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Common Diseases of Peanuts in the Top End of the NT

(Arachis hypogaea L.)

S. Bellgard, formerly Senior Plant Pathologist, Katherine and C. Ham, Irrigated Crops Agronomist, Darwin

INTRODUCTION

Diseases in peanut crops occur throughout the plant's life, and therefore checks are necessary from emergence to the post-harvest period. All parts of the peanut plant are subject to attack; and many diseases can reduce the quantity or quality of pods and seed. While crop losses associated with an individual disease may not cause economic losses, combinations of seedling disorders, leaf spots, and limb and peg (fruit attachment) blights can be detrimental to yield and quality. Certain diseases, such as leaf spots are found throughout the growing areas of Australia. Other diseases such as net blotch and *Cylindrocladium* black root rot have not been recorded in the NT at the time of publication. Seed-borne diseases pose a potential threat by providing an avenue for entry of certain quarantine diseases into peanut growing areas of the NT. Application of a seed dressing is required for seed to be allowed into the NT, which reduces the risk of seed-borne diseases.

SEEDLING DISORDERS

Seedling diseases are common. *Aspergillus* crown rot is a seed-borne disease, which can significantly cause plant losses early in the crop's life cycle. Losses as high as two plants per metre of planted row have been recorded. Seedlings and young plants are particularly susceptible especially if the seeds are planted too shallow (< 3 cm) or too deep (> 8 cm) and the soil is exceptionally wet or dry. High soil temperatures also increase the risk of infection. As plants mature and the soil cools, plants become less susceptible, and the mortality rate declines.

Seed rots and early emergence damping-off (wilting) are both common phases of the disease, but the most obvious symptom of the disease is a sudden wilt, leaving shrivelled, dried seedlings. Black masses of powdery spores surrounding the ground line (the section of stem at the ground level) are indicative of this disease. When the stem is split open at the ground line the tissue is brown and shrivelled. It is the destruction of this tissue that causes the plant to wilt.

Photo courtesy Pat Harden, Peanut Company of Australia

Figure 1. Seedling infected with *Aspergillus* crown rot. The black masses of spores are easily visible at the ground line of the seedling.

LEAF DISEASES

Because they occur frequently all over the world, early leaf spot (caused by *Cercospora arachidicola*) and late leaf spot (caused by *Cercosporidium personatum*) are generally regarded as the most important diseases of peanuts. A recent field study demonstrated how destructive these spots can be if fungicides are not applied. Leaf lesions increased over the growing season from 25% to 89% of total leaves infected in untreated plots compared with a consistent level of 10% of leaves infected in sprayed plots. Refer to page 32 of "Commercial Peanuts in the NT- A Grower's Experience" by Geoff and Melissa Plant for more information. Early leaf spot lesions usually consist of a light to dark-brown centre surrounded by a conspicuous yellow halo. Late leaf spot lesions are similar, but supposedly, the halo is usually either less prominent or absent. From our own observations, the halo is not a reliable characteristic for distinguishing between early and late leaf spot. At first outbreak of leaf spot disease, it is common practice to use an eradicant fungicide (e.g. Folicur® and/or Alto®). Re-spraying with a protectant fungicide (e.g. **chlorothalonil**) after two weeks is necessary, as the disease persists and spreads. Combined with twice weekly checks for their impact and occurrence, these "calendar" sprays are necessary until the crop is one month from harvest.

Figure 2. Peanut leaf infected with early leaf spot lesions, *Cercospora arachidicola*

Leaf scorch (caused by *Leptosphaerulina crassiasca*) usually appears at the leaf apex, followed by the development of a wedge-shaped lesion with a vivid yellow zone around the advancing disease margin. Leaf scorch is common early in the season and is often mistaken for a leaf spot. Identification can usually be distinguished from leaf spot by the irregular pattern of the yellow portion of the leaf. Occasionally both leaf spot and leaf scorch can coexist in the same section of the leaf making identification difficult for the novice.

Peanut rust caused by *Puccinia arachidis* has been observed occasionally. Characteristic rust-coloured pustules of spores occur on the underside of leaves. The prevalence of rust is a lot less than the leaf spot fungi. As with all rusts, air-borne uredospores (rust spores) can be introduced from other peanut producing areas. Unlike leaf spots, rust requires a living host to reinfect subsequent crops. It is generally believed that rust will not survive for long in peanut trash, therefore eradication of volunteer peanut plants during the fallow period is important in reducing primary inoculum sources.

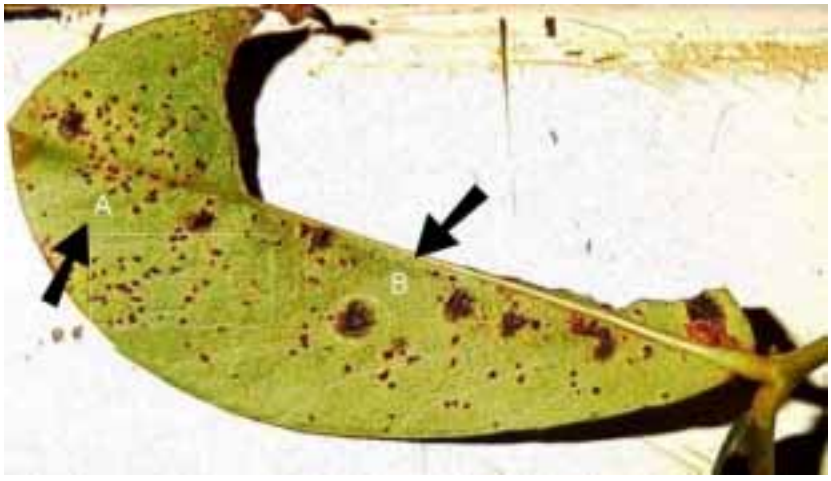

Figure 3. (A) Peanut rust *Puccinia arachidis* pustules on the back of an infected leaf. (B) The larger black spots are late leaf spot lesions, *Cercosporidium personatum*.

Little leaf, “witches broom” or phyllody is caused by a phytoplasmid. Phytoplasmids are poorly understood organisms; the symptoms they cause were often misdiagnosed as caused by viruses. The leaves of symptomatic plants can display severe yellowing, reduced leaf size and deformation. Plants are very bushy in appearance, with a proliferation of stems and leaves. Leaflets are pale yellow and small. Pegs tend to grow upwards and pod yields are severely reduced. The disease is spread by insect vectors, mainly, leafhoppers and sapsuckers. Little leaf is usually sporadic and patchy, with no practical control recommended.

Figure 4. Peanut plant affected by little leaf

STEM AND LIMB ROTS

Diseases caused by *Rhizoctonia solani* occur from planting to harvest. The disease appears to be more prevalent in dry season irrigated crops. The fungus causes black, sunken lesions on limbs close to the ground. Once the canopy closes over the furrow, *Rhizoctonia* limb rot becomes a major problem. Infected pegs often shred and break, leaving the developing pod in the ground. This adds to losses and contributes to problems associated with unwanted regrowth in the following crop. The strain of *Rhizoctonia solani* observed in the Katherine and Douglas Daly region has been positively identified as Astinomosis group (AG) 2-2.

Scab-like pustules are often observed on young limbs. No apparent damage is associated with the occurrence at this time and their distribution can be very patchy on any given limb exhibiting symptoms. Towards the end of the season the scabs will commence to shred and this leads to limb weakness and deterioration. *Diplodia gossypina* has also been retrieved from the shredded limb tissue. *Diplodia* is a common soil saprophyte associated with peanut as a wound parasite. Conidia of *Alternaria* sp. were also associated with the shredded limb sections on occasion.

Figure 5. Limb scab on peanut, the early stages of *Rhizoctonia solani* infection

Stem rot of peanuts, also called white mould, or *Sclerotium* rot is also a late-season disorder in the Katherine Daly Basin. White mould does not occur until mid-season when the foliage has covered the row middles. White mould appears to be more prevalent in the wet season crops and is often exacerbated by higher temperatures. The first obvious symptom of the disease is yellowing and wilting of the lateral branch, the main stem, or the entire plant. Sheaths of white mycelium (the body of the fungus) can be seen at or near the soil line around infected plant parts. Round sclerotia (dormant fungus) 0.5-2.0 mm in diameter, are produced on affected plant parts and the soil surface. Sclerotia are initially white but later turn dark brown.

ROOT, PEG AND POD ROTS

Pythium aphanidermatum and *P. myriotylum* cause damping off, vascular wilt, and root rot. They can infect plants singly or in combination. *P. myriotylum* is generally considered a warm-soil pathogen that is favoured by constantly moist soil conditions. There are exceptions and taproot rot epidemics have been observed in sandy soils where there is little chance of waterlogging. Fibrous roots are susceptible to decay, however all root tissues (including nodules) can be infected and ultimately turn dark brown to black during decay. The total root system is greatly reduced by deterioration of lateral and branch roots resulting in dead, wilting patches within the crop. If the infection does not extend to the vascular tissue, adventitious rootlets can be produced just below the soil surface on the taproot. Additionally, nodules have been observed forming on the taproot. As such, wilted plants may recover turgidity and outgrow the disease if conditions are conducive to growth.

Figure 6. Root rot caused by *Pythium* spp. Note the new growth of adventitious roots off the main tap root and the blackening of the tip of the main tap root.

Peg and pod rots become obvious near the end of the growing season. Peanut peg and pod rots were found to be associated with at least three fungi: *R. solani* (AG 2-2), *Pythium* spp. and *Fusarium* spp. (often referred to as pod rot complex). The pre-disposing factors are canopy closure, coupled with situations where pooled irrigation water sits in the furrow and provides very humid, moist conditions, and little opportunity for ventilation. The canopy can still appear green and healthy from the surface even where pod rots were found to be active below ground.

Figure 7. Pod rot and peg shredding caused by pod rot complex

Soil fauna plays a role in the pod rot complex. It is suspected that the feeding of nematodes and insect larvae makes the pods more susceptible than uninjured pods. Root lesion nematodes (*Pratylenchus* species) were first observed in Darwin in 1980, in Alice Springs in 1985 and then

in the Katherine Venn Blocks in 1992. In 2003 they were identified in small numbers at a peanut farm near Katherine. At the time of publishing they had not been present in large numbers, or seen as a high risk. Most of the current varieties of peanuts have a high resistance to nematodes. Nematodes are more of a concern to other crops used in rotation with peanuts.

SUMMARY

Peanuts display many leaf disorders that range from random spotting to total defoliation. Causes vary and may not be induced by diseases. Correct identification is difficult even for experienced observers. The purpose of this publication is to alert readers to the potential of disease in the Katherine/Daly basin and some common causes. If commercial production of peanuts is to be considered, professional advice should be sought both prior to and during production of the crop. Control options vary considerably in their cost and efficacy. Proper identification by an experienced adviser should precede any control strategy.

REFERENCES

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CONTACT INFORMATION

NT Department of Primary Industry
Fisheries and Mines
Pastoral Division
Katherine Research Station
Katherine
Plant Pathologist
Phone: (08) 8973 9739 (General enquiries)

NT Department of Primary Industry,
Fisheries and Mines
Berrimah Farm
Darwin
Irrigated Crops Agronomist
Phone: (08) 8999 2133 (General enquiries)

Peanut Company of Australia
133 Haly Street
Kingaroy
QLD 4610
Phone: (07) 4162 6311
Email: peanuts@pca.com.au

WARNING

Legal restrictions in the NT prohibit the feeding of any foliage (leaves, stems) from the peanut crop including the use of grazing, hay and residues to feed livestock if chlorothalonil has been applied as a fungicide against leaf diseases at any point during the growing season (read the label on the fungicide packet).

Please visit us on our website at www.primaryindustry.nt.gov.au

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