Oats are attacked by a number of diseases and pests which may limit oat grain and forage production. In addition oat quality may be influenced by pathogens.

The chief diseases are crown and stem rusts, powdery mildew, smuts, Septoria blight, Helminthosporium leaf blotch, BYDV, root rots and blast. Of the pests, frit fly (Oscinella frit) and cereal cyst nematodes are reported to be of greatest importance.

Following the comprehensive introductory paper of Simons, which described the incidence and possible control of a wide range of oat diseases, other papers dealt with specific topics which can be broadly grouped into (a) prevalence of rusts and mildew, mainly in Europe and America, virulence spectra and sources of resistance, (b) the nature of horizontal (slow rusting) resistance of oats to crown rust (c) the relationship between phytoalexin production and resistance to crown rust (d) transgressive segregation for enhanced levels of adult plant resistance to mildew (e) transmission of BYDV isolates by Rhopalosiphum insertum and (f) resistance/tolerance in oats to cereal cyst nematodes.

Most of the discussion was concerned with the following aspects:

1. Problems of virulence in crown and stem rusts, methods of analysis, and the effectiveness of rust resistant sources.
2. Use of partial resistance to mildew with major gene or systemic fungicide seed treatments.
3. The nature of horizontal resistance (slow rusting) to crown rust and the possibility of detecting mechanisms responsible for its expression.
4. Problems in detecting tolerance to disease.

Clifford pointed out that the UK Virulence Survey has shown that crown rust occurs very sporadically in the British Isles, seriously affecting crops only in South West England and South Wales in perhaps one year in ten. The data on changes of virulence patterns are consequently very limited. Rhamnus cathartica does not play any role in the production of new virulence combinations as it has been eradicated for almost half a century in Britain. Also the varieties grown in the UK probably did not play an important role in changes of crown rust virulence.

The problems of stem rust virulence on the European continent and the methods of analysis were given some attention. The basis for the annual surveys in oats was created through the establishment by Sebesta and Zwatz of the European Oat Disease Nursery (EODN), for the rusts in 1969, and for mildew in 1978. This nursery is now grown at 28 localities in 10 countries of the continent, namely, Austria, Czechoslovakia,
German Democratic Republic, Federal Republic of Germany, Greece, Hungary, Poland, Spain, USSR, Yugoslavia and the United Kingdom. The EODN sets consist of stem and crown rust differentials and powdery mildew sources of resistance. However, other oat diseases have been recorded when present and these, according to Sebesta, have chiefly been Septoria blight, Helminthosporium leaf blotch and Barley Yellow Dwarf Virus.

Virulence analysis of crown and stem rusts is carried out at the seedling stage. On the Pc- and Pq-lines sets, the rust isolates are differentiated into avirulence/virulence combinations using the formula method described by Green. The percentage of isolates from each country, which show virulence on each Pc- and Pq-line is taken as a criterion for breeding importance. Evaluation of severity is according to Cobb's scale for the rusts and the James' scale for mildew.

Virulence on the Pg-13 and Pg-16 resistances was found in one stem rust isolate from Poland in 1978.

The origin of the two major genes identified in PC 50-2 and PC 50-4 is not clear. It may be that both originate from A. sterilis L. CW 486-1, but the second gene could not be detected owing to virulence to it. Another possible explanation is that the second gene appeared in the PC 50 population through spontaneous hybridization.

Jones explained that in seasons when the incidence of mildew is relatively low, the higher levels of partial, adult plant resistance now becoming available can prove sufficient to protect oats with its comparatively low hectarage. However, to ensure protection at the earlier stages, necessary in high mildew years, major gene resistances are being incorporated in backgrounds with the durable type partial resistance. This would also avoid the 'vertifolia' effect that can occur when corresponding virulence becomes prevalent to the major gene resistance. Field experimentation has shown that another alternative is to use certain new systemic fungicide seed treatments, which protect the early growth stages until the adult plant resistance becomes effective. The latter reduces the need for further spray treatments, which add to input costs and the problems of pollution.

With reference to horizontal resistance (slow rusting) to crown rust, Luke reported that resistance in the variety Red Rustproof consists of morphological components, such as exclusion or resistance to penetration but also some physiological attributes. Both types could be combined to form very effective barriers to the pathogen.

The problem of recognising 'true' tolerance assayed on the basis of yield reduction under disease attack compared with disease free plots is a continuing one. The difficulty of distinguishing between losses due to tolerance and those resulting from some degree of resistance was pointed out, although Clifford referred to some earlier experiments which indicated that slow rusting and tolerance can be differentiated. Satisfactory identification, by Barr and Dube, of genotypes with both resistance and tolerance to cereal cyst nematode appears very encouraging provided their yield potential can be raised to acceptable levels.

Hypersensitive, major gene controlled resistance is still being extensively utilized as defence against disease, especially in the rusts. It would appear, however, that the trend is for more complex forms of resistance produced through combination of individual specific resistances or the latter combined with minor or modifying genes. These, as Rothman reported, are providing adequate protection for all the known North American oat stem rust races. With mildew there is a paucity of major