Official publication of Pakistan Phytopathological Society
Pakistan Journal of Phytopathology
ISSN: 1019-763X (Print), 2305-0284 (Online)
http://www.pakps.com

FIRST REPORT OF BACTERIAL HEAD ROT DISEASE CAUSED BY *PECTOBACTERIUM ATROSEPTICUM* ON SUNFLOWER IN PAKISTAN

[a]ShahzadAsad, [a]AnjumMunir*, [b]Ayub Khan, [c]Ishaq Ahmad,[b]MuhammadArshad

[a]Crop Diseases Research Institute (CDRI), Department of Plants and Environmental Protection (DPEP), National Agricultural Research Center (NARC), Islamabad, Pakistan.
[b]National Oilseed Research Program, National Agricultural Research Center (NARC), Islamabad, Pakistan.
[c]PARC Institute of Advanced Studies in Agriculture, NARC, Islamabad, Pakistan.

A B S T R A C T

Sunflower is an important oil seed crop in Pakistan. During a field visit at National Agricultural Research Center (NARC), Islamabad, Pakistan bacterial head rot disease caused by *Pectobacterium atrosepticum* (formly *Erwinaia caratovora* subsp*. atroseptica*) has been observed on both local and exotic hybrids of Sunflower crop. Pathogenicity test has been carried out to fulfill Koch's postulates. White and creamy colony growth was observed upon isolation and purification of the bacteria. Biochemical tests were conducted at Crop Diseases Research Institute (CDRI), NARC, Islamabad. Pathogenicity test has confirmed the presence of *Pectobacterium atrosepticum* on sunflower. This is first report documented this pathogen on sunflower crop in Pakistan.

Keywords: *Helianthus annuus*, head rot disease, *Pectobacterium atrosepticum*, Pakistan.

Bacterial head rot on Sunflower (*Helianthus annuus*) was observed during the spring of 2013at NARC, Pakistan. Disease incidence was estimated as 30% and the symptoms appear under high humidity and temperature condition in the field. *Pectobacterium atrosepticum* (formerly *Erwinia caratovora* subsp. *atroseptica*) has also been reported from Konya province of Turkey in 2008 with incidence of 30%. The bacterial appearance is in the form of ooze and small droplets while symptoms were water- soaked necrotic dark areas on stalks and heads of sunflower (Bastas *et al*., 2009). Similar symptoms were observed at NARC sunflower field with the difference that the disease was observed only on the heads and not on stalk (Figure 1).

Isolation from rotted sunflower heads on Wakimoto media showed development of bacteria characterize by white and creamy colonies (Figure 2) by using biochemical test, all isolates were identified as *Pectobacterium astrosepticum*. Biochemical test were applied for all isolates. These were performed according to method reported by De Boer and Kelmen, (2001) and Schaad *et al.,* (2001). On the basis of these biochemical tests bacteria obtained from purified colonies was rod shape, Gram negative, oxidase negative, catalase positive and facultative anaerobic. Pathogenicity test was conducted by using the method reported by Bastas *et al.,* (2009). Freshly prepared bacterial solution with the strength of 10^8 CFU/ml was pierced into sunflower heads with the help of syringe and was incubated for 2 weeks with 80% relative humidity at 28°C. All the isolates exhibited the symptoms on heads like water soaking and head rotting and ooze (Figure 3 and 3a). The control that was inoculated with sterile water was found showing no symptoms (Figure 4). The re-isolation of bacteria was conducted and was confirmed again with biochemical test to prove the Koch's postulates. This is first report of *P. atrosepticum* on sunflower in Pakistan causing head rot. In Pakistan the sunflower is cultivated at an area of 800,000 acre (Anonymous, 2013) and with the increasing trend of area under cultivation it is imperative to determine how far the disease is spreading in the country.

* Corresponding Author:
Email: anjums41@yahoo.com

Figure 1.Symptoms of sunflower rotting under natural field conditions

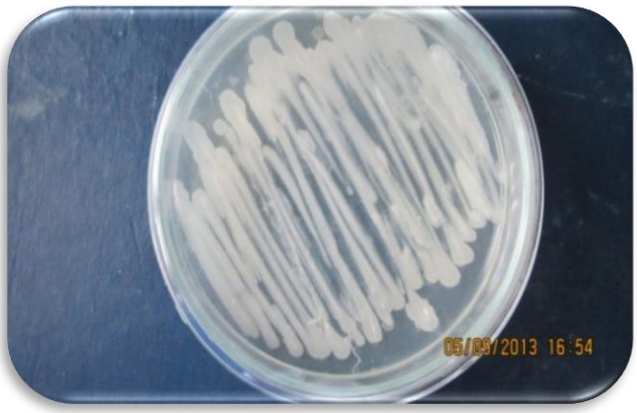

Figure 2. Colony growth of *Pectobacterium astrosepticum* after 3 days

Figure 3. Head of sunflower showing rottening symptoms

Figure 3a.Rottening symptoms after pathogenicity test with *Pectobacterium astrosepticum*

Figure 4. Healthy sunflower head in control treatment.

REFERENCES

Anonymous. 2013. Growing advice to cultivate Oilseed on maximum area land. Zaria media team. Pakistan Oilseed Development Board. Jan, 1, 2013.

Bastas, K.K., H. Hekimhan, S. Madan and M. Tor. 2009. First report of Bacterial stalk and head rot disease caused by *Pectobacterium astrosepticum* on Sunflower in Turkey. Plant Disease. 93(12):1352

De Boer, S. H and A. Kelman. 2001. Gram negative bacteria: Erwinia soft rot group. PP. 56-72. In: Laboratory guide for identification of plant pathogenic bacteria. N.M. Schaad, J. B. Jones and W. Chun, Third Ed, APS press, ST. Paul, MN, USA, 398 pp.

Schaad, N. W., J. B. Jones and W. Chun. 2001. Laboratory guide for identification of plant pathogenic bacteria. Third Ed, APS press, ST. Paul, MN, USA, PP.398.