMV	MNSV	CCYV	CYSDV
Akko LGA												
Boltongo	+++	+	+	-	+	-	++	+	-	-	+	+
Gona	++	-	++	-	-	-	+++	+	+	-	+	-
Kashere	+++	++	-	+	-	++	++	+	+	+	+	-
Bangu	-	+	-	-	-	-	++	+	-	-	-	-
Balanga LGA												
Gelengu	++	+	-	-	++	-	++	++	-	-	+	+
Bambam	++	+	+	-	-	+	++	-	+	-	-	-
Degri	++	++	-	+	++	-	++	+	+	+	+	+
Yolde	++	+	++	-	-	++	++	+	-	-	-	+
Yamaltu-Deba LGA												
Dadinkowa	++	+	+	-	-	-	++	++	+	+	+	+
Maikaho	++	+	-	+++	++	-	++	+	-	+	-	+
Dumbu	+++	+	++	-	-	-	++	+	+	-	+	-
Kwadon	++	-	+	-	-	++	++	-	+	+	-	+

ZYMV= Zucchini yellow mosaic virus, CMV = Cucumber mosaic virus, WMV = Watermelon mosaic virus, MNSV = Melon necrotic spot virus, CCYV = Cucurbits chlorotic yellows virus, CYSDV = Cucumber yellowing disorder virus

+ = Indicates reaction strength based on mean absorbance value at A_{405nm}

- = Indicates non-detection

Table 3: Seasonal distribution of viruses in sweet melon (*Cucumis melo* L.) leaf samples collected in Gombe State during 2014 surveys

Season/Location	Number of samples infected with viruses (%)					
	ZYMV	CMV	WMV	MNSV	CCYV	CYSDV
Rainy Season						
Akko LGA	20.0	15.0	12.5	3.1	4.4	7.5
Balanga LGA	21.3	13.8	11.3	2.5	3.8	5.6
Yamaltu-Deba LGA	23.4	11.3	10.0	4.4	4.4	6.3
Average	21.6	13.4	11.3	3.3	4.2	6.5
Dry Season						
Akko LGA	26.3	17.5	12.5	0.0	6.3	8.8
Balanga LGA	25.0	21.3	16.3	0.0	0.0	7.5
Yamaltu-Deba LGA	30.0	17.5	15.0	0.0	6.3	6.3
Average	27.1	18.8	14.6	0.0	4.2	7.5

Table 4: Seasonal distribution of viruses in sweet melon (*Cucumis melo* L.) leaf samples collected in Gombe State during 2015 surveys

Season/Location	Number of samples infected with viruses (%)					
	ZYMV	CMV	WMV	MNSV	CCYV	CYSDV
Rainy Season						
Akko LGA	31.4	19.4	20.2	1.2	3.7	4.0
Balanga LGA	39.2	20.6	11.4	3.1	4.1	6.3
Yamaltu-Deba LGA	26.6	12.8	12.9	4.8	7.1	4.0
Average	32.4	17.6	14.8	3.0	5.0	4.8
Dry Season						
Akko LGA	48.1	14.3	20.6	0.0	5.4	4.2
Balanga LGA	40.2	9.6	22.0	0.0	1.2	3.1
Yamaltu-Deba LGA	21.7	19.7	18.3	3.1	2.4	9.1
Average	29.4	14.5	20.3	1.0	3.0	5.5

DISCUSSION

This report is the first intensive survey of viruses infecting sweet melon (*Cucumus melo* L.) in Gombe state and indeed Nigeria. The survey was carried out in three local government areas of Gombe state, 2014 and 2015. The incidence of virus symptoms on the field was between 36.7 and 97.5% (Table 1). The mean severity scores were between 2 (mild) and 5 (severe) in four locations in each LGA. The virus symptoms encountered were necrosis, chlorosis, yellowing, mottling, leaf curling, mosaic, vein banding and chlorotic local lesions. These viral disease symptoms were prevalent in all the local government areas surveyed in both rainy and dry seasons. This suggests that viral infection of sweet melon is widespread in Gombe State and at all cropping seasons, hence threatens sweet melon production in the Country. The high prevalence of viral diseases in the study area could be due to farmers' poor agronomic practice such as poor farm sanitation by the farmers, continuous cropping, mono-cropping, and pest management methods (19; 16 and 22). It could be due to non-availability of resistant varieties, as 99.9% of the farmers interviewed during the study complained about non-availability of certified seeds which forces them to use seeds of previous harvest for new planting. Ayo-John *et al*., (7), observed that where such seeds were obtained from infected plants, would lead to infected seedlings that would serve as source of primary inoculums in the field. Virus symptoms observed in the study area were similar to those reported on some cucurbits in southwest Nigeria (1). Elsewhere, (5) reported the same symptoms on cucurbits in Pakistan.

However, some leaf samples showing virus-like symptoms of virus infection tested negative to all the six viruses. This could be that the symptoms observed on these plants may have been caused by other viruses yet to be identified. The symptoms may also be due to biotic agents such as nutritional deficiencies and genetic characteristics causing virus-like symptoms (17). The detection of these six viruses on non-symptomatic leaf samples (latent infection) shows that laboratory diagnosis serves as a more sensitive and conclusive method of affirming the health status of breeding and/ or planting materials (6).

Serological (DAS-ELISA) analysis of the leaf samples showed that ZYMV and CMV were more prevalent in dry season than in the rainy season in the study area. This

finding corroborates that of (20), who reported of higher prevalence of virus diseases in Cote d'voire. This could be due to high temperatures experience in the North during dry season. Harvell *et al*, (15) observed that high temperatures usually experienced in dry seasons, could increase the susceptibility of host plants to virus infection. Nahoua *et al*., (19) reported that ZYMV and CMV were the most prevalent viruses infecting cucumber, zucchini, watermelon and sweet melon in Cote d'voire. This finding is also in agreement with the findings of Diane (11) who reported that ZYMV was the most prevalent virus in Hawaiian Islands causing more than 60% of the infections recorded. ZYMV was the most virulent, causing the highest infection rates on the crop in the study area. This could be that ZYMV has the ability to exclude other viruses occurring in mixed infections. Lecoq and Pitrat (18) reported that when inoculations were done from mixed infections of ZYMV and PRSV-W or WMV, ZYMV is more often transmitted. In addition, helper component of other cucurbit viruses has been shown to support more efficient transmission of ZYMV than the homologous viruses (18). However, findings of the studies in the United States on the incidence of viruses infecting cucurbits are not the same as the result in this study. For example, WMV was reported to be the most widespread virus compared to CMV, PRSV-W and ZYMV in melon growing areas of California (14).

The second most widely distributed virus on sweet melon in Gombe state North Eastern Nigeria was CMV after ZYMV. CMV has a very broad host range infecting more than 1200 plant species in over 100 families including fruit crops, vegetables and ornamentals, both monocot and dicot (8). *Cucumber Mosaic Virus* (CMV) is seed borne and can be transmitted none persistently by aphids, making its spread faster and easier. Presence of perennial weed species near sweet melon fields may be a continuous source of inoculums if not eliminated on the farms. Continuous cropping of sweet melon alongside crops like cowpea, 'egusi' melon, sweet potato, watermelon, cucumber, and pepper may help greatly in the spread of CMV as some of these crops are primary hosts of the virus. Tomlinson (23) listed CMV as one of the viruses of economic importance in celery, cowpea, cucurbits, lettuce, pepper, and tomato. WMV and MNSV were also detected in the leaf samples analyzed. WMV had higher percentage incidence than MNSV. *Melon necrotic spot virus* (MNSV) is soil borne, seed and sap transmitted as well as aphids. The other viruses detected in the leaf samples were

CCYV and CYSDV. These two viruses are crinivirus and are emerging viruses. These viruses cause prominent yellowing symptoms on sweet melon leaf samples. Both viruses are transmitted by white flies, *Bemisia tabaci* and *Trialeurodes vaporariorum* (3). CYSDV was reported in the Mediterranean Basin such as Jordan, Israel, Turkey and Spain (2). Most farmers in Lebanon reported a yield reduction of 40-60% due to CYSDV and CCYV (3).

CONCLUSION

This report summarizes the findings of a systemic survey carried out during 2014 and 2015 to identify and evaluate the distribution and incidence of viruses infecting sweet melon in Gombe state North eastern Nigeria. Diagnosis of virus diseases solely by symptoms could be inaccurate; high temperatures, drought, reduced susceptibility of a plant species to virus and other factors could mask symptoms in an infected plant. In this study, observation of virus and virus-like symptoms in the field were confirmed by DAS ELISA. Further work should be carried out in different parts of the country to determine the extent of damage these viruses (Potyvirus and Crinivirus) could cause on sweet melon crops.

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