

Rainbow Shield Bug (*Calidea dregii*)

Wageningen 25 January 2010

Dear Colleagues

I want to alert you to the danger that the Rainbow Shield Bug (*Calidea dregii*) poses to the bio-fuel project in Guinea-Bissau. It is already damaging the *Jatropha* plants and information found in old publications going back to the 1930s indicate that it has the potential to cause much more damage both by reducing the harvest and the quality of the oil.

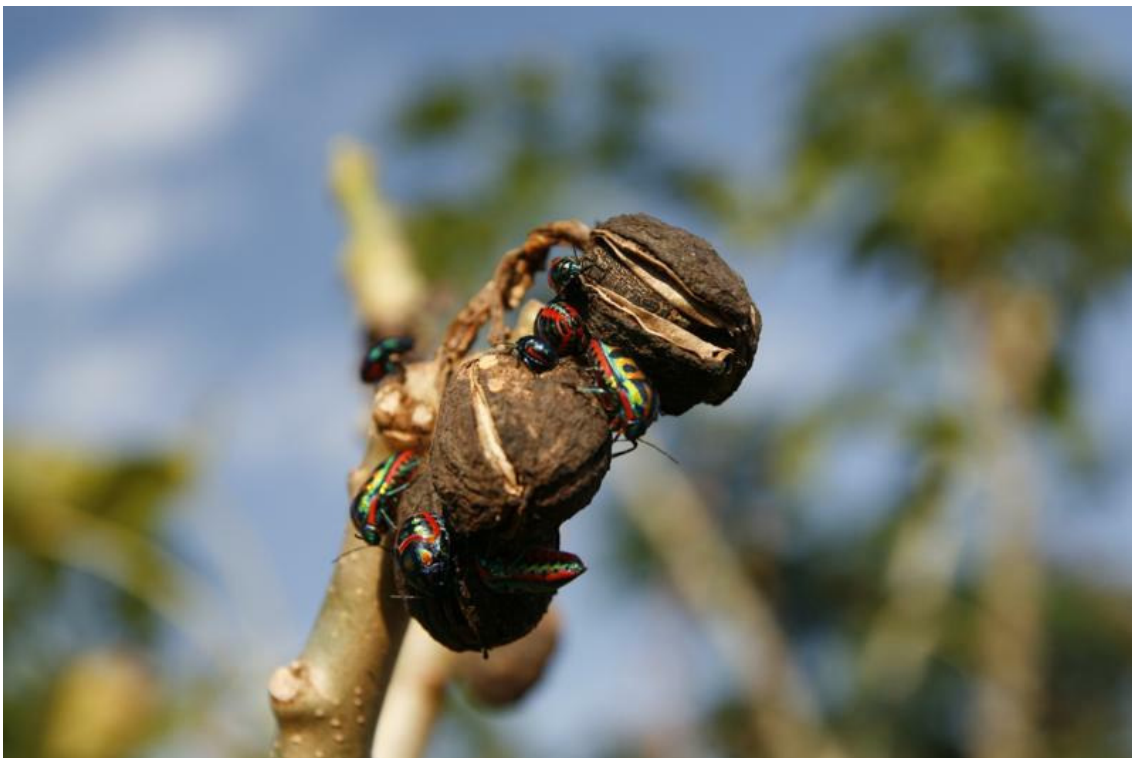


Illustration 1: Different instars (stages) of Rainbow Shield Bug (Calidea dregii)

The Rainbow Shield Bug suck the sap from developing seeds leading to seeds dropping prematurely or not developing fully. In cotton it leads to staining and therefore a lower price if the bolls do not drop prematurely. The low number of mature *Jatropha* seeds observed in Guinea-Bissau is likely caused by seed dropping due to damage from Rainbow Shield Bugs.

In Guinea-Bissau seeds that I sampled at two locations were found to weigh about 20% less than seeds from dry areas of Mozambique. One of the sites was a well manured hedge along a cattle path and the average seeds weight in the project area is therefore likely to be even smaller.

In Tanzania research in the 1940s found that Rainbow Shield Bug had a similar effect on sunflower, namely fewer and smaller seeds. It was also found that the infestation increased the free fatty acid (FFA) content of the sunflower oil. FFA are undesirable in oil used

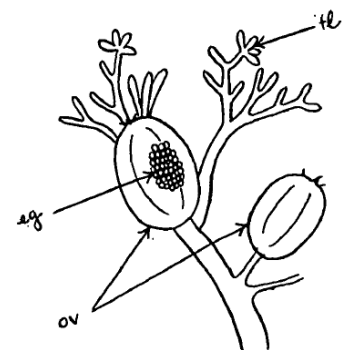


Illustration 2: Eggs of Calidea dregii on Jatropha podagrica. (T. Kaufmann 1966)

as fuel. No tests have yet been made of Jatropha oil yet but we will do so soon.

When I visited Guinea-Bissau in December the Rainbow Shield Bug (*Calidea dregii*) appeared in big numbers in all the Jatropha hedges I saw except in one well fertilized hedge.

There are number of different *Calidea* spp. and Africa South of Sahara and Arabia. The only species that I have observed on *Jatropha curcas* in Guinea-Bissau and Mozambique is be the Rainbow Shield Bug (*Calidea dregii*). In Mozambique it occurs in insignificant numbers whereas in Guinea-Bissau it is a major pest. It has been reported as a minor pest in Indian Jatropha.



Illustration 3: *Jatropha podagrica* was found to be the host plant for Rainbow Shield Bugs in Ghana. (Kaufmann1966; http://en.wikipedia.org/wiki/Jatropha_podagrica)

It is known to be difficult to kill with insecticide and it feeds and breeds on a wide variety of plants including poisonous ones like Jatropha and Castor. It has been reported on sorghum, maize, rice, okra, sunflower, Noog Abyssinia (*Guizotia abyssinica*), Star Burr *Acanthospermum hispidum*, *Jatropha podagrica*, *Jatropha curcas* and cotton. In the past cotton cultivation was abandoned in parts of Tanzania due to the Rainbow Shield Bug. There infestations can spread quickly and be devastating. In Ghana another study found the population of bugs to be more or less constant. It was, however, based on seven months of field work only.

The Rainbow Shield Bugs are highly mobile and fly around in the area to whatever food source is available. The high number of Rainbow Shield Bugs observed in Guinea-Bissau is probably due to a lack of alternative feed sources in the middle of the dry season. What will happen when big amounts of Jatropha and Castor are cultivated for bio-fuel? We do not want to increase the population of a bug that is causing trouble in important food crops.

Castor (*Ricinus communis*) is indigenous to North Africa and *Jatropha curcas* has survived with little attention in Guinea Bissau for probably a few centuries so some balance has occurred that prevents the complete eradication of Jatropha and Castor,

A study from Ghana (Kaufmann 1966) found that the population was mainly self controlled. Nymphs eat eggs, thus a higher density of nymphs reduces the number of eggs for the next generation. Natural enemies are not mentioned as a controlling factor.

In Tanzania early planting of Cotton reduced the infestations, probably because the boll formation stage then took place at a time when there were other food sources available for the Rainbow Shield Bug. This method cannot be used for perennials like Jatropha.

Pruning can delay or break dormancy and thus influence the flowering time of Jatropha. We currently know too little about this to make recommendations but simple field trials should be established to assess if this is feasible and what effect it has on infestation levels.

Pesticide made from Neem (*Azadirachta indica*) has been suggested in India but I am not aware of anybody actually having tried it.

Planting of trap crops that the bugs like more than *Jatropha curcas* is yet another option to look into. Please observe and tell me if you see plants that Rainbow Shield Bugs are particularly attracted to.

Kind regards
Flemming Nielsen

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