

RINGKASAN

Jagung (*Zea mays*) merupakan bahan pangan yang penting penghasil karbohidrat kedua setelah beras. Jagung digunakan sebagai bahan makanan baik bagi manusia maupun sebagai pakan ternak. Setiap tahunnya produksi jagung mengalami fluktuasi, Salah satu kendala produksinya disebabkan oleh patogen *R. solani* yang menyebabkan kehilangan hasil hingga 100%. Keberadaan patogen *R. solani* pada budidaya jagung mendorong petani untuk menggunakan pestisida kimia yang lebih cepat dirasakan manfaatnya. Tetapi pestisida kimia ini memiliki banyak dampak negatif, sehingga perlu dilakukan pengendalian yang aman bagi manusia maupun lingkungan, diantaranya menggunakan agensia hayati *Bacillus* sp. Penelitian ini bertujuan untuk menguji kemampuan isolat *Bacillus* sp, asal rizosfer jagung terhadap pertumbuhan jamur *R. solani* pada uji *in vitro* dan *in planta*, serta mengetahui pengaruh isolat *Bacillus* sp, terhadap pertumbuhan tanaman jagung.

Penelitian dilakukan di Laboratorium Perlindungan Tanaman dan Screenhouse Fakultas Pertanian Universitas Jenderal Soedirman Purwokerto. Dimulai bulan Maret 2018 hingga Januari 2019. Penelitian terdiri dari isolasi dan karakterisasi bakteri antagonis asal rhizosfer jagung, uji *in vitro* dan *in planta* bakteri antagonis terhadap *R. solani*. Uji *in vitro* menggunakan Rancangan Acak Lengkap dengan 9 perlakuan meliputi kontrol (tanpa pengendalian) dan 8 *Bacillus* sp, yaitu isolat Kembaran 7,8,9, Sumbang 1,2, Bojong 1, dan Pratin 1,2. Setiap perlakuan diulang 3 kali. Pengujian *in planta* menggunakan Rancangan Acak Kelompok dengan 4 perlakuan yaitu kontrol (tanpa pengendalian), fungisida (bahan aktif mankozeb), *Bacillus* sp Kembaran 7, dan *Bacillus* sp Kembaran 9. Setiap perlakuan diulang 6 kali. Variabel yang diamati meliputi karakterisasi bakteri antagonis dan jamur patogen, daya hambat antagonis, bobot kering miselium, masa inkubasi, kejadian penyakit, intensitas penyakit, AUDPC, tinggi tanaman, jumlah daun, bobot segar tanaman, bobot segar akar, uji saponin, uji tannin, dan uji hidrokuinon.

Hasil penelitian menunjukkan bakteri rhizosfer yang telah diisolasi dari akar tanaman jagung asal Kabupaten Banyumas dan Purbalingga, didapatkan 8 isolat yang terdiri dari Kembaran 7,8,9, Sumbang 1,2, Bojong 1, dan Pratin 1,2, termasuk bakteri *Bacillus* sp. Bakteri rhizosfer isolat Kembaran 9 memiliki tingkat penghambatan terhadap *R. solani* paling tinggi yaitu sebesar 57,9%. Hasil pengujian *in planta* *Bacillus* sp Kembaran 9 mampu menekan penyakit hawar pelepah batang dengan menunda masa inkubasi selama 30 hari, menurunkan intensitas penyakit 72,3%, menurunkan kejadian penyakit 63,63%, AUDPC 73%, meningkatkan tinggi tanaman 37%, jumlah daun 40%, bobot segar tanaman 53%, bobot segar akar 55%, kandungan senyawa saponin, tanin, hidrokuinon dalam tanaman. *Bacillus* sp, Kembaran 7 merupakan *Bacillus cereus*, dan *Bacillus* sp Kembaran 9 merupakan *Bacillus subtilis*.

SUMMARY

Corn (*Zea Mays*) is one of the main resource of carbohydrate beside rice for both human and animal. Corn production is fluctuative from year to year, one of many problems that cause the unstable production condition is *R. solani* that can decrease the yield until 100%. Most of farmer use chemical pesticide to control *R. solani* without notice the negative effect for human health and environment, for that reason a new methods to control *R. solani* is needed. One of many methods to overcome this problem is the use of biological agency such as *Bacillus* sp. This research aimed to observe the ability of *Bacillus* sp isolate from rizosfer of *zea mays* to the gorowth of *R. solani* on in vitro and in planta test, also to observe the effect of *Bacillus* sp to the growth of corn.

This research was conducted in Plant Protection Laboratory of Agriculture Faculty Jenderal Soedirman University Purwokerto. Started from March 2018 until Janury 2019. The research was consisted of isolation and characterization antagonism bacterial from rhizosfer of maize, in vitro and in planta test antagonism bacterial with *R. solani*. In vitro test arranged by Randomized Complete Block Design with 9 treatments included control and 8 isolate *Bacillus* sp, there are Kembaran 7,8,9, Sumbang 1,2, Bojong 1, and Pratin 1,2. 3 replications for in vitro test. In planta test arranged by Randomized Block Design with 4 treatments, consisted of control (without bacterial rhizosfer), Fungicide (mankozeb active ingredient), *Bacillus* sp Kembaran 7, and *Bacillus* sp Kembaran 9. 6 replications was applied for in planta test. The observed variable were characteristic of antagonistic bacteria and pathogenic fungi, antagonistic inhibition capacity, dry weight of mycelium, incubation time, incident of desease, AUDPC, height of plant, number of leaf, wet weight of plant, wet weight of root, saponine test, tannin test, and hudrcquinone test.

The result of this research showed that *Bacillus* sp isolated from rizosfer of maize from Banyumas and Purbalingga regency, 8 isolate were found (Kembaran 7,8,9, Sumbang 1,2, Bojong 1, and Pratin 1,2) there are was *Bacillus* sp. Bacterial rhizosfer isolate kembaran 9 showed the highest level of *R. solani* with in-vitro antagonism test of 57,9%, and in-planta test can delay incubation period for 30 days, reduce the disease intensity with effectivity by 72,3%. able to reduce incident the disease 63,63%, AUDPC 73%, can increase plant height 37%, leaf number 40%, fresh weight of the plant 53%, fresh weigh of the root 55% and the content of saponin, tanin, hidrokuenon in the plant. *Bacillus* sp, Kembaran 7 is *Bacillus cereus*, and *Bacillus* sp Kembaran 9 is *Bacillus subtilis*.