**Wen-Shi Tsai**

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**Education**

2008/06, Doctor of Agriculture in Plant Pathology, National Chung-Hsing University

1993/06, Master of Science in Molecular Biology, National Chung-Hsing University

1991/06, Bachelor of Science in Botany, National Chung-Hsing University

**Employment**

Associate Professor, Department of Plant Medicine, National Chiayi University (2014-present)

Associate Specialist, Virology Unit, AVRDC- The World Vegetable Center (2009-2014)

Principal Research Assistant, Virology Unit, AVRDC- The World Vegetable Center (1996-2008)

**Language**

English, Chinese and Taiwanese

**Experience**

* Survey of plant virus diseases in Cambodia, Ethiopia, Honduras, Indonesia, Mali, Philippines, Taiwan, Tanzania, Thailand and Vietnam
* Multilocation screening of begomovirus resistances (cucurbit, pepper and tomato)
* Plant virus diagnostics, epidemiology and host rang study
* Characterization of plant virus by RT-PCR, IC-RT-PCR, Northern hybridization, ELISA, Western blot, genomic sequencing and infectious clone
* Resistance screening and rating of germplasm, breeding lines for virus disease management (potyviruses, geminiviruses, tospoviruses, cucumoviruses, tobamoviruses)
* Development of transgenic tomato resistant to CMV, potyviruses and geminiviruses using CP, antisense gene and gene silencing strategy
* Project proposal development and project management
* Supervising /training of research scholars in virological methods and research topics

**Publications**

1. Kenyon, L.\*, Tsai, W. S., Shih, S. L., Lee, L. M. 2014. Emergence and diversity of begomoviruses infecting solanaceous crops in East and Southeast Asia. Virus Research, 186:104-113. (SCI)
2. Knierim, D., Tsai, W. S., Maiss, E. and Kenyon, L\*. 2014. Molecular diversity of poleroviruses infecting cucurbit crops in four countries reveals the presence of members of six distinct species. Archives of Virology, 159:1459-1465. (SCI)
3. **Tsai, W. S.,** Shih, S. L., Lee, L. M., Dolores, L. M. and Kenyon, L.\* 2014. First report of a novel begomovirus associated with yellow vein disease of Browne's Blechum (*Blechum pyramidatum*). Plant Disease, 98(5):701. (SCI)
4. **Tsai, W. S.\*,** Kenyon, L., Hanson, P., Shih, S. L. and Jan, F.-J.\* 2013. Tomato leaf curl disease in Taiwan and breeding for resistance against it. Plant Pathology Bulletin, 22:327-337.
5. **Tsai, W. S.,** Shih, S. L., Rauf, A., Safitri, R., Hidayati, N., Huyen, B. T. T. and Kenyon, L.\* 2013. Genetic diversity of legume yellow mosaic begomoviruses in Indonesia and Vietnam. Annals of Applied Biology, 163:367-377. (SCI)
6. **Tsai, W. S.,** Shih, S. L., Lee, L. M., Wang, J. T., Duangsong, U., and Kenyon, L.\* 2013. First report of *Bhendi yellow vein mosaic virus* associated with yellow vein mosaic of okra (*Abelmoschus esculentus*) in Thailand. Plant Disease, 97(2):291. (SCI)
7. Knierim, D., **Tsai, W. S.,** and Kenyon, L.\* 2013. Analysis of sequences from field samples reveals the presence of the recently described pepper vein yellows virus (genus *Polerovirus*) in six additional countries. Archives of Virology, 158(6):1337-1341.(SCI)
8. Knierim, D., **Tsai, W. S.,** Deng,T. C., Green, S. K. and Kenyon, L.\* 2013. Full-length genome sequences of four polerovirus isolates infecting cucurbits in Taiwan determined from total RNA extracted from field samples. Plant Pathology, 62:633-641. (SCI)
9. Kadirvel, P., de la Pen˜a, R., Schafleitner, R., Huang, S., Geethanjali, S., Kenyon, L., **Tsai, W.** and Hanson, P.\* 2013. Mapping of QTLs in tomato line FLA456 associated with resistance to a virus causing tomato yellow leaf curl disease. Euphytica, 190(2): 297-308. (SCI)
10. Shih, S. L., **Tsai, W. S.,** Lee, L. M. and Kenyon, L.\* 2013. Molecular characterization of begomoviruses infecting *Sauropus androgynus* in Thailand. Journal of Phytopathology 161:76-85. (SCI)
11. Sengoda, V. G.\*, **Tsai, W. S.,** de la Peña, R. C., Green, S. K., Liu, C. A., Kenyon, L. and Hughes, J. 2012. Expression of full length coat protein gene of Tomato leaf curl Taiwan virus is not necessary for recovery phenotype in transgenic tomato. Journal of Phytopathology 160:213-219. (SCI)
12. Lin, C.-Y., **Tsai, W. S.,** Ku, H.-M., and Jan, F.-J.\* 2012. Evaluation of DNA fragments covering the entire genome of a monopartite begomovirus for induction of viral resistance in transgenic plants via gene silencing. Transgenic Research 21:231-241. (SCI)
13. **Tsai, W. S.,** Shih, S. L., Kenyon, L., Green, S. K. and Jan, F.-J.\* 2011. Temporal distribution and pathogenicity of the predominant tomato-infecting begomoviruses in Taiwan. Plant Pathology 60:787-799. (SCI)
14. **Tsai, W. S.,** Shih, S. L., Venkatesan, S. G., Aquino, M. U., Green, S. K., Kenyon, L. and Jan, F.-J.\* 2011. Distribution and genetic diversity of begomovirusesinfecting tomatoand pepper plants in the Philippines. Annals of Applied Biology 158:275-287. (SCI)
15. **Tsai, W. S.,** Hu, C.-J., Shung, D.-P., Lee, L. M., Wang, J. T. and Kenyon, L.\* 2011. First report of *Squash leaf curl Philippines virus* infecting chayote (*Sechium edule*) in Taiwan. Plant Disease 95(9):1197. (SCI)
16. Lin, C.-Y., Ku, H.-M., **Tsai, W. S.,** Green, S. K. and Jan, F.-J.\* 2011. Resistance to a DNA and a RNA virus in transgenic plants by using a single chimeric transgene construct. Transgenic Research 20:261-270. (SCI)
17. **Tsai, W. S.,** Abdourhamane, I. K. and Kenyon, L.\* 2010. First report of *Pepper veinal mottle virus* associated with mosaic and mottle diseases of tomato and pepper in Mali. Plant Disease 94(3):378. (SCI)
18. **Tsai, W. S.,** Abdourhamane, I. K., Knierim, D., Wang, J.T. and Kenyon, L.\* 2010. First report of *Zucchini yellow mosaic virus* associated with leaf crinkle and yellow mosaic diseases of cucurbit plants in Mali. Plant Disease 94 (7):923. (SCI)
19. Chang, H.-H., Ku, H.-M., **Tsai, W. S.,** Chien, R.-C. and Jan, F.-J.\* 2010. Identification and characterization of a mechanical transmissible begomovirus causing leaf curl on oriental melon. European Journal of Plant Pathology 127:219-228. (SCI)
20. Shih, S. L., **Tsai, W. S.,** Lee, L. M., Wang, J. T., Green, S. K. and Kenyon, L.\* 2010. First report of *Tomato yellow leaf curl Thailand virus* associated with pepper leaf curl disease in Taiwan. Plant Disease 94(5):637. (SCI)
21. Knierim, D., Deng, T. C., **Tsai, W. S.,** Green, S. K. and Kenyon, L.\* 2010. Molecular identification of three distinct Polerovirus species and a recombinant Cucurbit aphid-borne yellows virus strain infecting cucurbit crops in Taiwan. Plant Pathology 59(5):991-1002. (SCI)
22. **Tsai, W. S.,** Shih, S. L., Green, S. K., Lee, L. M., Luther, G. C., Ratulangi, M., Sembel, D. T. and Jan, F.-J.\* 2009. Identification of a new begomovirus associated with yellow leaf curl diseases of tomato and pepper in Sulawesi, Indonesia. Plant Disease 93(3):321. (SCI)
23. Lin, C.-Y., **Tsai, W. S.,** Ku, H.-M. and Jan, F.-J.\* 2009 Transgenic strategies for developing transgenic plants with geminivirus resistance. Plant Pathology Bulletin, Taiwan, 18:185-200.
24. Shih, S. L.\*, Kumar, S., **Tsai, W. S.,** Lee, L. M. and Green, S. K. 2009. Complete nucleotide sequences of okra isolates of *Cotton leaf curl Gezira virus* and their associated DNA-β from Niger. Archives of Virology 154:369-372. (SCI)
25. **Tsai, W. S.,** Huang, Y. C., Zang, D. Y., Reddy, K., Hidayat, S. H., Srithongchai, W., Green, S. K. and Jan, F.-J.\* 2008. Molecular characterization of the CP gene and 3’UTR of *Chilli veinal mottle virus* from South and Southeast Asia. Plant Pathology 57:408-416. (SCI)
26. **Tsai, W. S.\*,** Shih, S.L., Green, S. K. and Jan, F.-J. 2007. Occurrence and Molecular Characterization of *Squash leaf curl Philippines begomovirus* in Taiwan. Plant Disease 91:907. (SCI)
27. Jan, F.-J.\*, Green, S. K., Shih, S. L., Lee, L. M., Ito, H., Kimbara, J., Hosoi, K. and **Tsai, W. S.** 2007. First report of *Tomato yellow leaf curl Thailand virus* in Taiwan. Plant Disease 91:1363.
28. Shih, S. L.\*, **Tsai, W. S.,** Green, S. K. and Singh, D. 2007. First report of Tomato leaf curl Joydebpur virus infecting chilli in India. Plant Pathology 56:341. (SCI)
29. Shih, S. L.\*, Green, S.K., **Tsai, W. S.,** Lee, L. M. and Levasseur, V. 2007. First report of a distinct begomovirus associated with okra yellow crinkle disease in Mali. Plant Pathology 56:718. (SCI)
30. **Tsai, W. S.\*,** Shih, S. L., Green, S. K., Rauf, A., Hidayat, S. H. and Jan, F.-J. 2006. Molecular characterization of pepper yellow leaf curl Indonesia virus in leaf curl and yellowing diseased tomato and pepper in Indonesia. Plant Disease 90:247. (SCI)
31. **Tsai, W. S.\*,** Shih, S. L., Green, S. K., Akkermans, D., Hidayat, S. H. and Jan, F.-J. 2006. Molecular characterization of a distinct tomato-infecting begomovirus associated with yellow leaf curl diseased tomato in Lembang, Java Island of Indonesia. Plant Disease 90:831. (SCI)
32. Shih, S. L.\*, Green, S. K., **Tsai, W. S.** and Ssekyewa, C. 2006. Molecular characterization of a begomovirus associated with tomato leaf curl disease in Uganda. Plant Disease 90:246. (SCI)
33. Shih, S. L.\*, Green, S. K., **Tsai, W. S.,** Lee, L. M., Wang, J. T. and Tesfaye, A. 2006. First report of a begomovirus associated with tomato yellow leaf curl disease in Ethiopia. Plant Disease 90:974. (SCI)
34. Shih, S. L.\*, **Tsai, W. S.,** Green, S. K. and Lee, L. M. 2006. Molecular characterization of a distinct begomovirus associated with tomato leaf curl disease in Arusha of Tanzania. Plant Disease 90:1550. (SCI)
35. **Tsai, W. S.\*,** Shih, S. L., Green, S. K., Hanson, P. and Liu, H. Y. 2004. First report of the occurrence of tomato chlorosis virus and tomato infectious chlorosis virus in Taiwan. Plant Disease 88:311. (SCI)
36. Bull, S. E.\*, **Tsai, W. S.,** Briddon, R. W., Markham, P. G., Stanley, J. and Green, S. K. 2004. Diversity of begomovirus DNA β satellites of non-malvaceous plants in South East Asia. Archives of Virology 149:1193-1200. (SCI)
37. Green, S. K., **Tsai, W. S.\*,** Shih, S. L., Rezaian, M. A. and Duangsong, U. 2003. Molecular characterization of a new *Begomovirus* associated with tomato yellow leaf curl and eggplant yellow mosaic diseases in Thailand. Plant Disease, 87:446. (SCI)
38. Shih, S. L.\*, **Tsai, W. S.,** Green, S. K., Hanson, P., Valand, G. B. and Kalloo, G. 2003. Molecular characterisation of a new tomato begomovirus from India. Plant Disease, 87(5):598. (SCI)
39. Shih, S. L.\*, **Tsai, W. S.,** Green, S. K., Khalid, S., Ahmad, I., Rezaian, M. A. and Smith, J. 2003. Molecular characterization of tomato and chilli leaf curl begomoviruses from Pakistan. Plant Disease, 87:200. (SCI)
40. Green, S. K.\*, **Tsai, W. S.,** Shih, S. L., Black, L. L., Rezaian, A., Rashid, M. H., Roff, M. M. N., Myint, Y. Y. and Hong, L. T. A. 2001. Molecular characterization of Begomoviruses associated with leafcurl disease in Bangladesh, Laos, Malaysia, Myanmar, and Vietnam. Plant Disease 85:1286. (SCI)

**International conferences**

1. Gniffke, P. A., Shieh, S. C., Lin, S. W., Sheu, Z. M., Chen, J. R., Ho, F. I., **Tsai, W. S.,** Chou, Y. Y., Wang, J. F., Cho, M. C., Schafleitner, R., Kenyon, L., Ebert, A. W., Srinivasan, R. and Kumar, S.\* 2013. Pepper research and breeding at AVRDC – The World Vegetable Center. XV EUCARPIA Meeting on Genetics and Breeding of Capsicum and Eggplant, 2-4 September 2013, Torino, Italy. Invited speaker
2. **Tsai, W. S.\***, Kumar, S. and Kenyon, L. 2013. Screening pepper (*Capsicum* spp.) lines for resistance to potyviruses at AVRDC- The World Vegetable Center. Asia-Pacific Congress of Virology, 17-20 December, 2013, Noida, India. Invited speaker
3. **Tsai, W. S.\*,** Hanson, P. and Kenyon, L. 2013. Reaction of tomato lines carrying different *Ty*-gene combinations to leaf curl viruses in Taiwan. Acta Phytopathologica Sinica, 43:103.  
   Poster presentation in the ICPP 2013, 10th International Congress of Plant Pathology, 25-30 August, 2013, Beijing, China. Poster presentation
4. **Tsai, W. S.,** Kenyon, L., Hanson, P., Shih, S. L. and Jan, F.-J\*. 2013. Tomato leaf curl disease in Taiwan and breeding for resistance against it. IN: Proceeding of the 2013 International Symposium on Insect Vectors and Insect-Borne Diseases. Eds Chang, C. –J., Lee, C.-Y. and Shih, H.-T., 6-8 August, 2013, Held at Agriculture Research Institute, Taichung, Taiwan, ROC. Invited speaker
5. Weng, S.-H., **Tsai**,**W.S.,** and Tsai, C.-W\*. 2012. Transmission biology of two tomato begomoviruses by *Bemisia tabaci*. The Entomological Society of America Annual Meeting, 11-14 November 2012, Knoxville, TN, USA. Poster presentation
6. **Tsai, W. S.\*,** Shih, S. L., Safitri, R., Huyen, B. T. T. and Kenyon, L. 2012. Molecular identification of legume-infecting begomoviruses in Southeast Asia. TheAmerican Phytopathological Society Annual Meeting, 4-8 August 2012, Providence, Rohde Island, USA. Poster presentation
7. Kadirvel, P.\*, de la Peña, R., Geethanjali, S., Kenyon, L., **Tsai, W. S.** andHanson, P. 2010. Mapping of QTLs associated with resistance to a virus causing Tomato yellow leaf curl disease (TYLCD) in tomato.7th Solanaceae Conference, 5-9 September 2010, Dundee, Scotland. Oral presentation
8. Chang, H.-H., Ku, H.-M., **Tsai, W. S.,** Chien R.-C., and Jan, Fuh-Jyh\*. 2009. Molecular and biological characterization of a mechanically transmissible Tomato leaf curl New Delhi virus infecting oriental melon plants. TheAmerican Phytopathological Society Annual Meeting, 1-5 August 2009, Portland, Oregon, USA. Phytopathology 99: S21. Poster presentation
9. **Tsai, W. S.\*,** Jan, F.-J., Green, S. K., Shih, S. L., Lee, L. M. and Kenyon, L. 2009. Molecular characterization and resistance screening of *Tomato yellow leaf curl Thailand virus* in Taiwan. Fifth International *Bemisia* Workshop, 9-12 November 2009, Guangzhou, P. R. China. Oral presentation
10. **Tsai, W. S.,** Huang, Y. C., Zang, D. Y., Reddy, K., Hidayat, S. H., Srithongchai, W., Green, S. K. and Jan, F.-J.\* 2008. Characterization of the CP gene and 3’UTR of *Chilli veinal mottle virus* from China, India, Indonesia, Taiwan and Thailand. 9th International Congress of Plant Pathology, 24-29 August 2008, Turin, Italy. Journal of Plant Pathology 90 (S2): S2384-385. Poster presentation
11. Lin, C.-Y., **Tsai, W. S.,** Green, S. K. and Jan, F.-J.\* 2007. Evaluation of the global genome of *Tomato leaf curl virus* for controlling geminiviruses via gene silencing. The American Phytopathological Society/ the Society of Nematologists Joint Meeting, 28 July-1 August, 2007, San Diego, California, USA. Phytopathology 97:S22. Oral presentation
12. Green, S. K.\*, Shih, S. L., **Tsai, W. S.,** Wang, J. T. and Lee, L. M. 2007 Evaluation of field management practices for the reduction of Tomato leafcurl virus (ToLCV) on tomato and Cucumber mosaic virus (CMV) of pepper p.101 In: 2007 Workshop on plant insect-borne diseases and protection (Oct.26, NCHU, Taichung, R. O. C.) Bureau of Animal and Plant Health Inspection and Quarantine, Taipei and National Chung Hsing University, Taichung, R.O.C. 278 pp. Oral presentation
13. Green, S. K.\*, **Tsai, W. S.,** Shih, S. L., Huang, Y. C. and Lee, L. M. 2005. Diversity of begomoviruses of tomato and weeds in Asia. In: Proceeding of the international seminar on whitefly management and control strategy, 3-8 October, 2005, Held at Agriculture Research Institute, Taichung, Taiwan, ROC. Oral presentation
14. Green, S.K.\*, **Tsai, W. S.,** Shih, S. L. and Rezaian A. 2001. Molecular characterisation and phylogenetic relationships of tomato geminiviruses in Australasia. p.37; In: Programme and Abstracts 3rd International Geminivirus Symposium, 24-28 July, John Innes Centre, Norwich, UK. Poster presentation
15. Hsu, Y. H.\*, **Tsai, W. S.** and Chu, C. L. 1994. Association of CMV coat protein and RNAs with chloroplasts in tobacco. The American Phytopathological Society Annual Meeting, 1994, Albuquerque, New Mexico. Poster presentation