

BIBLIOGRAPHY

ATLEB, MARISA B. APRIL 2013. Preliminary Study on the Evaluation of Plant Extracts against Coffee Ringspot Virus in Arabica Coffee at Benguet State University. Benguet State University, La Trinidad Benguet.

Adviser: Julio S. Ligat, PhD.

ABSTRACT

The crude extracts were taken from the existing plant species with or in between the Arabica coffee trees at the main campus Benguet State University in La Trinidad, Benguet. The source of Coffee Ringspot Virus-infected sample was the existing Arabica coffee tree at the main campus. At Benguet State University (BSU), the Arabica coffee are planted with or in between different tree species which includes agoho , pine, fern, eucalyptus and others.

Results showed that the *Phaseolus vulgaris* which was sprayed with crude extract from all the different plant species, 2 days before inoculation of Coffee Ringspot Virus, had mild virus infection (1-10%), it could be said that the mixture extracts from different plant species found growing with Arabica coffee trees in BSU Main campus have antiviral properties against the virus. The untreated plants had moderate virus infection of 11-25%.



RESULTS AND DISCUSSION

Evaluation of Plant Extracts Against Coffee Ringspot Virus

One day after inoculation with Coffee Ringspot Virus, it was observed in the *Phaseolus vulgaris* that except for agoho extract which had a rating of 1.11 which is equivalent to 1-10% infection, all the treatments had had no virus infection. The untreated plant had the highest virus infection rating of 1.56 rating or 1-10% infection.

Two days after virus inoculation, the plants which were sprayed with crude sap from bamboo, citrus and nappier grass, had no virus infection. The untreated plant had the highest virus infection. (3.44 rating scale or 11-25% infection).

Three days after virus inoculation, the plants which were sprayed with crude sap from Alnus, Caliantra, Bamboo, Agoho, citrus, passion fruit and bottle brush had 11-25% virus infection. The untreated plant had the highest virus infection of 26-50%.

Foreign countries reported that citrus contains citronella oil which is popular as a natural insect repellent. Its mosquito repellent qualities have been proved including effectiveness in repelling mosquito causing dengue fever. This shows that the insect vectors of Coffee Ringspot Virus were prevented from introducing the disease to Arabica coffee.

Alnus, ipi-ipil and caliantra have nitrogen-fixing capacity that enhanced the growth of Arabica coffee and resisted the detrimental effect of Coffee Ringspot virus. The holocellulose and alpha cellulose contents of bamboo had enhance the photosynthetic capacity of Arabica coffee and produced the necessary inhibitory aromatic compounds against the disease.



Table 1. Rating of Coffee Rings Virus spot infection as affected by different crude plant extract in *Phaseolus vulgaris* (test plant)

SOURCE OF EXTRACT	DAYS AFTER INOCULATION		
	DAY 1	DAY 2	DAY 3
Untreated	1.56	3.44	7.00
Alnus	0.89	1.56	5.78
Caliandra	0.67	1.78	5.78
Bamboo	0.89	0.89	5.33
Agoho	1.11	1.33	5.78
Citrus	0.89	0.89	5.33
Passion fruit	0.67	1.33	5.78
Bottle brush	0.99	1.11	5.78
Pine tree	0.89	1.56	6.00
Ipil-ipil	0.69	1.33	6.00
Cypress	0.67	1.33	6.00
Nappier grass	0.67	0.67	6.00

All the treated plants had mild infection (1-10%) of Coffee Ringspot Virus infection (Table 2). The untreated plant shows moderate virus infection (4.0 rating scale or 11-25%).



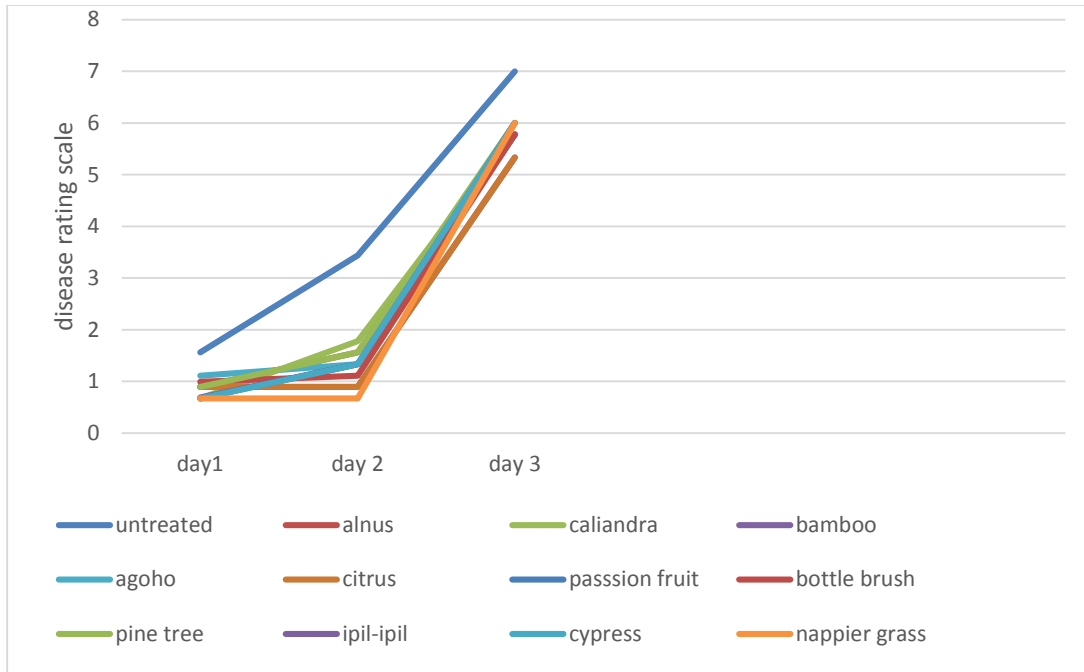


Figure 1. Effect of crude plant extracts against Coffee Ringspot Virus in *Phaseolus vulgaris*

The plants which were sprayed with crude extract from citrus had mild infection (rating scale of 2.44) of Coffee Ringspot Virus. The untreated had moderate virus infection (rating scale of 4.00).

The plant samples as sources of crude extracts were the existing different plant species with or in between the Arabica coffee trees at Benguet State University, La Trinidad, and Benguet.

The source of Coffee Ringspot Virus-infected sample was the existing Arabica coffee tree at Benguet State University, La Trinidad, Benguet.

The plant which was sprayed from crude extract of bamboo had mild infection (rating scale of 2.37) of Coffee Ringspot Virus. The untreated had moderate virus infection (rating scale of 4.00).



Mottling (Figure 3 and 5), leaf distortion (Figure 3 and 5), and vein clearing (Figure 6) were the symptoms observed shown by the test plant.



Figure 2. Symptom of Coffee Ringspot Virus



Figure 3. Symptom of mottling, leaf distortion and vein clearing in an inoculated test plant



Figure 4. No viral symptom in test plant sprayed with bamboo extract

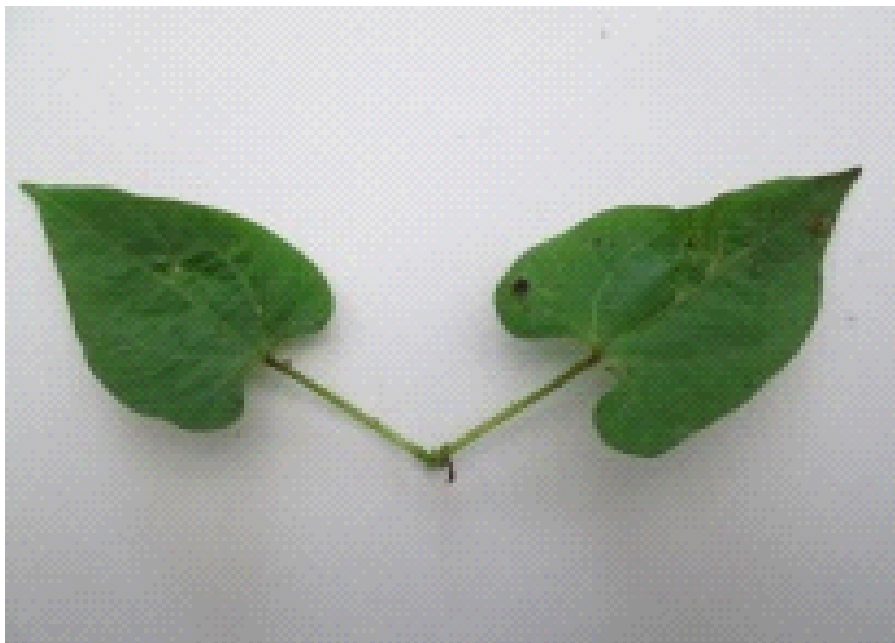


Figure 5. Symptom of mottling and leaf distortion in test plant

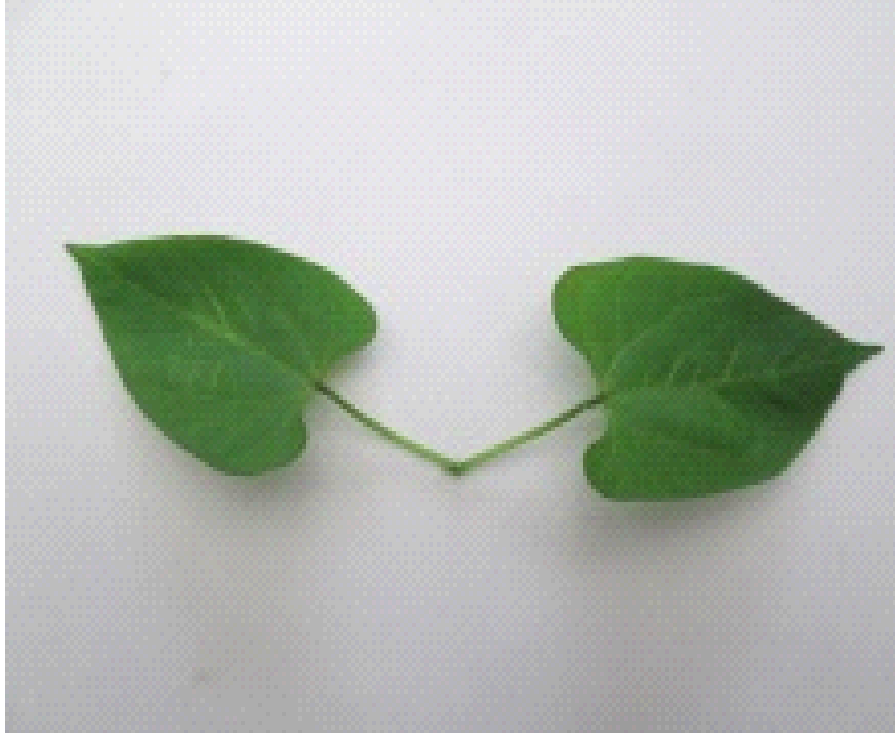


Figure 6. Symptom of vein clearing in test plant

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Eleven of crude extracts were from different plant species planted with or in between the Arabica coffee trees at Benguet State University, La Trinidad, Benguet were evaluated against the Coffee Ringspot Virus of Arabica coffee. CoRSV infected samples were collected from existing Arabica coffee tree at Benguet State University, La Trinidad, Benguet.

All the treated plants had mild (1-10%) Coffee Ringspot Virus infection. The untreated plant had moderate virus infection of 4.0 (11-25%).

Result showed that one day after inoculation of coffee ring spot virus, the test plants sprayed with crude extract from caliantra, passion fruit, cypress and nappier grass had the lowest disease infection while the untreated had the highest virus infection. Two days after inoculation of the virus it was observed that the test plant sprayed crude extracts from nappier has the lowest while untreated had the highest virus infection. Three days after virus inoculation the test plant which was sprayed with extract from bamboo had the lowest virus infection and untreated had the highest infection rate.

Conclusions

Since the *Phaseolus vulgaris* which was sprayed with crude extract from all the different plant species, 2 days before inoculation of Coffee Ringspot Virus, had mild virus infection (1-10%), it could be said that all the evaluated crude extracts from the different plant species have antiviral properties against Coffee Ringspot Virus (CoRSV). The untreated had moderate virus infection of 4.0 or 11-25%.



The best extract sprayed was bamboo extracts which had shown no visual symptom having mild infection on the test plant (Figure 3).The holocellulose and alpha cellulose contents of bamboo had enhance the phosynthetic capacity of Arabica coffee and produced the necessary inhibitory aromatic compounds against the disease.

Recommendations

A comprehensive study on the antiviral properties of the plant extracts evaluated should be done. As most of these plants are found in or in between coffee trees. More should be planted in between the Arabica coffee at the main campus of Benguet State University, La Trinidad, Benguet.



LITERATURE CITED

- AGRIOS, G.N. 1997. Plant Pathology, 4thed. Academic Press limited. 24-28 Oval Road, London NW1 7DX, UK, Pp. 375-377.
- ANGADOL, P. P. and LIGAT J. S. 1983. A survey on the incidence of virus symptoms on important flowers in Benguet unpublished BS Thesis. Benguet State University, LaTrinidad, Benguet. Pp. 15-16.
- BANISA, R.L. and J.S. LIGAT.2008. A Preliminary Survey on the Incidence of Coffee Ringspot Virus-like Disease in Arabica Coffee at the Benguet State University. BS Thesis. Benguet State University, La Trinidad, Benguet. Pp.1-20.
- CAGA, R. 2012. Isolation and evaluation of indigenous biological agent's against coffee leaf rust disease on organic Arabica coffee. Benguet State University. Unpublished Thesis. P. 1.
- CASTILLO P.C. 1969. Postward trends in the Production, Consumption and Price of Coffee. Unpublished M.S Thesis. UPCA. P. 2.
- DAGUIO, C.T. and J.S. LIGAT.2000. Incidence of Coffee in Bantay, Tabuk, Kalinga. BS Thesis. Benguet State University, La Trinidad, Benguet. Pp. 4-7.
- PENTDERGRAST, M.2009. Tea and Coffee Trade Journal. Retrieved December 29, 2009 from [http:// en. Wikipedia. Org/wiki/coffee](http://en.Wikipedia.Org/wiki/coffee).
- SINGH, R, S, 1978. Plant Disease. 4th Edition. Oxford and New Delhi CBH Publishing Co. Pp. 453-456.
- TARR, A. J. S. 1972. Principles of Plant Pathology. London. The Mc Millan Press. Pp. 43-47.
- WALKER, M.N.1969. Seed Transmission of Cucumber Mosaic Virus in Spinach. Retrieved 26th of October 2009 from <http://www.Apset.org/phyto/PDF/1997/070410R.PDF>.
- WELLMAN. F, L.1961. Coffee Botany, Cultivation and Utilization. New York: Interference Publishers Inc. Pp. 253-257.
- ZIDA, E.P., P. SEREME, V. LETH and P. SANKARA, 2008. Effect of aqueous extracts of *Acacia gourmaensis* A. Chev and *Eclipta Alba* (L.) hassk. On seed health seedling vigor and grain yield of sorghum and pearl millet. Asian J. Plant Pathol, 2: Pp. 40-47.

